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# European taxonomy for public services

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## 1. INTRODUCTION

The Core Public Service Vocabulary-Application Profile (CPSV-AP)<sup>1</sup> was prepared in the context of the ISA<sup>2</sup> Action 2016.29 – Accessing member state information resources at European level – Catalogue of Services<sup>2</sup> of the European Commission’s Interoperability for European Public Administrations (ISA) programme<sup>3</sup>. The CPSV-AP has been seen as a common flexible layer for public administrations to create models for structuring their public service descriptions. The CPSV-AP defined some mandatory classes and properties to be used in any model compliant with it. This ensures the interoperability of all the compliant models for those core classes and properties. This core data model therefore facilitates the set-up of catalogues of services oriented to businesses and citizens.

For some of its properties, the CPSV-AP recommends the user to select a value from a controlled list or taxonomy. This approach has the advantage of ensuring the consistency of the semantics between administrations.

Even though the CPSV-AP pushes for the harmonisation between catalogues of public services in Europe, many administrations follow different taxonomies. This results for example in differences in the naming of public services: multiple administrations calling the same service differently. How can the end-user know that one service in one municipality is the same as another service named differently in another municipality? How can the national coordinator check easily that a certain law has been implemented in every public organisation? Answering to those questions leads to additional work for harmonising multiple catalogues, for instance by mapping the different terms. If this is feasible between few administrations as a snapshot, it can quickly become a considerable work with hundreds of different municipalities continuously updating their catalogue of services. While each catalogue of services contains specific services offered to citizens, business and other organisations, there are also many generic public services common at national or international level.

For a specific domain, reaching a consensus about an exhaustive list of terms with a consistent structure and precise descriptions is a prerequisite for ensuring in the long term a common understanding of the information exchanged among different partners. Taxonomies and other types of controlled vocabularies are the preferred means to achieve such a common understanding by specifying the terms of the domain, disambiguating them from each other, controlling synonyms, and structuring the domain via term relationships.

**In the case of public services, a commonly agreed taxonomy of generic public services would help public administrations to harmonise their catalogues of services.** It will allow for an easier comparison of the public services

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<sup>1</sup> <https://joinup.ec.europa.eu/solution/core-public-service-vocabulary-application-profile/about>

<sup>2</sup> European Commission. Interoperability for European Public Administrations (ISA). Accessing member state information resources at European level. [http://ec.europa.eu/isa/actions/01-trusted-information-exchange/1-3action\\_en.htm](http://ec.europa.eu/isa/actions/01-trusted-information-exchange/1-3action_en.htm)

<sup>3</sup> European Commission. Interoperability for European Public Administrations (ISA). [http://ec.europa.eu/isa/index\\_en.htm](http://ec.europa.eu/isa/index_en.htm)

between member states and it makes it easier to find public services.<sup>4</sup> In the context of the Single Digital Gateway Regulation<sup>5</sup>, all public administrations in the European Union have to exchange information about certain services at the European level. A common denomination between the services proposed would be a first step towards clear understanding of the services for the users.

This work builds further on the initial steps taken during the previous phase of the Catalogue of Services action. In particular, we reuse a previously constructed mapping of multiple lists of public services to a generic list of public services.

### **1.1. Scope and objectives**

The objective of this activity is to reach a consensus with the Working Group on a first level taxonomy of public services. This taxonomy represents an initial step in categorising generic public services. Furthermore, this activity links the taxonomy of public services built to the CPSV-AP and the Single Digital Gateway.

There are many types of taxonomies in literature, including<sup>6</sup>;

- a flat structure such as simple controlled vocabularies;
- rings such as synonyms or authority control applications;
- hierarchies such as classification schemes;
- faceted structures such as metadata; and
- a network or complex taxonomies such as thesauri or semantic networks.

The most common use of the word 'taxonomy' is as a hierarchical classification scheme. This document will scope it this way.

#### What is a taxonomy?

A taxonomy is a knowledge organisation system that aims to increase semantic interoperability by organising information. It is a system for storing and organising terms that represent (public) organisation's critical concepts, such as service groups, content types, roles and personas, and knowledge topics. Public administration taxonomies consists of term names and labels that are specific to public service information. Within the taxonomy for public services, these term names are managed using hierarchical relationships: levels and sublevels.

Taxonomies achieve semantic operability through;

- describing all relevant terms within the domain of the information exchange;
- completely eliminating ambiguity;
- controlling all synonyms within the domain; and
- establishing appropriate relationships between terms.

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<sup>4</sup> [https://ec.europa.eu/isa2/sites/isa/files/final-report-phase-1-current-state-of-affairs\\_en.pdf](https://ec.europa.eu/isa2/sites/isa/files/final-report-phase-1-current-state-of-affairs_en.pdf)

<sup>5</sup> [https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L\\_.2018.295.01.0001.01.ENG&toc=OJ:L:2018:295:TOC](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2018.295.01.0001.01.ENG&toc=OJ:L:2018:295:TOC)

<sup>6</sup> <https://onlinelibrary.wiley.com/doi/full/10.1002/bult.2014.1720400410>



Taxonomies are important building blocks to create more advanced KOS<sup>7</sup> like ontologies.

As there are some very similar classification methods (e.g. ontology, controlled vocabularies ...), Annex I provides an overview of some closely related classification schemes and their (subtle) differences.

## **1.2. Structure of this document**

This document consists of the following sections:

- Section 2 sketches the context of taxonomy technology, needs and benefits;
- Section 3 provides some basic perspectives and a foundation to build a taxonomy on;
- Section 4 describes the methodology that was followed to create the taxonomy;
- Section 5 describes the European taxonomy for public services, including the governance; and
- Finally, in section 6, the potential next steps are described to this initial activity.

Concerning the annexes:

- Annex I contains a shortlist of classification schemes;
- Annex II and Annex III describe the business and life events;
- Annex IV describes the list of output types;
- Annex V contains the Single Digital Gateway Regulation Annex I;
- Annex VI contains a list of used resources;
- Annex VII provides the lists of analysed public services.

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<sup>7</sup> Knowledge Organisation Systems

## 2. WHY BUILDING A TAXONOMY OF PUBLIC SERVICES?

This chapter explains what the benefits and needs are for building a taxonomy, how this solution fits in a broader field of different technologies and how it fits in the current initiatives around the world, and more specifically in the EU.<sup>8</sup>

### 2.1. Costs and benefits for building a taxonomy of public services

Many IT and data solutions can look promising for solving a single problem. However, besides giving a solution to a defined problem, the different alternatives should ideally be balanced before selecting the best solution. Criteria such as development cost, vendor neutrality or maintenance cost should be assessed and confronted to the benefits. This section provides a short analysis on the benefits and costs for building a taxonomy.

#### 2.1.1. Benefits

Taxonomies address content accessibility, reuse, and findability issues head-on. It has two primary roles:

- One role is to give public service concepts structure and organisation.
- The other role is to be an authoritative source that provides content assets to content management systems, and content-driven applications and websites.

This document identifies four main benefits for building taxonomies in general, including some examples.

#### 1) Resolve differences between terminologies

Many public administrations have problems with terminology and vocabulary; they inherit different vocabularies through legacy systems for example. A taxonomy's core function is to resolve terminologies and vocabularies differences, leading to improved information consistency, better analytics, and smarter public administration processes.

#### Example with the taxonomy of public services in the Netherlands<sup>9</sup>

The Uniform Product name List (UPL) in the Netherlands is the standard taxonomy of generic public services. There are 380 municipalities in the Netherlands. This means potentially 380 variants of the exact same service. Information about a service often needs to be offered at both local and national level, making it very complex without naming convention. The Dutch virtual catalogue contains more than 60.000 services. By applying generic service labels from the UPL, the responsible organization was able to bring this number down to 1.000 different services for exchanging information. Creating the UPL was the result of a national exercise to reach an exhaustive list of generic services.

#### 2) Optimise the structure of your system interface

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<sup>8</sup> <http://www.kmworld.com/Articles/Editorial/What-Is/What-is-a-Taxonomy-81159.aspx>

<sup>9</sup> Catalogue of Services webinar, 10/09/2018, available from <https://joinup.ec.europa.eu/collection/semantic-interoperability-community-semic/event/catalogue-services-webinar-10-september-2018-1030-1230-cet>

Managing concept and term relationships improves the general findability of information in your system interface. Search results are more relevant and accurate when search engines ingest taxonomy terms, and when users can select taxonomic terms to fine-tune their queries. The broad-to-narrow organization of terms drives both navigation and search in websites and intranets (e.g. SharePoint), enterprise content management (ECM) systems, digital asset management (DAM) systems, applications and mobile apps, and so on. A taxonomy relates documents and digital assets to these findability architectures as well, resulting in a consistent user experience across all platforms.

### Example with the Finnish public service web portal<sup>10</sup>

Figure 1 shows how agreeing on an exhaustive taxonomy with multiple levels can help structure information efficiently in a web interface. One step further, once integrated with a core vocabulary, taxonomies can be combined to obtain different perspectives. For example in the case of Finland, Figure 1 shows two perspectives combined: the end-user (e.g. information and services for citizens) and general themes for public services (e.g. social security).



**Figure 1: Structure of the information and services for citizens on the Finnish web portal.**

### 3) Populate metadata field values

Tagging documents or digital assets incorrectly is a common problem that affects findability and retrieval. Tagging accuracy is improved when restricted terms (i.e. controlled vocabularies) are stored in a taxonomy. If the decision is made to change an element in the taxonomy—renaming Health Care to Life Science, for example—the change only needs to be made in the taxonomy and not to each of the content systems.

This enables public administrations to be prepared for change, reducing time to deliver a (new) public service. Implementing taxonomies can also lead to reduced

<sup>10</sup> <https://www.suomi.fi/citizen>

costs and increasing speed and precision for delivering services or information, developing products, and conducting operations.

#### 4) Improve the online public service user experience by helping users locate desired content objects

Websites and mobile apps could use taxonomies to present information in useful ways and to further improve the user experience. Taxonomies empower users to explore services by providing clear choices for browsing and accurate results for search.

Chatbots and voice interfaces work with unstructured data (i.e. mostly text). However, structuring the text in accordance with a certain logic, such as faceted logic and conceptual relationships, can help train them and specialize them to certain services. Some of those logic elements are precisely the ingredients of a mature taxonomy. Taxonomies allow for the automation of targeted content delivery, analytics reports, and problem recognition, knowledge logistics, and intelligent operational support.

##### Example with a chatbot

The taxonomies are the bridge between the user query and the public service description. Figure 2 shows elements in a user query being matched to different potential taxonomies within CPSV-AP. This is matched to the relevant public service description, in the example showed in Figure 3; the matched Flemish public service is shown with the matching elements highlighted.

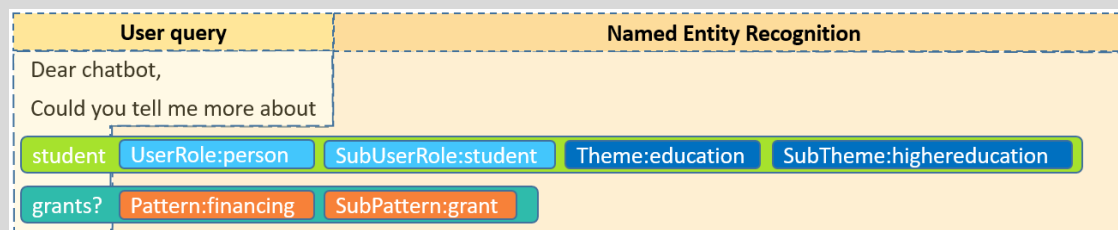


Figure 2: Example of Named Entity Recognition.<sup>11</sup>

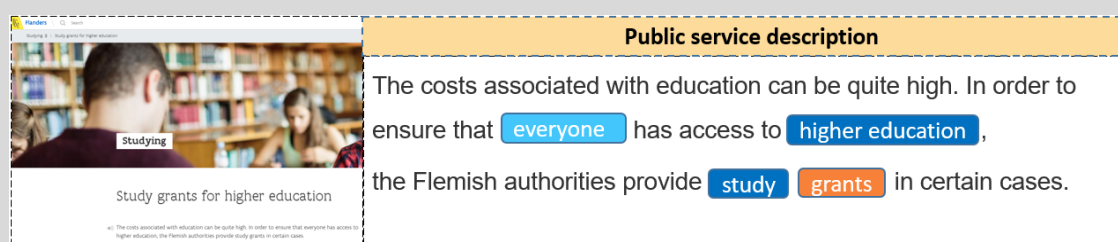


Figure 3: Flemish matching public service description.

### 2.1.2. Costs

#### 1) Time consumption

<sup>11</sup> More info: see Architecture for public administration chatbots [report](#) (limited access).

The construction of a taxonomy is a time-consuming, labour-intensive process, especially if the domain to be covered is broad and the terminology used is rich and complex.<sup>12</sup> Large classifications are sometimes the result of decades of work.

## 2) Development

Hierarchical taxonomies require a lot of consultation, investigation, research and testing to design well. They require careful planning to implement as a navigation and browse structure or as embedded sources for search. There are many different ways to apply hierarchies to “things” – sometimes as encoded metadata and sometimes as values in indexes; sometimes generated by human classifiers and other times by automated classifiers. Managing dynamic classification schemes can also add non-trivial update, management and maintenance costs.<sup>13</sup>

### Example of similar, but different taxonomies

Table 1 contains four different taxonomies on themes. Yet, they were all built for a different purpose and they do differ from one another, illustrating the challenge of developing the one ‘perfect’ taxonomy.

**Table 1: Taxonomy examples.**

Taxonomy	Link
NACE	<a href="http://ec.europa.eu/competition/mergers/cases/index/nace_all.html">http://ec.europa.eu/competition/mergers/cases/index/nace_all.html</a>
World Bank	<a href="http://pubdocs.worldbank.org/en/538321490128452070/Sector-Taxonomy-and-definitions.pdf">http://pubdocs.worldbank.org/en/538321490128452070/Sector-Taxonomy-and-definitions.pdf</a>
COFOG <sup>14</sup> (OECD)	<a href="https://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Classification_of_the_functions_of_government_(COFOG)">https://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Classification_of_the_functions_of_government_(COFOG)</a>
DCAT-AP (ISA <sup>2</sup> )	<a href="https://publications.europa.eu/en/web/eu-vocabularies/at-concept-scheme/-/resource/authority/data-theme/?target=Browse">https://publications.europa.eu/en/web/eu-vocabularies/at-concept-scheme/-/resource/authority/data-theme/?target=Browse</a>
Spain’s theme taxonomy	<a href="https://www.w3.org/community/opendataspain/2013/03/04/simple-classification-scheme-public-sector/">https://www.w3.org/community/opendataspain/2013/03/04/simple-classification-scheme-public-sector/</a>

## 3) Adoption

One challenge of implementing taxonomies is to make them adopted by various actors. This means reaching out to relevant actions, bringing them together and holding meetings, which consumes many resources. In this case, a specific cost in creating a taxonomy for public services, is the high difficulty of creating a taxonomy that could be used by all 28 member states. An efficient governance system should be implemented to tackle this issue.<sup>15</sup>

### Example of the differences between different public administrations’ terminologies

<sup>12</sup> Guidelines for the Construction, Format, and Management of Monolingual Controlled Vocabularies. National Information Standards Organisation. 2005.

<sup>13</sup> <https://onlinelibrary.wiley.com/doi/full/10.1002/bult.2014.1720400410>

<sup>14</sup> Classification of the Functions of Government

<sup>15</sup> See section 9.5

Figure 4 and Figure 5 show that there exist significant differences in categorising public services on public administration portals. Providing one agreed European taxonomy for public services will be challenging: if one taxonomy is built on top of all European portals, there will be a need to convince the member states and regions to align.

<p><b>Benefits and grants</b></p> <p>Includes information on benefits, funds and grants, including Child Benefit and tax credits.</p>	<p><b>Births, deaths and family</b></p> <p>Parenting, marriages, divorce and separation.</p>	<p><b>Business</b></p> <p>Tools and guidance on getting started, finance, premises and employing people.</p>
<p><b>Driving, transport and travel</b></p> <p>Find out about parking, public transport and road safety.</p>	<p><b>Education and training</b></p> <p>School, college, university, apprenticeships and student funding.</p>	<p><b>Environment, farming and marine</b></p> <p>Guidance on recycling, flooding, farming, fishing and conservation, including advice for businesses.</p>
<p><b>EU Exit (Brexit)</b></p> <p>Information on the UK's possible exit from the European Union (Brexit) and how it may affect people and businesses in Scotland.</p>	<p><b>Health, social care and wellbeing</b></p> <p>Includes information on care services, costs and help for carers.</p>	<p><b>Housing and local services</b></p> <p>Find out about owning and renting a property, council services and emergency planning.</p>
<p><b>Justice and the law</b></p> <p>Legal processes, courts, the police and victim support.</p>	<p><b>Living in and visiting Scotland</b></p> <p>Voting, charities, tourism and life in Scotland.</p>	<p><b>Money and tax</b></p> <p>Includes guidance on Income Tax, Self Assessment, National Insurance and debt.</p>
<p><b>Passports, travel and living abroad</b></p> <p>Advice for renewing and applying for passports and travelling abroad.</p>	<p><b>Working, jobs and careers</b></p> <p>Finding a job, holidays, pay and disclosure checks.</p>	

**Figure 4: Scottish government portal, toplevels and sublevels.<sup>16</sup>**

<p>&gt; <b>Care and family</b></p> <p>Flanders can boast many high-quality hospitals, administering the best of cares.</p>	<p>&gt; <b>Enterprise and investment</b></p> <p>Wondering about the investment opportunities in Flanders?</p>	<p>&gt; <b>Leisure</b></p> <p>The Flemish Authorities intend to open up sports to as wide a public as possible</p>
<p>&gt; <b>Mobility</b></p> <p>You must have a valid driving licence for driving a motor vehicle in Flanders.</p>	<p>&gt; <b>Moving and Housing</b></p> <p>Moving to Flanders, Renovation grant, Civic integration</p>	<p>&gt; <b>Studying</b></p> <p>If you plan on studying in Flanders, there is a vast range of schools and universities to choose from.</p>
<p>&gt; <b>Tourism</b></p> <p>Flanders. State of the arts.</p>	<p>&gt; <b>Working</b></p> <p>Looking for a job in Flanders?</p>	<p>&gt; <b>Discover Flanders</b></p> <p>Flanders is the northern federated state of Belgium with Brussels as its capital.</p>

**Figure 5: Flanders government portal, toplevels and sublevels or descriptions.<sup>17</sup>**

### 2.1.3. Overview

A developed taxonomy is a valuable authoritative source for public administrations. It will improve content organisation, accessibility, reuse, and findability. Taxonomy-driven improvements lead to reduced costs for delivering services, developing

<sup>16</sup> <https://www.mygov.scot/>

<sup>17</sup> <https://www.vlaanderen.be/en>

products, and conducting operations. If the complexity of a European taxonomy is overcome in a cost-efficient way, it is definitely recommended to develop this taxonomy.

## **2.2. CPSV-AP**

A taxonomy as a hierarchical classification scheme is a building block for more advanced data models. The Core Public Service Vocabulary Application Profile is a data model that has been developed in collaboration with a Working Group for

describing public services.<sup>18</sup> The CPSV-AP does already make use of some controlled vocabularies, as shown in Table 2.

**Table 2: Overview of CPSV-AP controlled vocabularies.**

Class	Property	Controlled vocabulary
Business Event	Type <sup>19</sup>	See Annex III
Life Event	Type <sup>20</sup>	See Annex I

<sup>18</sup> <https://joinup.ec.europa.eu/solution/core-public-service-vocabulary-application-profile/about#what>

<sup>19</sup> The 2<sup>nd</sup> level business events might apply for different 1<sup>st</sup> level business events, leading to a many-to-many mapping between 1<sup>st</sup> and 2<sup>nd</sup> level business events. A description for each 2<sup>nd</sup> level business event has been included in "Description of 2<sup>nd</sup> level business events".

**ANNEX I. <sup>20</sup>THE LIST CURRENTLY ONLY INCLUDES A 1<sup>ST</sup> LEVEL FOR LIFE EVENTS A DESCRIPTION FOR EACH 1<sup>ST</sup> LEVEL LIFE EVENTS HAS BEEN INCLUDED IN "CLASSIFICATION SCHEMES**

**Table 11: Shortlist of similar classification schemes.**

Classification scheme	Explanation
Controlled vocabulary	A controlled vocabulary is an authoritative list of terms to be used in indexing. Controlled vocabularies do not necessarily have any structure or relationship between terms within the list.
Taxonomy	A taxonomy is a (controlled) vocabulary with a hierarchical structure.
Thesaurus	A thesaurus is a controlled vocabulary, which follows a standard structure, where all terms have relationships to each other. There are typically three kinds of relationships: hierarchical, associative and equivalent.
Ontology	An ontology is a taxonomy with different relationships between terms (more than three kinds).
Vocabulary	In the Semantic Web, vocabularies define the concepts and relationships (also referred to as "terms") used to describe and represent an area of concern. There is no clear division between what is referred to as "vocabularies" and "ontologies", but the trend is to use the word 'ontology' for more complex and formal classifications.
Application Profile	An application profile is an ontology within a specific context, e.g. CPSV-AP. It specifies the cardinality and the data types while specifying mandatory, recommended and optional elements to be used for a particular application, as well as recommendations for controlled vocabularies to be used.
Core Vocabulary	A Core Vocabulary is a simplified, reusable and extensible data model that captures the fundamental characteristics of an entity in a context-neutral fashion. Core Vocabularies are the starting



Public Service	Type	TBC <sup>21</sup>
	Thematic Area	TBC
	Language	European Publications Office's Languages Named Authority List (NAL) <sup>22</sup>
	Sector	List of NACE codes <sup>23</sup>
	Spatial	MDR Continents Named Authority List <sup>24</sup> , MDR Countries Named Authority List <sup>25</sup> , MDR Places Named Authority List <sup>26</sup> , Geonames <sup>27</sup>
	Status	ADMS Status vocabulary <sup>28</sup>
Participation	Role	TBC
Criterion Requirement	Type	TBC
Evidence	Type	TBC
	Language	European Publications Office's Languages Named Authority List (NAL) <sup>29</sup>
Output	Type	See Annex IV
Cost	Currency	European Publications Office's Currencies Named Authority List (NAL) <sup>30</sup>
Channel	Type	{E-mail, Homepage, Fax, Assistant, Telephone, Mobile App, Digital TV, Mail, Service Bureau, Client's Location}

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	point for agreeing on new semantic interoperability assets and defining mappings between existing assets to guarantee a level of cross-domain and cross-border interoperability that can be attained by public administrations.
Data model	A data model is an abstract model that organises elements of data and standardizes how they relate to one another (and to other entities). All classification schemes in this table, except controlled vocabularies, are a kind of data model.

Description of 1st level life events”.

<sup>21</sup> To be continued.

<sup>22</sup> <http://publications.europa.eu/mdr/authority/language/index.html>

<sup>23</sup> [http://ec.europa.eu/competition/mergers/cases/index/nace\\_all.html](http://ec.europa.eu/competition/mergers/cases/index/nace_all.html)

<sup>24</sup> <http://publications.europa.eu/mdr/authority/continent/index.html>

<sup>25</sup> <http://publications.europa.eu/mdr/authority/country/>

<sup>26</sup> <http://publications.europa.eu/mdr/authority/place/index.html>

<sup>27</sup> <http://sws.geonames.org/>

<sup>28</sup> <http://purl.org/adms/status/>

<sup>29</sup> <http://publications.europa.eu/mdr/authority/language/index.html>

<sup>30</sup> <http://publications.europa.eu/mdr/authority/currency/index.html>

Rule	Language	European Publications Office's Languages Named Authority List (NAL) <sup>31</sup>
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The CPSV-AP is a data model built to represent the core classes and properties for describing public services. The model is therefore light weighted and flexible to the specific needs of the different public administrations. From this perspective, a taxonomy listing and categorising all existing public services in details was not perceived as supporting this flexibility. However, a taxonomy harmonising the names of common public services, as described in the previous section 2.1.1, would improve the interoperability of public service descriptions.

To achieve such benefits, a possibility would be to combine various perspectives from the CPSV-AP in order to build a taxonomy of public services. Based on discussions with public administration experts from the working group<sup>32</sup>, the following perspectives were identified as the most valuable for classifying public services:

- Life and business events;
- Themes (mentioned in Table 2 as Public Service Thematic Area);
- Patterns (mentioned in Table 2 as Public Service Type); and
- Beneficiaries.

Finally, chatbot technology is leveraged as well by the use of taxonomies. Chatbots could make use of these controlled vocabularies, which would increase accuracy and thus findability.

### 2.3. Single Digital Gateway

Public administrations use different terminologies for describing their public services, affecting the ability to share data within and across countries. Every organisation is an independent creator of information, resulting in too many sets of inconsistent organising principles and categorisation structures.

The Single Digital Gateway is a European regulation to “provide information, procedures, assistance and problem solving services”<sup>33</sup> in a digital manner for public services in Europe. It is part of the Digital Single Market Strategy<sup>34</sup>, which is built on three pillars:

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<sup>31</sup> <http://publications.europa.eu/mdr/authority/language/index.html>

<sup>32</sup> Webinar 1: <https://joinup.ec.europa.eu/collection/semantic-interoperability-community-semic/event/catalogue-services-webinar-6-february-2019>

Webinar 2: <https://joinup.ec.europa.eu/collection/semantic-interoperability-community-semic/event/catalogue-services-webinar-10-april-2019-930-1130-cet>

Workshop: <https://joinup.ec.europa.eu/collection/semantic-interoperability-community-semic/event/technical-workshop-catalogue-public-services-vis-vis-sdg-implementation-16-may-2019-930-1730-cet>

<sup>33</sup> [https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L\\_.2018.295.01.0001.01.ENG&toc=OJ:L:2018:295:TOC](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2018.295.01.0001.01.ENG&toc=OJ:L:2018:295:TOC)

<sup>34</sup> <https://ec.europa.eu/digital-single-market/en/policies/shaping-digital-single-market>

- Access: better access for consumers and businesses to digital goods and services across Europe;
- Environment: creating the right conditions and a level playing field for digital networks and innovative services to flourish;
- Economy & Society: maximising the growth potential of the digital economy.

The Single Digital Gateway Regulation fits into this strategy as it “pursues a threefold [objective][...]”:

- reducing additional administrative burden on citizens and businesses that exercise or want to exercise their internal market rights, including the free movement of citizens, in full compliance with national rules and procedures;
- eliminating discrimination; and
- ensuring the functioning of the internal market with regard to provision of information, procedures and assistance, and problem solving services<sup>35</sup>.

The current regulation focuses on a subset of services to be proposed fully digitally at the European level. Each member state has to map its own catalogue of public services to the list of 21 procedures proposed in Annex II of the European regulation.

Your Europe, the EU citizens and businesses portal, has a search function which will give access to:

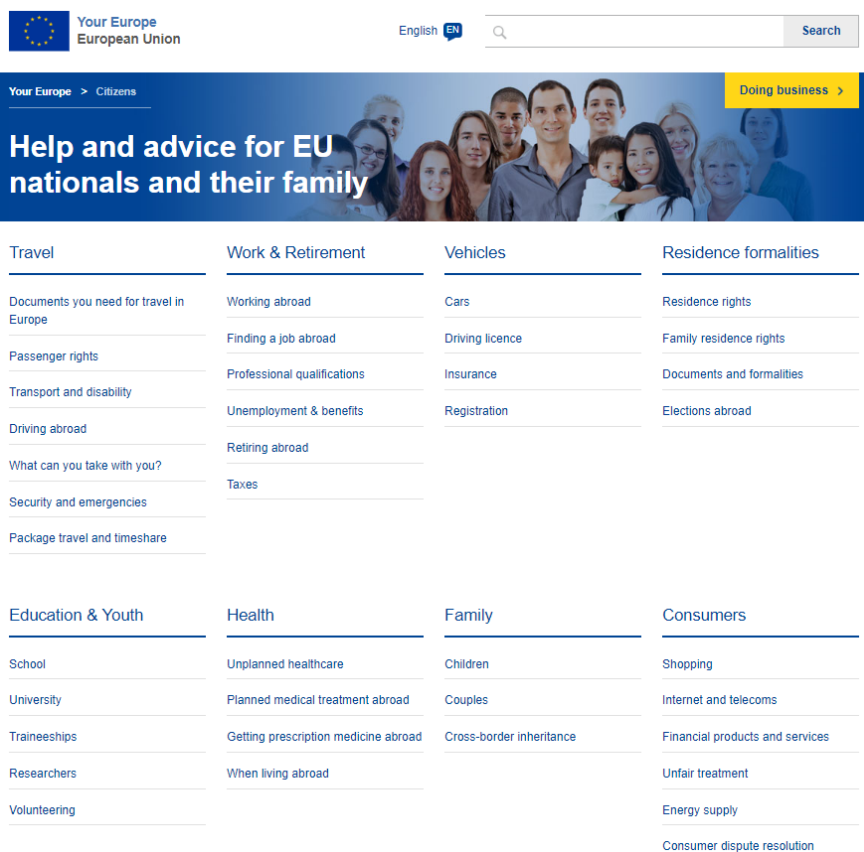
- Information: Citizens and businesses will be able to easily find reliable, qualitative information on EU and national rules that apply to them when they want to exercise their Single Market rights.
- Procedures: Citizens and businesses will find out exactly how to carry out administrative procedures and what steps they need to follow. The EU member states will have to provide the 21 procedures<sup>36</sup> digitally by 2023.
- Assistance services: If users are still confused about which rules apply or have trouble with a procedure, they will be guided to the EU or national assistance service most suited to address their problem.

Figure 6 shows the current ‘Your Europe’ portal for citizens. Now, it contains information on cross border public services. The portal provides a clear overview of themes for the citizen to choose from. The themes used on the portal were developed from different sorts of user testing (e.g. by card sorting, which means that users organise topics into categories that make sense to them). As part of the categorisation, examples of categorisation were used from the national portals. The portal themes and sub-themes were thus backed by user data, and verified in user testing scenarios. This approach was manual. As the future European entry point for more and more services, adopting a solution and approach that would enable Your Europe to take benefits from the quantity of data collected, seems necessary. Applying analytics to easily identify the most used themes and sub-themes could be one of the concrete use cases.

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<sup>35</sup> [https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L\\_.2018.295.01.0001.01.ENG&toc=OJ:L:2018:295:TOC](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2018.295.01.0001.01.ENG&toc=OJ:L:2018:295:TOC)

<sup>36</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32018R1724>



**Figure 6: Your Europe, citizens' view.<sup>37</sup>**

On top of that, as more information will be included on this portal in the future, for example when the 21 procedures will be introduced, manual labor will increase drastically to structure and maintain information. The risks are important:

- Delays or inconsistencies between national and Your Europe portals for describing services and maintaining its descriptions every time there is a change at national or sub-national levels;
- Difficulties to link the descriptions of public services collected from member states and the usage data collected on the portal; and
- Lack of a clear overview to structure services in the long-term.

Proposing a taxonomy of public services in combination with a richer data model for describing the services could avoid such risks. Firstly, **the main objective of the combination of a data model and taxonomies should be to automate the publication and maintenance of public service descriptions on Your Europe.** Secondly, by structuring the descriptions of public services in a harmonized way as from the beginning, Your Europe would more easily run data analytics. Thirdly, preparing a hierarchical taxonomy of public services would help structure services stably in the long run.

Finally, not only the provision of information and public services by public administrations is being modernised around the world, but the provision of information by citizens and businesses is also changing. The European initiative 'the Once-Only Principle (OOP)<sup>38</sup>, which aims to have citizens and businesses supply

<sup>37</sup> [https://europa.eu/youreurope/citizens/index\\_en.htm?](https://europa.eu/youreurope/citizens/index_en.htm?)

<sup>38</sup> <http://toop.eu/once-only>

diverse data only once to a public administration, is one of these modernisations. As the OOP creates a need to share data (information) between multiple member states, a need for taxonomies is again created.

More generally, implementing taxonomy technology on a member state and European level would support all three pillars from the Digital Single Market Strategy:

- As services are described using different controlled vocabularies (themes, patterns, life events, beneficiaries etc.), users would be able to use those vocabularies as tags to find the services from different perspectives. A single taxonomy of public services at the European level would keep those multiple perspectives consistent, always making sure that the right service is shown;
- Taxonomies create an environment that enables smoother data exchange, not only for public administrations but for the private sector as well, as they could make use of the same taxonomies;
- Taxonomy technology will have positive effects on the economy as a whole by saving citizen's and businesses' time in search and making it easier to link services (using CPSV-AP, enriched with taxonomies).

Section 2 described why it is important to create taxonomies for public services. This is relevant for all entities, which are part of the SDG Regulation (information, procedures and assistance services), but it is especially relevant because all three entities need a standardised playing field for the 28 member states. **A common data model (e.g. CPSV-AP) and the connected taxonomies do not only add value in this case, they are absolutely necessary to make the SDG a success.**

#### **2.4. Analysis**

Developing a high-quality taxonomy for public services on a European level is a cost, and a recurrent cost at that, as it would need to be maintained. **The benefits do outweigh the costs though in this case, as a high-quality European taxonomy of public services is a crucial building block to standardise the description of public services and make them easily findable.** This technology strengthens the CPSV-AP, the Single Digital Gateway and chatbot technology.

### 3. WHAT TAXONOMY TO BUILD FOR THIS PURPOSE?

To build a taxonomy of public services answering the needs and benefits described in the previous chapter, the entity providing public services should be kept in mind. Public administrations already categorise public services on their portals to ensure an efficient provision of public services. Here, on the public administration portals, the most visible public service taxonomies for users can be found. When looking at the two examples, provided in section 2.1.2 (Scottish and Flemish government portal), it immediately becomes clear that the taxonomies used on public administration portals use different terms. Figure 7 shows another example of the ESD list.

This difference in categorisation might not be a bad thing though, for instance when the taxonomy is based on analytics (meaning the menu options are ranked on usage): differences will exist between countries and regions. However, for exchanging information, the use of different categorisations makes it extremely complex and thus expensive.

**A solution should be made to not only retain a public administration's independence to categorise public services in their preferred way, but also to include harmonised taxonomies for easily exchanging and referring to data.** This means creating a back-end solution, which is different from the front-office solution. Then, public administrations could link the back-office and front office.

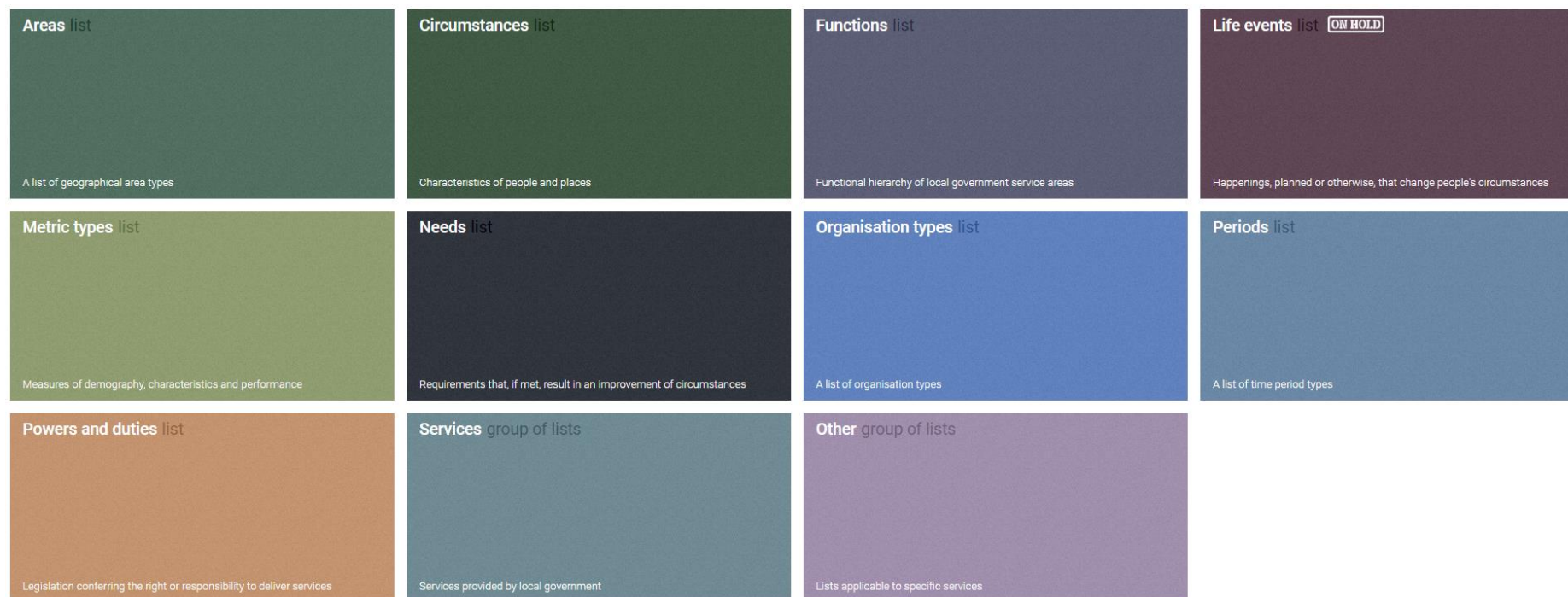
For example, Scotland uses the theme 'Health, social care and wellbeing', while Flanders uses the theme 'Care and family' when categorising public services according to 'themes' (front-office). On a European level, this theme could be called 'Health Care' (back-office). Public administrations in member states and regions of member states could link their identified themes to the European ones to harmonise their data. In Section 4 on the followed methodology, a more extensive analysis of different public service taxonomies around the world is provided (themes and patterns).

Taxonomies that are more extensive were developed to tackle similar issues. For instance, a taxonomy on eGovernment services was developed by the Open Government Study as can be seen in Figure 8.

This taxonomy provides many different perspectives but does make it too complex for the purpose of the European taxonomy for public services. **In this document, the choice is made to take two perspectives into account, namely the user and the public administration.** At first, this chapter describes the user perspective on public services. This is important, as users (citizens and businesses) are the end-customers of the public services. They need to go through the whole public service process, starting with accessing the catalogue of services, for example on public administration's websites. In the second part, this chapter takes the public administration perspective.

#### 3.1. User perspective

Figure 9 shows a citizens' view of a public service. These are all (existing) taxonomies or controlled vocabularies that should be implemented in the CPSV-AP model as to increase findability of public services.



**Figure 7: Different public administration perspectives for local public services.<sup>39</sup>**

<sup>39</sup> <https://standards.esd.org.uk/?>

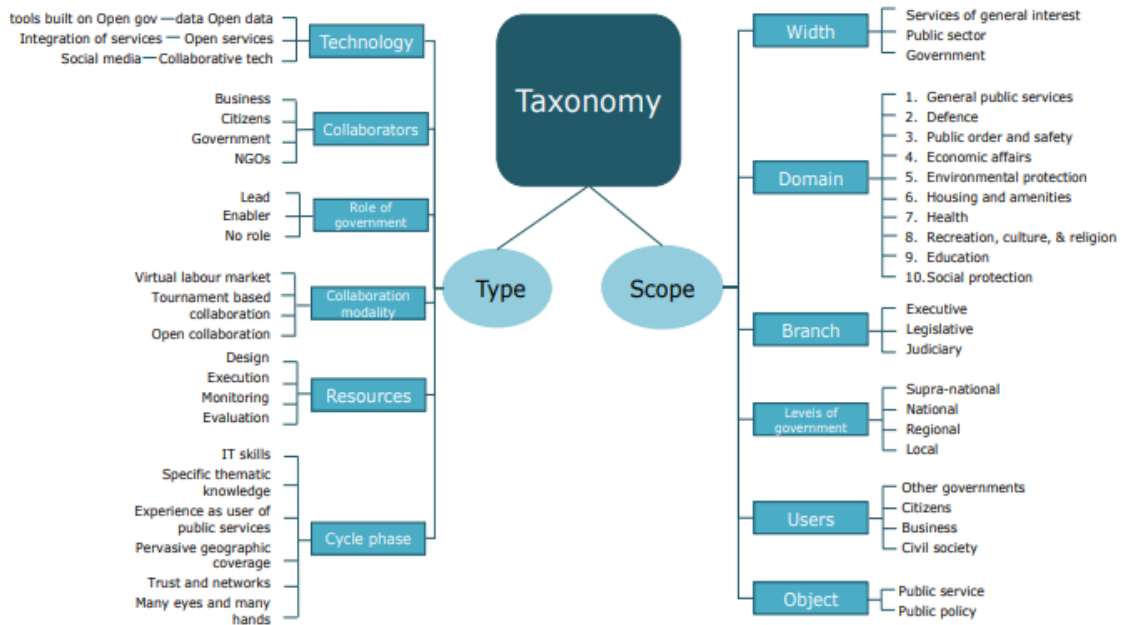


Figure 8: Taxonomy created as part of the Open Government Study.<sup>40</sup>

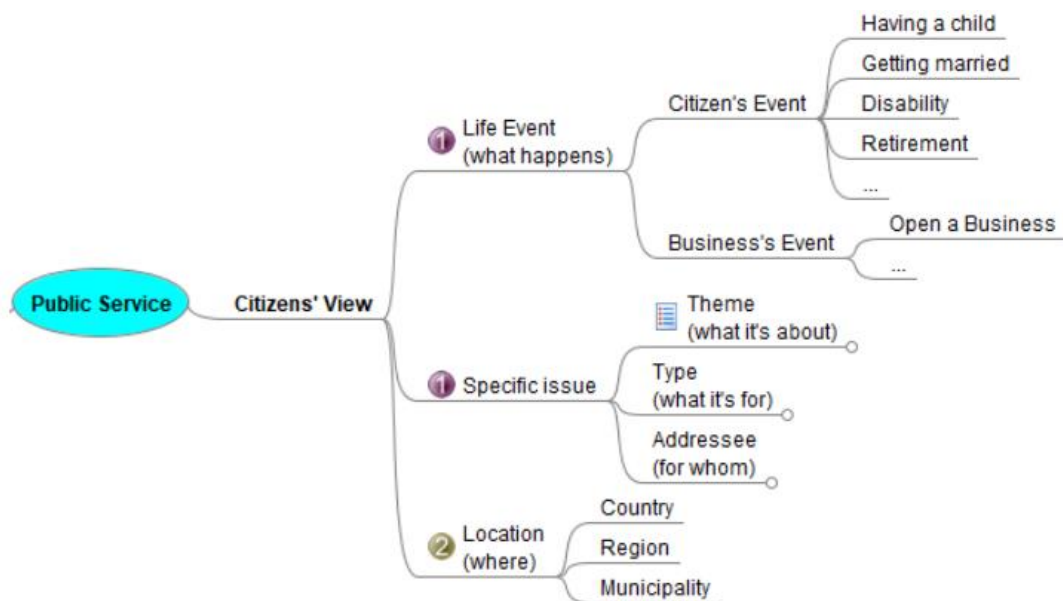


Figure 9: Public services as seen from a citizens' perspective<sup>41</sup>

In section 2.2, four different perspectives were identified from the list of controlled vocabularies used in CPSV-AP as key for building a taxonomy of public services:

- Life events;
- Themes or Thematic Area;

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[https://ec.europa.eu/futurium/en/system/files/ged/final\\_report\\_ogs\\_web\\_v3.0\\_0.pdf](https://ec.europa.eu/futurium/en/system/files/ged/final_report_ogs_web_v3.0_0.pdf)

41 <https://github.com/catalogue-of-services-isa/Taxonomy/issues/2>



- Patterns or Public Service Type; and
- Beneficiaries/Addressee.

All those perspectives can be easily mapped one-to-one with the ones from Figure 9. The only missing perspective is the location. However, as the objective of the taxonomy is to categorise services common in Europe, the location is perceived as a key information for describing public services, but not for creating a taxonomy of public services. In practice, the location of public services can differ between countries. For example, a service granting money to university students might be a regional service in Belgium, but a national service in Spain. Nevertheless, the location perspective could be mapped to the location property in CPSV-AP (see CPSV-AP class Public Organisation<sup>42</sup>).

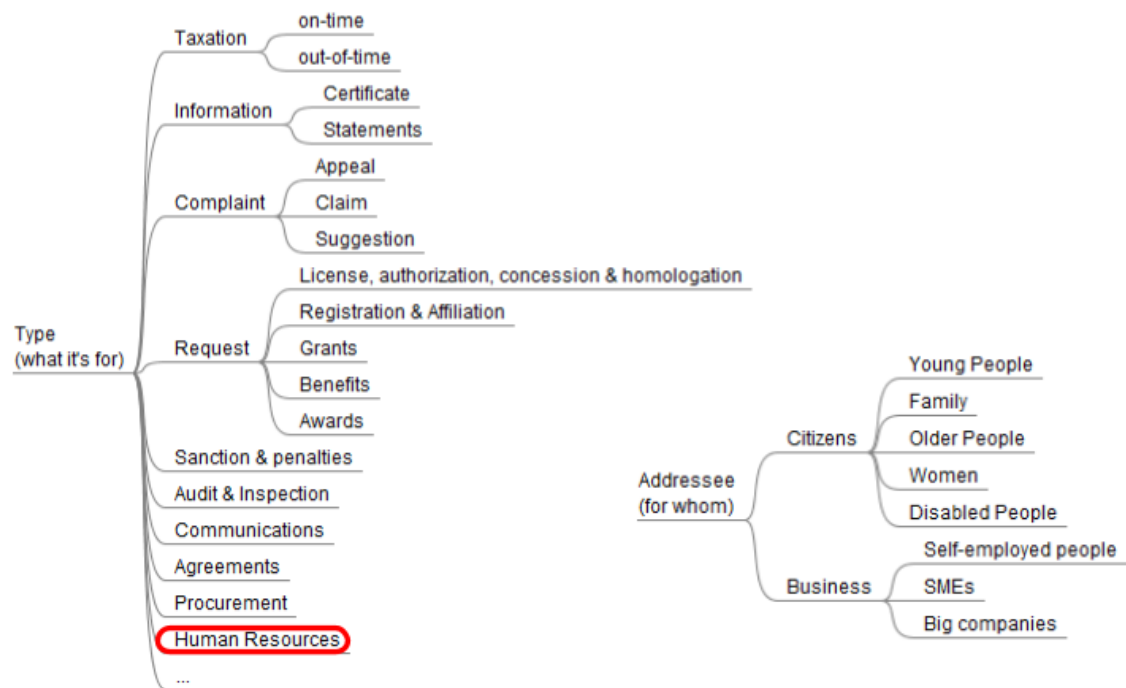
Besides the location, the citizens' view is separated into two complementary perspectives: life events and specific issues, which consists of three different vocabularies.

From the user perspective, life events are important as they represent a very clear and straightforward point of entry for finding a specific service. Events are interesting because with only a few of them, a considerable proportion of the services requested are covered. Also, life events provide multiple linked public services in one package. However, as shown by Figure 9, for specific services, events would be even more complex than other classifiers. This implies that building an exhaustive list of public services would oblige the builder to use additional perspectives to structure those specific issues. Moreover, using life events would create a non-exhaustive taxonomy: not all public services can be categorized under a life event.

Figure 10 shows a list of possible patterns and subpatterns as well as different user roles and subroles.

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<sup>42</sup> <https://joinup.ec.europa.eu/solution/core-public-service-vocabulary-application-profile/release/221>

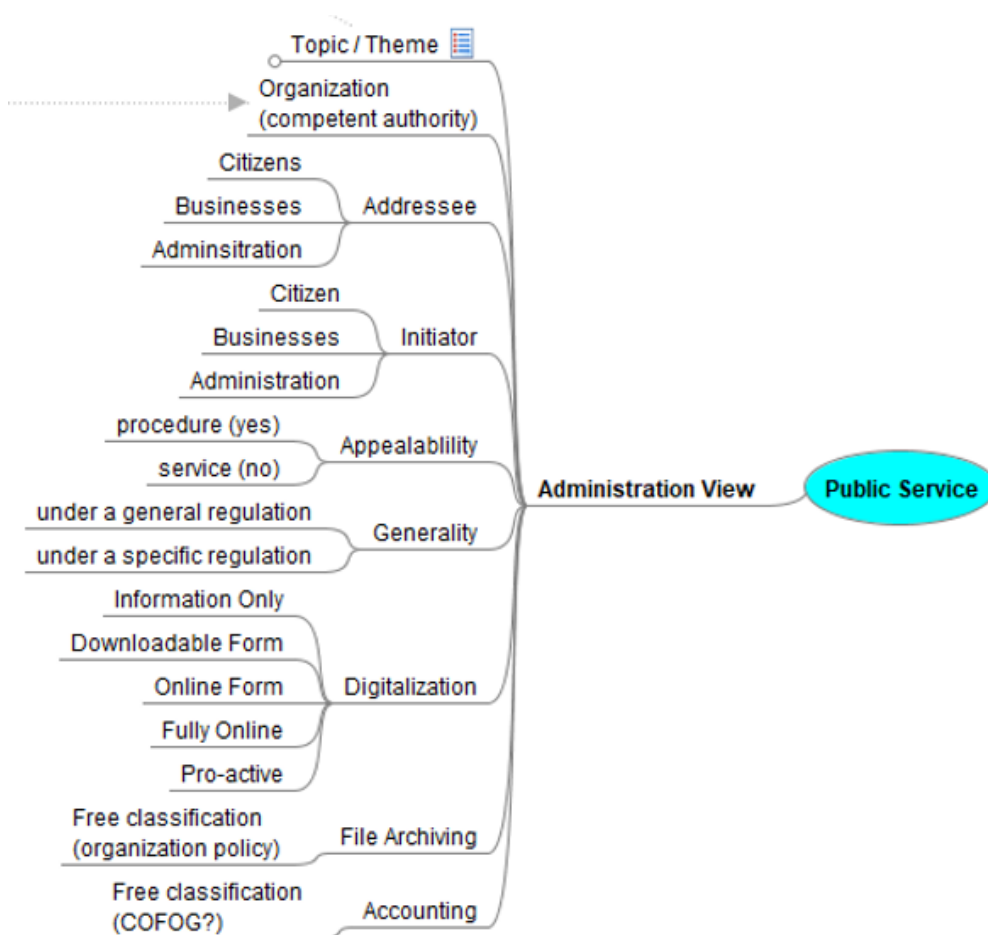


**Figure 10: Public services as seen from a citizen’s perspective, specific issue.<sup>43</sup>**

### 3.2. Public administration perspective

Public administrations have many perspectives on public services as shown in Figure 11. All those perspectives are relevant for describing public services while not all would be needed for building an exhaustive taxonomy of public services.

<sup>43</sup> <https://github.com/catalogue-of-services-isa/Taxonomy/issues/2>



**Figure 11: Public services as seen from a public administration’s perspective.**<sup>44</sup>

When looking at the similarities between the public administration and the user’s views, the themes and the addressees stand out. The other perspectives are less essential as they take more into consideration the delivery of the service. For example:

- Competent authority: considering that each country will have major divergences about the competent authority compared to the others, the taxonomy of public services should leave it outside;
- Digitalization: as part of the SDG, all services should be provided fully digitally. Similarly, to many other perspectives, the maturity of public administrations differ significantly for the digitalization. Nevertheless, some elements of the ‘digitalization’ seems close to patterns/types described before; and
- Initiator: the entity could partially overlap with the already discussed user roles/addressees.

### 3.3. Combining the perspectives

After analysis of the different perspectives and conversations with the Working Group and other experts, the decision was made that **there is a need for three**

<sup>44</sup> <https://github.com/catalogue-of-services-isa/Taxonomy/issues/2>

**subtaxonomies to create one European taxonomy for public services: user roles<sup>45</sup>, themes and patterns** (in Figure 9 and Figure 10 named as 'Type').

As this would lead to a too complex taxonomy (e.g. 3 user roles times 30 themes times 10 patterns equals 900 generic public services), it was decided to decouple user roles from the taxonomy but it is recommended to still use it to pre-categorise the public services.

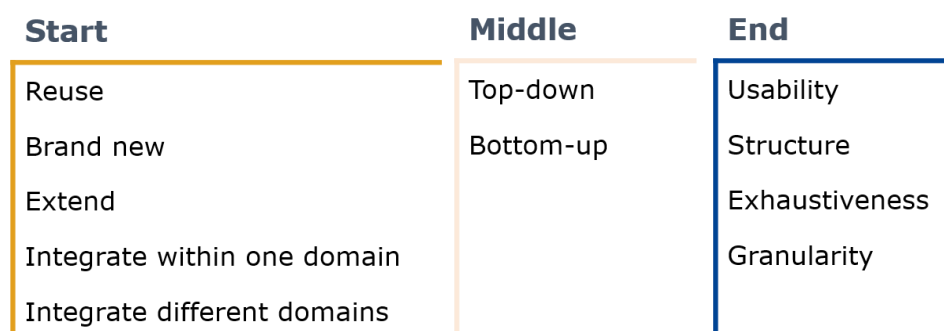
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<sup>45</sup> Before: beneficiaries

#### 4. HOW TO BUILD A TAXONOMY OF PUBLIC SERVICES?

It is indispensable to develop a taxonomy in a systematic way. Analogous to software engineering, a systematic approach should be applied in the development of taxonomies in order to guarantee their quality, correctness, and consistency.

When developing a taxonomy, some important aspects, as shown in Figure 12, should be considered at different points in time. While the end criteria become essential only at the end of the process, it is important to keep them in mind during the process as they represent the main aspects on which the taxonomy will be evaluated.



**Figure 12: Key aspects for building a taxonomy.**

##### 4.1. Starting the European taxonomy of public services

Keeping this in mind, a taxonomy foundation should be built. There are multiple options in choosing a foundation:

- reusing an existing taxonomy;
- developing a new taxonomy;
- extending an existing taxonomy;
- integrating homogeneous taxonomies (same domains); or
- integrating heterogeneous taxonomies (different domains).

The different options can be combined: even though a new taxonomy is being developed, it can make use of certain existing taxonomies. Independently from the option selected, an important best practice for building taxonomies consists of reusing existing ones. Table 3 provides a short pros and cons analysis of reusing taxonomies.

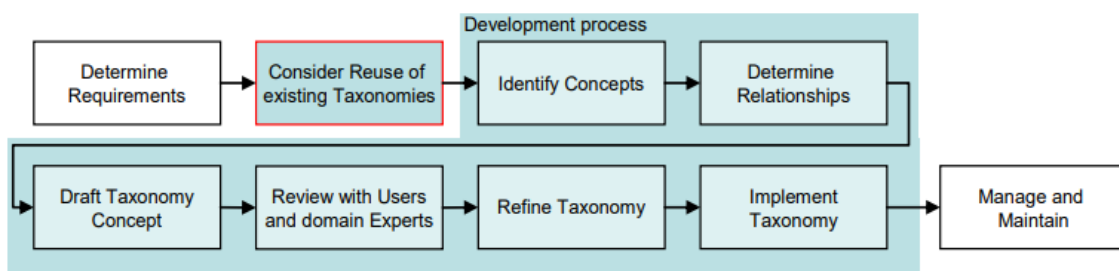
**Table 3: Pros and cons of reusing taxonomies.<sup>46</sup>**

Pros	Cons
Reduction of development costs if the existing taxonomies are well recognized.	Identification and the process of gaining familiarity with reuse candidates.
Improvement of interoperability with applications using the same taxonomy. In particular, reuse should be considered when there are well-established taxonomies available that are applied in contexts quite	Potential translation of existing taxonomies from proprietary formats into the target format.

<sup>46</sup> <https://joinup.ec.europa.eu/sites/default/files/document/2011-12/guidelines-and-good-practices-for-taxonomies-v1.3a.pdf>

similar to the one in which the planned taxonomy is to be applied.	
One single reuse candidate covers most of the domain the target taxonomy has to cover, i.e. it is not necessary to merge different taxonomies.	Integration of various heterogeneous sources for reuse.
Avoid duplicating efforts.	Maintenance of the taxonomies reused.

Figure 13 shows the structure of a taxonomy development process where the reusing of existing taxonomies is considered. Before creating a new taxonomy from scratch, it should always be investigated whether an existing one can be reused.



**Figure 13: Development process of a taxonomy.<sup>47</sup>**

The methodology described in Figure 13 covers the entire development of a taxonomy. As creating a taxonomy on a European level is complex and difficult, two actions were undertaken:

- a continuous conversation was held with member state representatives during the course of this phase; and
- most of the work for building the European taxonomy of public services consists in aligning existing terminologies, consequently, we conducted the desk research for identifying existing taxonomies throughout the entire phase.

As part of the initial phase for the taxonomy development, the following steps have been conducted:

- Gathering of existing lists of public services from an amount of public administrations;
- Compare the lists in order to identify potential generic public services;
- Categorise the services based on design principles, comparisons with high-level categorisations, comparisons with member state initiatives
- Propose a first list of generic public services;
- Categorise the generic public services in a proposed taxonomy, maximally reusing existing taxonomies and categorisations;
- Discuss the proposition with the CPSV-AP Working Group and any other interested stakeholders during the webinar of the 6<sup>th</sup> February
- Consequently to the webinar of the 6<sup>th</sup> February, share the proposed taxonomy of public services with the Working Group and collect their feedback;

<sup>47</sup> <https://joinup.ec.europa.eu/sites/default/files/document/2011-12/guidelines-and-good-practices-for-taxonomies-v1.3a.pdf>

- Discuss the revised taxonomy and the received feedback during the webinar of the 10<sup>th</sup> April 2019;
- Start mapping the 21 procedures from the Annex II of the SDGR to the taxonomy;
- Analyse issues and revise the taxonomy; and
- Finalise the taxonomy during and after the workshop held in Brussels on the 16<sup>th</sup> May 2019.

It is important to remind at this point that the objective of this phase is to agree on a first level of terms as part of the European taxonomy of public services. The taxonomy proposed should be further refined in order to go through the implementation phase.

#### 4.1.1. Starting points for two perspectives: themes and patterns

SEMIC.EU<sup>48</sup>, as one of the primary pan-European resources for Semantic Interoperability Assets, was one of the preferred sources to search for candidates.

In the case of themes, elements such as `dc:theme`<sup>49</sup> was the preferred candidate to start. It is a multilingual list of themes in 25 languages and with a URI per theme. As part of DCAT-AP, the vocabulary was used for describing another domain, i.e. datasets. It contains only 13 themes, which is very few compared to the thousands of different public services existing. This made the vocabulary high-level and therefore represented a good starting point to be further refined with additional taxonomies independently from the original domain.

#### **What about (partially) reusing NACE?<sup>50</sup>**

In some areas of public administration, a superordinate taxonomy is provided that must not be changed except from extensions limited to specific parts of the taxonomy. For example, NACE is the official classification for economic activities within the EU. The only allowed extension of NACE is an additional level for branches specific to a member state.

For patterns, only a few sources could be found that provided a relevant taxonomy. The researched patterns can be found in Table 17.

#### 4.1.2. Starting points for public services

Regarding public services, this work built on the initial analysis, which used multiple lists of public services. . An overview of all the lists analysed is available in Annex VII.

Table 4. An overview of all the lists analysed is available in Annex VII.

<sup>48</sup> <https://joinup.ec.europa.eu/collection/semantic-interoperability-community-semic>

<sup>49</sup> <https://publications.europa.eu/en/web/eu-vocabularies/at-concept-scheme/-/resource/authority/data-theme/?target=Browse>

<sup>50</sup> [http://ec.europa.eu/competition/mergers/cases/index/nace\\_all.html](http://ec.europa.eu/competition/mergers/cases/index/nace_all.html)

**Table 4: Overview - Starting lists of public services, newly added lists in bold.**

Name	Organisation responsible	Region	Link
Single Digital Gateway Annex II	DG GROW	Europe	<a href="http://data.consilium.europa.eu/doc/document/ST-10069-2018-INIT/en/pdf">http://data.consilium.europa.eu/doc/document/ST-10069-2018-INIT/en/pdf</a>
Uniforme Productnaam (UPL)	Logius – Ministerie van Binnenlandse Zaken en Koninkrijksrelaties	The Netherlands	<a href="http://standaarden.overheid.nl/owms/4.0/doc/waardelijsten/overheid.uniformeproductnaam">http://standaarden.overheid.nl/owms/4.0/doc/waardelijsten/overheid.uniformeproductnaam</a>
Servizi-gov	Digital Italy Agency	Italy	<a href="https://github.com/italia/servizi-gov/tree/master/resources/service-templates">https://github.com/italia/servizi-gov/tree/master/resources/service-templates</a>
Elenco procedimenti amministrativi di competenza dell'amministrazione provinciale	Provincia Autonomia di Trento	Trento	<a href="https://comefareper.provincia.tn.it/conoscere-i-procedimenti">https://comefareper.provincia.tn.it/conoscere-i-procedimenti</a>
GEA-NZ Reference Taxonomies	Government Enterprise Architecture	New Zealand	<a href="https://www.ict.govt.nz/guidance-and-resources/architecture/government-enterprise-architecture-for-new-zealand-framework/gea-nz-reference-taxonomies/">https://www.ict.govt.nz/guidance-and-resources/architecture/government-enterprise-architecture-for-new-zealand-framework/gea-nz-reference-taxonomies/</a>
<b>Universal Menu Draft from SMA</b>	Ministry of Economy, Trade and Industry (METI) NGO Askoe Small and Medium company Agency	Japan	<a href="http://universalmenu.org/openum/index.html">http://universalmenu.org/openum/index.html</a>
<b>ESD</b>	Local Government Association	England, Scotland, Belgium, Netherlands, Norway, Sweden, Germany.	<a href="https://standards.esd.org.uk/?uri=list%2Fservices&amp;tab=details">https://standards.esd.org.uk/?uri=list%2Fservices&amp;tab=details</a>

#### 4.1. Developing the European taxonomy of public services

##### 4.1.1. Best practices and modelling principles

As none of the existing taxonomies identified completely met the expectations, a new taxonomy was started in the previous phase. Some best practices were respected for building the taxonomy of public services<sup>51</sup>:

- All the siblings in a hierarchy should have the same level of generality, as this corresponds to users' intuitive expectations;
- If a class has only one direct subclass, the taxonomy is not complete or modelling may not be appropriate. If a class has only one direct subclass,

<sup>51</sup> <https://joinup.ec.europa.eu/sites/default/files/document/2011-12/guidelines-and-good-practices-for-taxonomies-v1.3a.pdf>



either the class or the subclass is superfluous, as either the class or the subclass doesn't add information to the taxonomy;

- If there are more than a dozen subclasses for a given class, adding intermediate categories should be considered;
- If no natural classes exist to group concepts, there is no need to create artificial classes, as the ontology is a reflection of the real world.
- A taxonomy should be linked to a data model; and
- There should be no duplicate services in the taxonomy. In reality, public services can be categorised under multiple user roles, multiple themes and multiple patterns at the same time. However, to create a European taxonomy for public services without duplicates, a public service should be categorized in only one specific user role, theme and pattern. Which ones exactly the working group could decide. Nonetheless, public services could still be tagged with all relevant user roles, themes and patterns in their respective descriptions, for example using CPSV-AP.

To create a taxonomy, three approaches can be used:

- A top-down approach;
- A bottom-up approach; and
- A combination of both.

The top-down approach starts with a definition of the most general concepts in the domain, followed by a specialisation of the concepts. Sources for finding these concepts, such as studies, textbooks, reference texts, encyclopaedias, etc. about the domain may be used.

The bottom-up approach starts with determining the specific terms. In the case of classifying documents, these terms can be extracted from the documents. As in the top-down approach, the hierarchy and the relationships are created in parallel.

In practice, in most cases, a combination of both approaches will be applied. None of the three approaches, i.e. top-down, bottom-up, or the combination of the two, is inherently better than any of the others. The choice of the approach may depend on the available sources. When sources such as reference texts and encyclopaedias contain a systematic, high-level terminology of the domain, including definitions of categories, the top-down approach may be preferred. When the main sources available are the content objects to be described, e.g. documents to be classified, the bottom-up approach may be preferred. The combination could be preferred, as the concepts, identified by the double approach can use the best identified concepts from both approaches.<sup>52</sup>

Generally, taxonomies have to be implemented in a machine-readable language. In practice, pan-European partners use a diversity of taxonomy languages, which necessitates syntactic integration.

Other concepts that should be taken into account are:

- Synonyms, lexical variants and near-synonyms<sup>53</sup>;

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<sup>52</sup> <https://joinup.ec.europa.eu/sites/default/files/document/2011-12/guidelines-and-good-practices-for-taxonomies-v1.3a.pdf>

<sup>53</sup> Semantically different, but seen as the same term, e.g. sea water and salt water

- Every term in a taxonomy has to have a hierarchical relationship to at least one other term within the taxonomy.

Finally, the lineage of each term should be kept. This can include scope notes, definitions, and history notes for each term included in the taxonomy, as far as necessary. In particular, a definition is considered necessary when it cannot be assumed that a specific term will be understood by all of the user groups. In this version of the taxonomy, definitions were used and gathered, but it was not scoped to reach an agreement to identify one definition per term.

#### *4.1.2. Bottom-up approach*

Public service lists were analysed to create a European taxonomy for public services. The lists of public services were collected at different times in 2018 and 2019. The work started with the analysis and the creation of a generic list of public services from the lists of SDG, The Netherlands and New Zealand. Later the lists of ESD and Japan were added.

The initial services considered were the 21 procedures from the SDG since they were by essence already European. From these 21 procedures, similar services or more generic services were searched in the UPL and the GEA. At this point, all new generic services found in the two lists were added to the generic proposition. For example, services such as the ones concerning the Maori affairs in New Zealand or the extraordinary pension for Indian resistance in The Netherlands were not included in the list.

In this exercise, the UPL was used more as a confirmation list for the relevant services found in the GEA. This decision was justified by the fact that firstly, there was no description provided with the services listed in the UPL and secondly, the translation from Dutch to English was automated without an expert from Logius to validate its quality. The list obtained from the three lists was similar in many parts to the business taxonomy of the GEA with some more genericity and mappings to the SDG and the UPL.

To this initial list, we added the Italian list for which we had a translation of the public services and their descriptions. The Italian list was integrated in the generic proposition by:

- identifying gaps filled in by Italian services;
- mapping the Italian services to the generic services already included; and
- creating more generic services from the analysis of the Italian list.

Next to this, a review cycle enabled to:

- move the list obtained so far from naming conventions sometimes too close from life and business events to more generic public services naming; and
- add extra generic services when the services listed were too detailed.

In the previous iteration, the bottom-up methodology resulted in a proposition of 57 generic public services. A sample is listed in Table 5 with one example per generic service. This list is a first proposition towards building a more complete and widely agreed list of generic public services. In this list, 227 different public services were grouped under the 57 generic services.

**Table 5: Extract of the list of generic public services with examples and mapping**

List of high-level generic public services	Examples of granular generic public services
Life event registration service	Register/Declare a birth
Life event certification service	Requesting proof of registration of birth
Border control service	Customs inspection
Life event material service	Provide assistance to asylum seekers and victims of human rights violations
Life event information service	Provide advice on travel regulations and eligibility criteria, visa classes and entry conditions.
Financial obligation service	Payment of residence (tourist) tax
Life event support service	Help contact family and friends, in the event of being detained or arrested.
Education financing service	Early childhood education
Education registration service	Applying for a tertiary education study financing, such as study grants and loans from a public body or institution
Education certification service	Request proof of admission in public higher education institution
Education framework service	Curriculum development
Emergency services	Plan natural disasters recovery

In the next iteration, new lists of public services were mapped to the existing draft taxonomy. The enriched high-level list of generic public services resulted in the distinction between two perspectives: patterns and themes. This was confirmed by the top-down approach and the feedback received from members of the working group (cfr. chapter 3) via GitHub or during the webinars.

When combining those two perspectives, we obtained an extensive list of high-level generic public services. In the proposed taxonomy, there are 31 themes and 9 patterns. Each pattern is possible for every theme. This means that we determined 279 high-level generic public services in total.

The new high-level list was tested by mapping the granular services to it and confirmed by adding the Japanese 'Universal Menu'. In total, over 2000 public services were analysed and mapped to reach the current version of the high-level list of generic public services. The terms in the list should have a balanced granularity, be mutually exclusive and form together an exhaustive list.

#### *4.1.3. Top-down approach*

The main input for creating the taxonomy of public services was extracted from the different lists of granular public services mentioned before and available in Annex VII.

Besides the extraction and validation of patterns, themes and the combination of both to result in the high-level list of generic public services, a complementary exercise was conducted to increase the validity of the taxonomy:

- The patterns were mapped to top-down lists from Iran, the ESD and the GEA;

- The themes were mapped to categorisations in government portals from Norway, Flanders, Bulgaria, Scotland and the UK;
- The themes were mapped to top-down categorisations like NACE, DCAT-AP and the World Bank; and
- A scoring was added to the themes based on how many times they were used in government portals and the top-down lists.

Figure 14 shows the mapping of the identified patterns to top-down lists. Figure 15 shows the mapping of the identified themes to top-down lists and public administration portals. The complete taxonomy and mappings can be found on GitHub.<sup>54</sup>

Patterns	ESD patterns: Interactions	Iran Archetype services: Patterns	GEA
Framework	Regulation	Establishing laws, regulations, tariffs and standards	
Information	Providing information	- Keeping public records - Publishing information, statistics and reports	Information
Registration			
Certification		Validation and qualification assessment	- Certification - Authorization/Licence
Financing	Providing benefits and grants	Providing grants and concessional loans	
Production			Waste management
Feedback			Opposition to administrative acts
Control & monitoring		Monitoring, auditing and conducting trials Enforcing the law	Monitoring and control
Taxation	Collecting revenue		
	Consultation		
	Booking venues, resources and courses		
	Application for service		
	Paying for goods and services		
	Procurement		
	Providing acces to community, professionals or business networks		
		Infrastructure investment, development and maintenance	
		Service operator	
		Training and cultivating culture	
			Residence and civil status
			Concession
			Prohibition
			Contribution
			Payment Processing
			Primary service request
			Social/health service
			Water provision
			Public infrastructure
			Public transportation

Figure 14: Top down mapping of patterns.<sup>55</sup>

<sup>54</sup> <https://github.com/catalogue-of-services-isa/Taxonomy>

<sup>55</sup> <https://github.com/catalogue-of-services-isa/Taxonomy>

Green means a complete mapping, yellow a partial mapping.

Proposed themes	Annex I SDG	Scotland (portal)	Flanders (portal)	Bulgaria (portal)	Wikipedia	Norway (portal)	ESD	UK (portal)	12 Core Policy Domains	Spain	Iran	World Bank	DCAT-AP	NACE
Agriculture & food				Logging					Agriculture			Agriculture, fishing and forestry	Agriculture, fisheries, forestry and food	Agriculture, forestry and fishing
Animal														
Border control														
Culture, sport and leisure			Culture, sport and leisure	Culture, organised events		Culture, sport and recreation	Leisure and culture			Culture and entertainment Sports	Cultural & social affairs		Education, culture and sport	Arts, entertainment and recreation
Defence					Military									Public administration and defence; compulsory social security
Digital					Telecommunications						ICT	ICT		Information and communication
Education	Education or traineeship in another Member State	Education and training	Education and science		Education, [e.g. state (public) schools, public universities, etc...]	Schools and education	Education and learning	Education and learning	Education	Education	Education & research	Education	Education, culture and sport	Education
Emergency					Emergency services, (e.g. Fire, EMS, Law Enforcement, Search and Rescue, etc...)									
Environmental		Environment, farming and marine	Nature and environment		Environmental protection	Nature and environment	Environmental protection	Environment and countryside		Environment	Environment, agriculture & natural resources		Environment	
Family	Cross-border family rights, obligations and rules					Family and children		Childcare and parenting	Family					

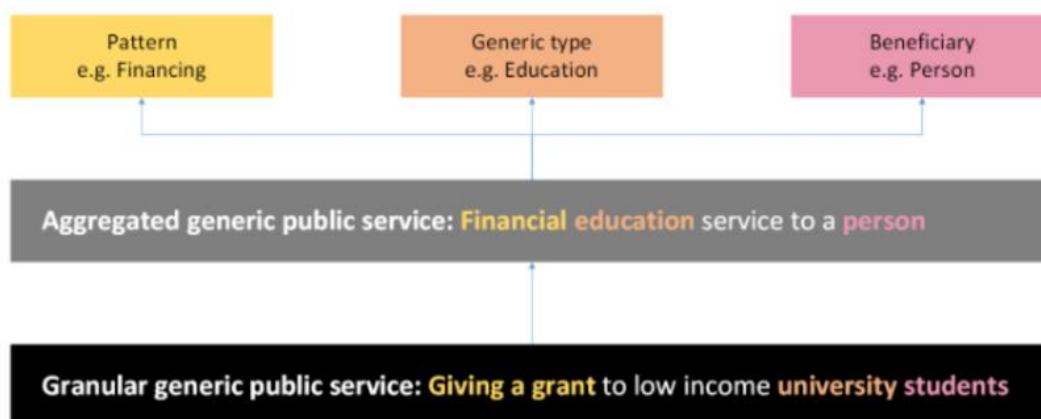
Figure 15: Top down mapping of themes. Full list to be found on GitHub.<sup>56</sup>

<sup>56</sup> <https://github.com/catalogue-of-services-isa/Taxonomy>

Green means a complete mapping, yellow a partial mapping.

While mapping the different lists of public services, multiple elements were observed. A public service title can usually be broken down into multiple elements (see Figure 16). The ones identified as part of this work were themes and patterns and in some cases the user roles.

- Themes were a recurring factor: each public service can be coupled to a theme;
- Each service can be coupled to a pattern as well; and
- Some services can be mapped to multiple themes and multiple patterns.<sup>57</sup>



**Figure 16: Braking down a public service.<sup>58</sup>**

To make this categorisation, we looked at the *granularity*, the *mutually exclusivity* and the *exhaustiveness* of the themes and patterns. A taxonomy with a high level of quality has to be clear and has to maintain a balance in the three elements mentioned above.

To illustrate our way of categorising the different themes and patterns, we list in Table 6 some of the challenges we faced during this categorisation.

**Table 6: Sample of encountered challenges and proposed solutions.**

Issue	Proposed solution
How do we decide to integrate a new term or not?	Start with a limited amount of services to put in a taxonomy. Work iteratively and together with a working group consisting of European member state representatives.
Should all terms be completely independent from each other or can a public service be categorised within multiple generic public services (i.e. tags)?	This is solved by combining themes as a controlled vocabulary (which can be used as tags) and themes as a taxonomy (which are combined with user role and pattern).

<sup>57</sup> Themes and patterns are defined in section 5.

<sup>58</sup> <https://joinup.ec.europa.eu/collection/semantic-interoperability-community-semic/event/catalogue-services-webinar-6-february-2019>

At what level of granularity should the list be created and how to guarantee the consistency of granularity among the different services?	Keep the level of granularity balanced. Nonetheless, the real confirmation will happen with the implementation of the taxonomy.
What is the sphere of public services / private services? At what moment will we consider a service as a public service?	This is up to the member states to decide. As part of this work, we considered as public services all the services included within a list coming from a public administration.

Finally, the patterns and themes should be crystal clear to be used. For that reason a second level of patterns and themes was developed, to create a clear structure and meaning for users of the taxonomy. Figure 17 shows that the second level patterns provide a better meaning than only first level patterns (e.g. Framework).

Patterns	Second level Patterns						
Framework	Procedures	Measures	Law definition	Management (of a bureaucratic structure)	Asset management	Collective infrastructure	Schemes & plans
Information	Information	Advice					
Registration	Registration						
Certification	Certification	Licensing	Permission	Authorisation			
Financing	Financial support	Material support	Provision of free services	Provision of discounted services			
Production	Governmental service at normal price	Maintenance of property	Maintenance of infrastructure	Provision of infrastructure for a charge	Waste management		
Feedback	General complaints	Injury / Damage complaints	Feedback	Appeals against decisions	Mediation		
Control & monitoring	Control	Monitoring	Testing	Assessment	Law enforcement		
Taxation							

**Figure 17: List of patterns and subpatterns of the taxonomy.**

#### 8.4. Refining the European taxonomy of public services

When evaluating a taxonomy, some criteria should be considered such as:

- Usability, e.g. by asking users in different countries if they understand most terms in the same way;
- The structure of the taxonomy, e.g. by having several users search for specific content and by keeping some KPIs (e.g. the amount of time needed to find the right subterm in the taxonomy);
- Completeness
- Appropriateness of granularity: The taxonomy granularity needs to be high-level for stability and exhaustiveness but also needs a more detailed level for using the taxonomy in practice and exchanging data between public administrations. Moreover, the granularity for themes and patterns should be similar.

Those criteria can mostly be applied thanks to the implementation of the taxonomy. Based on this implementation and consecutive evaluation, the taxonomy can be refined.

#### 8.4.1. Multilinguality<sup>59</sup>

In the context of this work and the Catalogue of Services action, multilingual taxonomies and classifications play an important role. A multilingual taxonomy is assumed to be symmetrical, i.e. "all different language versions of a multilingual thesaurus have to be identical and symmetrical; each preferred term must have one and only one equivalent term in every language and be related in the same way to other preferred terms in the given language (a symmetrical thesaurus). The number of non-preferred terms can be different".

When a suitable term for a concept is missing from one of the languages in a multilingual taxonomy, there are two solutions. Either a loan term from another language can be used (Table 7) or an artificial so-called "coined term" can be defined (Table 8).

**Table 7: Example of loan terms.**

German	English
Schadenfreude	Schadenfreude
Teenager	Teenager

**Table 8: Example of a coined term.**

English	French
gender mainstreaming	Intégration de la dimension de genre

A second type of multilingual taxonomy is the non-symmetrical taxonomy, where the number of preferred terms in each language does not need to be the same, and where the relationships between preferred terms can differ for the different languages. Such a multilingual taxonomy can not be considered as a taxonomy, but consisting of a number of heterogeneous taxonomies, one for each language.

#### 8.4.2. Review cycles

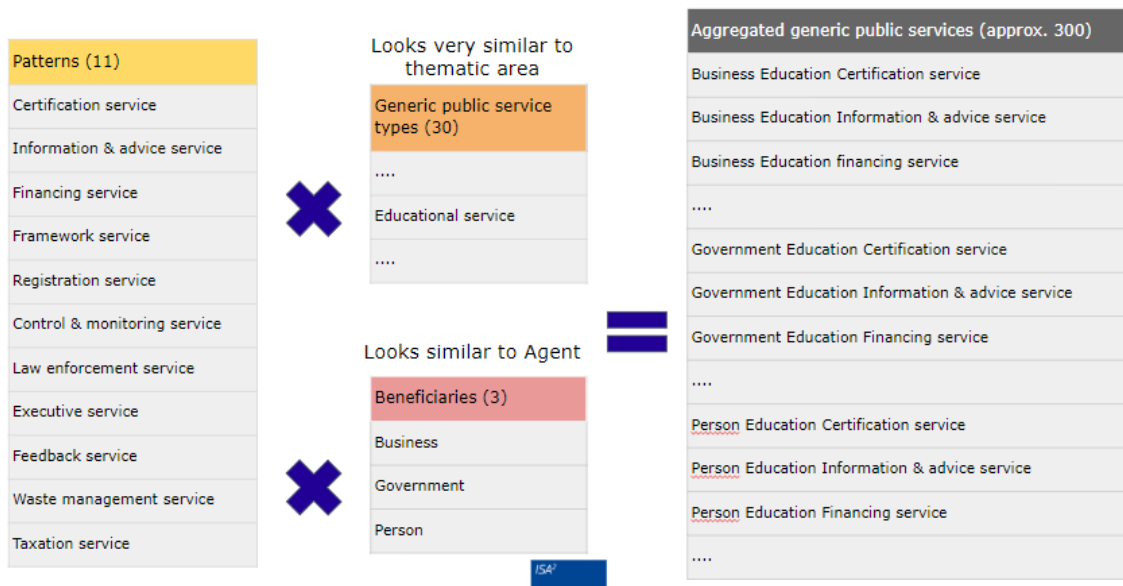
Before a taxonomy is published, at least a few review cycles should have taken place. For the European taxonomy for public services, two webinars and a workshop were held to discuss the proposed taxonomy and adapt the scope or level of granularity. Figure 18 shows the first proposition made during the webinar on February 6 2019. A first draft of the taxonomy was uploaded on GitHub<sup>60</sup> on March 5 for the Working Group members to review. The current version also includes columns on why themes, sub-themes, patterns and subpatterns were used or removed so there is a documented history of change management of the taxonomy.

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<sup>59</sup> <https://joinup.ec.europa.eu/sites/default/files/document/2011-12/guidelines-and-good-practices-for-taxonomies-v1.3a.pdf>

<sup>60</sup> <https://github.com/catalogue-of-services-isa/Taxonomy>





**Figure 18: Taxonomy proposal combining patterns, types (now themes) and beneficiaries during the first webinar.<sup>61</sup>**

Figure 19 shows an update during the CoS workshop on May 16. The main conclusions from the workshop were that the key perspectives for describing public services are the following:

- A top-down approach is challenging: each country has multiple perspectives for structuring services and these perspectives are often maintained at different levels within each country;
- Generally, building a taxonomy starts top-down to obtain an exhaustive view before refining the first taxonomy obtained by testing it bottom-up;
- At the European level, it is crucial to agree on the set of perspectives for building the taxonomy of public services; and
- The European taxonomy should be applied starting with the services identified by member states for the 21 procedures of the SDG. This requires each member state to be involved as they are the product owners.



**Figure 19: Taxonomy breakout sessions during the 16 May workshop.**

<sup>61</sup> <https://joinup.ec.europa.eu/collection/semantic-interoperability-community-semic/event/catalogue-services-webinar-6-february-2019>

## 5. THE TAXONOMY

This chapter describes the version 0.12 of the European taxonomy of public services. It gives some examples and explanations for each perspective taken for building the taxonomy.

### 9.1. Themes

Public services can be divided by themes. Users as well as public administrations can look up public services by themes. Table 9 provides an overview of the proposed themes for the taxonomy. Some sub-themes were identified, but this was done on an ad hoc basis and should be further refined. Themes and sub-themes could be extended in the future for instance in the context of the 21 procedures. The full list of identified sub-themes can be found on GitHub.<sup>62</sup>

What is a theme?	
Public service description	A <b>university student grant</b> is a public service that <b>allocates grants to university students</b> to increase opportunities for students with less financial power.
Filtering	If we remove the <b>sub user role (student)</b> , the <b>core/subpattern (grant)</b> and the <b>goal of the service</b> , the only thing that remains is a <b>'university'</b> .
The theme	This is a detailed service (subtheme) of a generic public service theme, education.
Good to know	A theme can be used with any pattern. A public service (sometimes vaguely defined by the public administration) can contain multiple themes.

**Table 9: List of themes**

Agriculture & food
Animal
Border control
Culture, sport and leisure
Defence
Digital
Education
Emergency
Environmental
Family

<sup>62</sup> <https://github.com/catalogue-of-services-isa/Taxonomy>

General Business
General Government
General Person / Civil status
Health care
Housing
Legal
Manufacturing
Media
Monetary policy
Money & Debt
Natural resources
Public space management & heritage
Religious
Retail
Science and technology
Stock market
Tourism & travelling
Transportation & transportation infrastructure
Utilities
Welfare & social care
Work

## 9.2. Patterns

Public services can also be divided by patterns. Users as well as public administrations can look up public services by patterns. Table 10 provides an overview of the proposed patterns and first-level patterns of the taxonomy. This could be extended in the future.

What is a pattern?	
Public service description	A <b>university student grant</b> is a public service that <b>allocates grants to university students</b> to increase opportunities for students with less financial power.
Filtering	If we remove the <b>sub user role (student)</b> , the <b>subtheme</b> and the <b>goal of the service</b> , the only thing that remains is a <b>'grant'</b> .
The theme	This is a detailed service (subpattern) of a generic public service pattern, financing.
Good to know	A pattern can be used with any theme. A public service (sometimes vaguely defined by the public administration) can contain multiple patterns.

**Table 10: List of patterns and subpatterns.**

Patterns	Second level Patterns						
Framework	Procedures	Measures	Law definition	Management (of a bureaucratic structure)	Asset management	Collective infrastructure	Schemes & plans
Information	Information	Advice					
Registration	Registration						
Certification	Certification	Licensing	Permission	Authorisation			
Financing	Financial support	Material support	Provision of free services	Provision of discounted services			
Production	Governmental service at normal price	Maintenance of property	Maintenance of infrastructure	Provision of infrastructure for a charge	Waste management		
Feedback	General complaints	Injury / Damage complaints	Feedback	Appeals against decisions	Mediation		
Control & monitoring	Control	Monitoring	Testing	Assessment	Law enforcement		
Taxation							

### 9.3. Combining the elements: the European taxonomy for public services

When putting the two elements together, a European taxonomy of public services is created. Figure 20 shows a sample of the European taxonomy for public services. Themes and patterns are combined to create a 'high-level generic public service'. Public administrations could categorise their public services by using this list. The only constraint is that each public service can be allocated to only one theme and one pattern. The full version of the taxonomy can be found on GitHub<sup>63</sup>.

Vocabularies		Taxonomy	
Patterns	Themes	Taxonomy of high-level generic services	Non-exhaustive list of granular generic services
Certification	Agriculture & food	Certification Agriculture & food service	
Certification	Animal	Certification Animal service	
Certification	Border control	Certification Border control service	
Certification	Culture, sport & leisure	Certification Culture, sport & leisure service	
Certification	Defence	Certification Defence service	
Certification	Digital	Certification Digital service	
Certification	Education	Certification Education service	Request proof of admission in public higher education institution
Certification	Emergency	Certification Emergency service	
Certification	Environmental	Certification Environmental service	Certificate request for energy performance of buildings
Certification	Family	Certification Family service	
Certification	General business	Certification General business service	
Certification	General government	Certification General government service	
Certification	Health care	Certification Health care service	Consultation of sickness certificate for employers
Certification	Housing & building	Certification Housing & building service	Request proof of registration of the civic numbering
Certification	Legal	Certification Legal service	
Certification	Life event & identity	Certification Life event & identity service	
Certification	Manufacturing	Certification Manufacturing service	

**Figure 20: Sample of the European taxonomy of public services.**

### 9.4. Format and support tool(s)

The taxonomy was made in Excel. To be maximum reusable, the taxonomy should be published in machine readable standards (e.g. SKOS<sup>64</sup>, OWL<sup>65</sup>) and formats (e.g. XML, RDF) and included on portals like the EU vocabularies<sup>66</sup> portal of the Publications Office (or previous name Metadata Registry<sup>67</sup>). Converting Excel to RDF can be done using open source tools<sup>68</sup> and should be considered as a next step.

By using machine-readable standards, concepts would be identified by URIs and organized in concept schemes. Labels would be given to all elements in the taxonomy (preferred, alternative, and hidden) and should be multilingual. A history of the change management of the taxonomy could be kept there, as well as the semantic relations (broader, narrower, related) between terms in the taxonomy as well as between existing standards (e.g. dcat:theme).

A potential tool which could be used to publish and maintain the taxonomy in an open and interoperable way is VocBench<sup>69</sup>. VocBench provides a solution to centralise the

<sup>63</sup> <https://github.com/catalogue-of-services-isa/Taxonomy>

<sup>64</sup> <https://joinup.ec.europa.eu/document/tutorial-give-software-taxonomies-multilingual-labels-represented-skos>

<sup>65</sup> <https://www.w3.org/OWL/>

<sup>66</sup> <https://publications.europa.eu/en/web/eu-vocabularies/>

<sup>67</sup> <https://joinup.ec.europa.eu/collection/metadata-registry/about>

<sup>68</sup> For example: <http://labs.sparna.fr/skos-play/convert>

<sup>69</sup> <http://vocbench.uniroma2.it/>

management of controlled vocabularies and metadata used by public administrations to support interoperability. It is a free web-based platform facilitating collaborative editing and management, it supports multilingual controlled vocabularies such as thesauri, authority lists and glossaries.<sup>70</sup>

### **9.5. Governance**

Due to changes in the underlying domain, a taxonomy always needs to be maintained, which mainly refers to updating the terms and relationships. Updating terms comprises addition, modification, and deletion of terms.

The addition of a term is necessary when indexing or searching reveals terms not yet in the taxonomy. New terms for indexing may be necessary when new content objects have to be described by the taxonomy. On the other hand, additional term candidates may be identified by evaluating search logs recorded from user queries.

As described in the previous section, this document recommends looking into open source tools and a clear governance body in order to finalise and maintain the taxonomy. Addition, modification, and deletion of terms have to be supervised by a control board. A technical Working Group should be formed. It could consist of member state representatives and technical experts. Such a group should take the ownership of the maintenance and further development of the taxonomy, assisted by a European initiative.

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<sup>70</sup> <https://joinup.ec.europa.eu/solution/vocbench3/about>

## 6. NEXT STEPS

From the interest expressed by the Working Group members during the webinars and workshop in 2019, the Working Group input on GitHub and the continuous discussions held in between, four streams of activities could be considered as next steps:

1. Integration with CPSV-AP
  - a. Integrate the taxonomy and its different perspectives within CPSV-AP;
  - b. Carry out research to discover or update other controlled vocabularies in CPSV-AP;
2. Enhancement of the taxonomy
  - a. Create a Working Group to be responsible for the governance of the European taxonomy for public services. This group should be supported by a dedicated team from the European Commission or the Publications Office;
  - b. Publish the taxonomy in SKOS through an open source tool such as VocBench;
  - c. Provide guidelines on how to use the taxonomy (and other controlled vocabularies);
  - d. Propose a description and a definition for each term of the taxonomy;
3. Application of the taxonomy for the 21 procedures
  - a. Map the national public services to the 21 procedures of the SDG as granular services in the taxonomy in order to apply the taxonomy to a concrete case;
  - b. Publish the granular services obtained from the mapping to the 21 procedures on the EU Vocabularies platform;
4. Other activities
  - a. Link this activity with the chatbot activity (through APIs) to enlarge the findability of public services for the general population.

## ANNEX I. CLASSIFICATION SCHEMES

Table 11: Shortlist of similar classification schemes.<sup>71</sup>

Classification scheme	Explanation
Controlled vocabulary	A controlled vocabulary is an authoritative list of terms to be used in indexing. Controlled vocabularies do not necessarily have any structure or relationship between terms within the list.
Taxonomy	A taxonomy is a (controlled) vocabulary with a hierarchical structure.
Thesaurus	A thesaurus is a controlled vocabulary, which follows a standard structure, where all terms have relationships to each other. There are typically three kinds of relationships: hierarchical, associative and equivalent.
Ontology	An ontology is a taxonomy with different relationships between terms (more than three kinds).
Vocabulary	In the Semantic Web <sup>72</sup> , vocabularies define the concepts and relationships (also referred to as "terms") used to describe and represent an area of concern. There is no clear division between what is referred to as "vocabularies" and "ontologies", but the trend is to use the word 'ontology' for more complex and formal classifications. <sup>73</sup>
Application Profile	An application profile is an ontology within a specific context, e.g. CPSV-AP <sup>74</sup> . It specifies the cardinality and the data types while specifying mandatory, recommended and optional elements to be used for a particular application, as well as recommendations for controlled vocabularies to be used.
Core Vocabulary	A Core Vocabulary is a simplified, reusable and extensible data model that captures the fundamental characteristics of an entity in a context-neutral fashion. Core Vocabularies are the starting point for agreeing on new semantic interoperability assets and defining mappings between existing assets to guarantee a level of cross-domain and cross-border interoperability that can be attained by public administrations.
Data model	A data model is an abstract model that organises elements of data and standardizes how they relate to one another (and to other entities). All classification schemes in this table, except controlled vocabularies, are a kind of data model. <sup>75</sup>

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<sup>71</sup> <http://www.taxonomies-sig.org/about.htm>

<sup>72</sup> [https://en.wikipedia.org/wiki/Semantic\\_Web](https://en.wikipedia.org/wiki/Semantic_Web)

<sup>73</sup> <https://www.w3.org/standards/semanticweb/ontology>

<sup>74</sup> <https://joinup.ec.europa.eu/solution/core-public-service-vocabulary-application-profile/about>

<sup>75</sup> [https://en.wikipedia.org/wiki/Data\\_model](https://en.wikipedia.org/wiki/Data_model)



**ANNEX II. DESCRIPTION OF 1ST LEVEL LIFE EVENTS**

**Table 12: Description of 1st level life events.**

1 <sup>st</sup> level life event	Description
Having a child	This life event groups public services related to becoming a caretaker for a child, for instance in case of giving birth, adopting, receiving a foster child...
Becoming a (social) caretaker	This life event groups public services related to the situation where you need to take care of another person (other than when you get a child), for instance for an elder, a disabled person...
Starting education	This life event groups any public service related to education, for example pre-school education, elementary school, higher education and university...
Looking for a new job	This life event groups public services for when someone looks for a new job or starts a new job.
Losing/quitting a job	This life event groups public services related to the situation when someone leaves or quits a particular jobs on his own, or when someone loses his job, for instance getting fired, collective dismissal, in case of failure of the company...
Looking for a place to live	This life event groups public services related to a person's place of living, for instance, changing residence, buying a house or a piece of land, building, renting a house or apartment...
Changing relationship status	This life event groups public services related to a person's official relationship, for instance marriage, registered partnership, divorce...
Driving a vehicle	This life event groups public services related to driving a vehicle, for instance car, motorcycle... Some example public services are getting your driver license, following driving lessons, registering your car...
Travelling abroad	This life events groups public services related to what you need to do when travelling abroad, for instance getting an international passport or driving license, getting a visa, getting vaccination...
Moving to/from the country	This life event groups public services that relate to when someone moves from one country to another.
Going into military service	This life event groups public services related to taking up a mandatory military or civil service.
Facing an emergency / health problem	This life event groups public services related to when someone faces an emergency, for instance in the case of an accident, or a severe health problem, for instance getting disabled.
Facing a crime	This life event groups public services related to a crime. for instance in case

### ANNEX III. DESCRIPTION OF 2<sup>ND</sup> LEVEL BUSINESS EVENTS

**Table 13: Description of 2nd level business events**

Business Event (1st level)	Business Event (2nd level)	Description
Starting business	Registering a company	This business event groups public services that are related to different kind of activities that have to be done before the business is eligible to operate, for instance registering in the business register, registering as a VAT payer, notifying the residence of your company...
	Needing a licence, permit or certificate to start or continue an activity	This business events groups public services related to the request of a licence, permit, certificate or other official document that have to be acquired before starting to execute a certain activity.
	Registering Intellectual Property	This business event groups public services related to the registering inventions, patents, trademarks, copyrights.
	Registering a branch	This business event groups public services relating to the start-up of a new activity, and that have to be done before you can start with the particular activity.
	Starting a new activity	This business event groups public services for the start-up of a new activity, and that have to be done before you can start with the particular activity.
	Financing a company	This business event groups public services related to different types of funding, grants, loans, subsidies that help to finance the business.
	Hiring an employee	This business event groups public services for recruiting and registering employees, applying for a work permits, changes in employment.
	Starting cross-border business	Registering a cross-border business
Registering a branch		This business event groups public services for opening affiliates and representative offices.
Doing business	Financing a company	This business event groups public services related to different types of funding, grants, loans, subsidies that help to finance the business.
	Needing a licence, permit or certificate to start or	This business events groups public services related to the request of a licence, permit, certificate or other official document that have to be acquired before starting to execute a certain activity.

Business Event (1st level)	Business Event (2nd level)	Description
	continue an activity	
	Registering Intellectual Property	This business event groups public services related to the registering inventions, patents, trademarks, copyrights.
	Hiring an employee	This business event groups public services for recruiting and registering employees, applying for a work permits, changes in employment.
	Participating in public procurement	This business event groups public services related to participating in a public tender, or directly selling services/products to a public administration.
	Notifying and reporting to authorities	Notifying authorities about different type of activitie, for instance environmental information nnuual reports, accounting procedures... This business event also includes periodic activities, for instance declaring the profit of a company (and thus paying taxes).
	Starting a new activity	This business event groups public services for the start-up of a new activity, and that have to be done before you can start with the particular activity.
	Registering a branch	This business event groups public services relating to the start-up of a new activity, and that have to be done before you can start with the particular activity.
	Having problems in paying creditors	This business event groups public services for starting the necessary (legal) procedures for getting protection when a company does not have enough cash flow for paying creditors.
Closing business	Restructuring of a company	This business event groups public services related to the reorganisation, merger, acquisition, any change on the legal status of the business.
	Dissolution of a company	This business event groups public services related to the closing, deregistration, discontinuation, liquidation, bankruptcy and other procedures that end the existence of a business.

## ANNEX IV. DESCRIPTION OF OUTPUT TYPES

Table 14: Description of output types

Output type	Description
Declaration	A formal statement or document, which can be used for proving something. E.g. identity card, passport health card, declaration of honour...
Physical object	A tangible product coming out of the public service, of which the underlying value is not a declaration, recognition, permit, financial obligation, financial benefit or code e.g. buildings, container, birth gift, electronic devices...
Code	A series of alpha-numeric or other characters E.g. a microchip code, access code, social security number, enterprise number...
Financial obligation	The obligation of a citizen or business to pay a certain amount to public administrations or a subsidiary. E.g. Financial commitment, Premium, Imposition, Tax, Fine...
Financial benefit	The obligation of a public administration or subsidiary to pay a certain amount to a citizen or business. E.g. Payment declaration, Financial, benefit, Subsidy, Allowance, Compensation...
Recognition	A formal statement or document, which can be used for proving the capability or conformance with something of a citizen or business. E.g. certificate, diploma, recognition...
Permit	A formal statement or document, which officially allows a business or citizen to do something. E.g. Admission, Permit, Authorisation...

**ANNEX V.****SDGR ANNEX I**

<b>Area</b>	<b>INFORMATION REGARDING RIGHTS, OBLIGATIONS AND RULES ARISING FROM UNION AND NATIONAL LAW</b>
A.Travel within the Union	<ol style="list-style-type: none"><li>1.documents required of Union citizens, their family members who are not Union citizens, minors travelling alone and non-Union citizens when travelling across borders within the Union (ID card, visa, passport)</li><li>2.rights and obligations of travellers by plane, train, ship, bus in and from the Union, and of those who buy travel packages or linked travel arrangements</li><li>3.assistance in case of reduced mobility when travelling in and from the Union</li><li>4.transport of animals, plants, alcohol, tobacco, cigarettes and other goods when travelling in the Union</li><li>5.voice calling and sending and receiving electronic messages and electronic data within the Union</li></ol>
B.Work and retirement within the Union	<ol style="list-style-type: none"><li>1.seeking employment in another Member State</li><li>2.taking up employment in another Member State</li><li>3.recognition of qualifications with a view to employment in another Member State</li><li>4.taxation in another Member State</li><li>5.rules on liability and mandatory insurance linked to residence or employment in another Member State</li><li>6.terms and conditions of employment, including for posted workers, as stipulated by law or statutory instrument (including information on working hours, paid leave, holiday entitlements, rights and obligations regarding overtime work, health checks, termination of contracts, dismissal and redundancies)</li><li>7.equal treatment (rules prohibiting discrimination in the workplace, rules on equal pay for men and women and on equal pay for employees on fixed-term or permanent employment contracts)</li><li>8.health and safety obligations in relation to different types of activity</li><li>9.social security rights and obligations in the Union including those related to getting pensions</li></ol>
C.Vehicles in the Union	<ol style="list-style-type: none"><li>1.taking a motor vehicle temporarily or permanently to another Member State</li><li>2.acquiring and renewing a driving licence</li><li>3.taking out mandatory motor vehicle insurance</li><li>4.buying and selling a motor vehicle in another Member State</li><li>5.national traffic rules and requirements for drivers, including general rules for the use of the national road infrastructure: time-based charges (vignette), distance-based charges (toll), emission stickers</li></ol>

<p>D. Residence in another Member State</p>	<ol style="list-style-type: none"> <li>1. moving temporarily or permanently to another Member State</li> <li>2. purchasing and selling of immovable property, including any conditions and obligations related to taxation, ownership, or use of such property, including its use as a secondary residence</li> <li>3. participating in municipal elections and elections to the European Parliament</li> <li>4. requirements for residence cards for Union citizens and their family members, including family members who are not Union citizens</li> <li>5. conditions applicable to the naturalisation of nationals from another Member State</li> <li>6. rules applicable in the case of death, including rules on the repatriation of remains to another Member State</li> </ol>
<p>E. Education or traineeship in another Member State</p>	<ol style="list-style-type: none"> <li>1. education system in another Member State, including early childhood education and care, primary and secondary education, higher education and adult learning</li> <li>2. volunteering in another Member State</li> <li>3. traineeships in another Member State</li> <li>4. conducting research in another Member State as part of an education programme</li> </ol>
<p>F. Healthcare</p>	<ol style="list-style-type: none"> <li>1. getting medical treatment in another Member State</li> <li>2. buying prescribed pharmaceutical products in a Member State other than the one where the prescription was issued, online or in person</li> <li>3. health insurance rules applicable in the case of short-term or long-term stays in another Member State, including how to apply for a European Health Insurance Card</li> <li>4. general information on access rights or obligations to participate in available public preventive healthcare measures</li> <li>5. services provided through national emergency numbers, including '112' and '116' numbers</li> <li>6. rights and conditions for moving to a residential care home</li> </ol>
<p>G. Citizens' and family rights</p>	<ol style="list-style-type: none"> <li>1. birth, custody for minor children, parental responsibilities, rules on surrogacy and adoption, including second-parent-adoption, maintenance obligations in relation to children in a cross-border family situation</li> <li>2. living in a couple with different nationalities, including same-sex couples (marriage, civil or registered partnership, separation, divorce, marital property rights, the rights of cohabitants)</li> <li>3. rules of gender recognition</li> <li>4. rights and obligations in relation to succession in another Member State, including tax rules</li> <li>5. rights and rules applicable in the case of cross-border parental child abduction</li> </ol>

H.Consumer rights	<ol style="list-style-type: none"> <li>1.buying goods, digital content or services (including financial services) from another Member State, online or in person</li> <li>2.holding a bank account in another Member State</li> <li>3.connection to utilities, such as gas, electricity, water, household waste disposal, telecoms and the internet</li> <li>4.payments, including credit transfers, delays in cross-border payments</li> <li>5.consumer rights and guarantees related to buying goods and services, including procedures for consumer dispute resolution and compensation</li> <li>6.safety and security of consumer products</li> <li>7.renting a motor vehicle</li> </ol>
I.Protection of personal data	<ol style="list-style-type: none"> <li>1.exercising data subjects' rights in relation to the protection of personal data</li> </ol>

<b>Area</b>	<b>INFORMATION REGARDING RIGHTS, OBLIGATIONS AND RULES</b>
J.Starting, running and closing a business	<ol style="list-style-type: none"> <li>1.registering, changing the legal form of or closing a business (registration procedures and legal forms for carrying out business)</li> <li>2.moving a business to another Member State</li> <li>3.intellectual property rights (applying for a patent, registering a trademark, a drawing or a design, getting a licence for reproduction)</li> <li>4.fairness and transparency in commercial practices, including consumer rights and guarantees related to selling goods and services</li> <li>5.offering online facilities for cross-border payments when selling goods and services online</li> <li>6.rights and obligations arising under contract law, including late payment interests</li> <li>7.insolvency proceedings and liquidation of companies</li> <li>8.credit insurance</li> <li>9. mergers of companies or selling a business</li> <li>10. civil liability of directors of a company</li> </ol>



	<ol style="list-style-type: none"> <li>11.rules and obligations regarding the processing of personal data</li> </ol>
K. Employees	<ol style="list-style-type: none"> <li>1.terms of employment stipulated by law or statutory instrument (including working hours, paid leave, holiday entitlements, rights and obligations regarding overtime work, health checks, termination of contracts, dismissals and redundancies)</li> <li>2.social security rights and obligations in the Union (registering as employer, registering employees, notifying the end of contract of an employee, paying social contributions, rights and obligations related to pensions)</li> <li>3.employment of workers in other Member States (posting of workers, rules on freedom to provide services, residency requirements for workers)</li> <li>4.equal treatment (rules prohibiting discrimination in the workplace, rules on equal pay for men and women and equal pay for employees on fixed-term or under permanent employment contracts)</li> <li>5.rules on staff representation</li> </ol>
L. Taxes	<ol style="list-style-type: none"> <li>1.VAT: information on the general rules, rates and exemptions, registering for and paying VAT, obtaining a refund</li> <li>2.excise duties: information on the general rules, rates and exemptions, registration for excise tax purposes and payment of excise tax, obtaining a refund</li> <li>3.customs duties and other taxes and duties collected on imports</li> <li>4.customs procedures for imports and exports under the Union Customs Code</li> <li>5.other taxes: payment, rates, tax returns</li> </ol>
M. Goods	<ol style="list-style-type: none"> <li>1.obtaining CE marking</li> <li>2.product rules and requirements</li> <li>3.identifying applicable standards, technical specifications and getting products certified</li> <li>4.mutual recognition of products not subject to Union specifications</li> <li>5.requirements regarding classification, labelling and packaging for hazardous chemicals</li> <li>6.distance/off-premises selling: information to be given to customers in advance, confirmation of the contract in writing, withdrawal from a contract, delivering of the goods, other specific obligations</li> <li>7.defective products: consumer rights and guarantees, after-sale responsibilities, means of redress for an injured party</li> </ol>

	<p>8.certification, labels (EMAS, energy labels, Eco-design, EU eco-label)</p> <p>9. recycling and waste management</p>
N. Services	<p>1.acquiring licences, authorisations or permits with a view to starting and operating a business</p> <p>2. notifying the authorities of cross-border activities</p> <p>3.recognition of professional qualifications, including vocational education and training</p>
O.Funding a business	<p>1.obtaining access to finance at the Union level, including Union funding programmes and business grants</p> <p>2. obtaining access to finance at national level</p> <p>3.initiatives addressed to entrepreneurs (exchanges organised for new entrepreneurs, mentoring programmes, etc.)</p>
P.Public contracts	<p>1. participating in public tenders: rules and procedures</p> <p>2.submitting a bid online in response to a public call for tender</p> <p>3.reporting irregularities in relation to the tender process</p>
Q.Health and safety at work	<p>1.health and safety obligations in relation to different types of activity, including risk prevention, information and training</p>

## ANNEX VI. RESOURCES

**Table 15: Overview: Lists of public services.**

Name	Organisation responsible	Region	Link
Single Digital Gateway Annex II	DG GROW	Europe	<a href="http://data.consilium.europa.eu/doc/document/ST-10069-2018-INIT/en/pdf">http://data.consilium.europa.eu/doc/document/ST-10069-2018-INIT/en/pdf</a>
Uniforme Productnaam (UPL)	Logius – Ministerie van Binnenlandse Zaken en Koninkrijksrelaties	The Netherlands	<a href="http://standaarden.overheid.nl/owms/4.0/doc/waardelijsten/overheid.uniformeproductnaam">http://standaarden.overheid.nl/owms/4.0/doc/waardelijsten/overheid.uniformeproductnaam</a>
Elenco procedimenti amministrativi di competenza dell'amministrazione provinciale	Provincia Autonoma di Trento	Trento	<a href="https://comefareper.provincia.tn.it/conoscere-i-procedimenti">https://comefareper.provincia.tn.it/conoscere-i-procedimenti</a>
Servizi-gov	Digital Italy Agency	Italy	<a href="https://github.com/italia/servizi-gov/tree/master/resources/service-templates">https://github.com/italia/servizi-gov/tree/master/resources/service-templates</a>
Universal Menu Draft from SMA	Ministry of Economy, Trade and Industry (METI) NGO Askoe Small and Medium company Agency	Japan	<a href="http://universalmenu.org/openum/um/index.html">http://universalmenu.org/openum/um/index.html</a>
GEA-NZ Reference Taxonomies	Government Enterprise Architecture	New Zealand	<a href="https://www.ict.govt.nz/guidance-and-resources/architecture/government-enterprise-architecture-for-new-zealand-framework/gea-nz-reference-taxonomies/">https://www.ict.govt.nz/guidance-and-resources/architecture/government-enterprise-architecture-for-new-zealand-framework/gea-nz-reference-taxonomies/</a>
ESD	Local Government Association	England, Scotland, Belgium, Netherlands, Norway, Sweden, Germany.	<a href="https://standards.esd.org.uk/?uri=list%2Fservices&amp;tab=details">https://standards.esd.org.uk/?uri=list%2Fservices&amp;tab=details</a>

**Table 16: Used resources – Top-down themes**

Region	Link
Scotland	<a href="https://www.mygov.scot/">https://www.mygov.scot/</a>
Flanders	<a href="https://www.vlaanderen.be/en">https://www.vlaanderen.be/en</a>
Bulgaria	<a href="https://admin-guide.sofia.bg/navigator/m_cat_pas111.aspx?9WWEqGecnNps8nMSHhVNNMy/pFhStnnUNUTTR0BQIOVnfR3f8hvd/iU1yEhu3RfLIqAmLUyKeGIXQdRqD/3hAg==">https://admin-guide.sofia.bg/navigator/m_cat_pas111.aspx?9WWEqGecnNps8nMSHhVNNMy/pFhStnnUNUTTR0BQIOVnfR3f8hvd/iU1yEhu3RfLIqAmLUyKeGIXQdRqD/3hAg==</a>
Norway	<a href="http://psi.norge.no/los/all.rdf">http://psi.norge.no/los/all.rdf</a>
UK	<a href="https://www.gov.uk/">https://www.gov.uk/</a>
EU SDGR (Annex I)	<a href="https://ec.europa.eu/info/law/better-regulation/initiatives/com-2017-256_en">https://ec.europa.eu/info/law/better-regulation/initiatives/com-2017-256_en</a>

Global (Wikipedia)	<a href="https://en.wikipedia.org/wiki/Public_service">https://en.wikipedia.org/wiki/Public_service</a>
EU (ESD)	<a href="https://standards.esd.org.uk/?uri=list%2Ffunctions">https://standards.esd.org.uk/?uri=list%2Ffunctions</a>
Global	<a href="https://www.huffpost.com/entry/12-core-policy-domains_b_775008?guccounter=1">https://www.huffpost.com/entry/12-core-policy-domains_b_775008?guccounter=1</a>
EU (NACE)	<a href="http://ec.europa.eu/competition/mergers/cases/index/nace_all.html">http://ec.europa.eu/competition/mergers/cases/index/nace_all.html</a>
Spain (taxonomy)	<a href="https://www.w3.org/community/opendataspain/2013/03/04/simple-classification-scheme-public-sector/">https://www.w3.org/community/opendataspain/2013/03/04/simple-classification-scheme-public-sector/</a>
Iran (taxonomy)	<a href="https://www.scitepress.org/PublicationsDetail.aspx?ID=xUN5bETKiBo%3d&amp;t=1">https://www.scitepress.org/PublicationsDetail.aspx?ID=xUN5bETKiBo%3d&amp;t=1</a>
Global (World Bank)	<a href="http://pubdocs.worldbank.org/en/538321490128452070/Sector-Taxonomy-and-definitions.pdf">http://pubdocs.worldbank.org/en/538321490128452070/Sector-Taxonomy-and-definitions.pdf</a>
EU - dcat:theme	<a href="http://pubdocs.worldbank.org/en/538321490128452070/Sector-Taxonomy-and-definitions.pdf">http://pubdocs.worldbank.org/en/538321490128452070/Sector-Taxonomy-and-definitions.pdf</a>

**Table 17: Used resources – Top-down patterns**

Region	Link
EU (ESD)	<a href="https://standards.esd.org.uk/?uri=list%2Ffunctions">https://standards.esd.org.uk/?uri=list%2Ffunctions</a>
Iran	<a href="https://pdfs.semanticscholar.org/4d70/09b41756e0ce2bfe731b8c2e285f85e55ed.pdf?_ga=2.35536545.1836092349.1547824072-2080586540.1547824072">https://pdfs.semanticscholar.org/4d70/09b41756e0ce2bfe731b8c2e285f85e55ed.pdf?_ga=2.35536545.1836092349.1547824072-2080586540.1547824072</a>
Global (GEA)	<a href="https://www.dropbox.com/s/cigcehlh5dpbs5i/Taxonomy%20of%20public%20services.pdf?dl=0">https://www.dropbox.com/s/cigcehlh5dpbs5i/Taxonomy%20of%20public%20services.pdf?dl=0</a>

## ANNEX VII. LIST OF PUBLIC SERVICES ANALYSED

### A. European initiatives

#### 1) Single Digital Gateway proposal for regulation – DG GROW

The Annex II of the proposal for regulation of the European Parliament and of the Council on “*establishing a single digital gateway to provide information, procedures, assistance and problem solving services and amending Regulation (EU) No 1024/2012*”<sup>76</sup>, referred in Article 6(1), contains the list of public service procedures detailed in the Annex II of the SDG. The Regulation “*pursues a threefold [objective][...]*”:

- *reducing additional administrative burden on citizens and businesses that exercise or want to exercise their internal market rights, including the free movement of citizens, in full compliance with national rules and procedures;*
- *eliminating discrimination; and*
- *ensuring the functioning of the internal market with regard to provision of information, procedures and assistance, and problem solving services”.*

The procedures should be used by the Regulation for:

- supporting the ‘Once-only’ principle, in compliance with the protection of personal data; and
- providing fully-digitised user interfaces across borders for member states already applying such procedures and without affecting the substance of the existing procedures.

When looking at the public services in the Annex II of the SDG, we observe that:

- Services are categorised by event;
- There are two different types of generic services: the services that are present in each member state as national or regional services (e.g. submitting an income tax declaration) and the services that are directly at a European level (e.g. Application for European Health Insurance Card (EHIC));
- All services listed should be present or directly related to national lists of public services;
- Many existing public services are not part of this proposition.

In addition to those procedures from Annex II, there are also information areas in Annex I<sup>77</sup> (see Annex V of this document). The SDG regulation points also to “procedures provided for in Directives 2005/36/EC<sup>78</sup>, 2006/123/EC<sup>79</sup>, 2014/24/EU<sup>80</sup> and 2014/25/EU<sup>81</sup>”.

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<sup>76</sup> <http://data.consilium.europa.eu/doc/document/ST-10069-2018-INIT/en/pdf>

<sup>77</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32018R1724&from=EN#d1e32-31-1>

<sup>78</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32005L0036&from=EN#d1e548-22-1>

<sup>79</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32006L0123&from=EN>

<sup>80</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014L0024&from=EN>

<sup>81</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014L0025&from=EN>

**Table 18: Existing list of procedures for the Single Digital Gateway, Annex II.**

<b>Life Event</b>	<b>Nº Seq</b>	<b>Procedure</b>	<b>Expected output subject to an assessment of the application by the competent authority in accordance with their national law, where relevant</b>
Birth	1	Requesting proof of registration of birth	Proof of registration of birth or birth certificate
Residence	2	Requesting proof of residence	Confirmation of registration at the current address
Studying	3	Applying for a tertiary education study financing, such as study grants and loans from a public body or institution	Decision on the application for financing or acknowledgement of receipt
	4	Submitting an initial application for admission in public higher education institution	Confirmation of the receipt of application
Working	5	Request for determination of applicable legislation in accordance with Title II of Regulation (EC) No 883/200429	Decision on applicable legislation
	6	Notifying changes in personal or professional circumstances of the person receiving socialsecurity benefits, relevant for such benefits	Confirmation of receipt of notification of change
	7	Application for European Health Insurance Card (EHIC)	European Health Insurance Card (EHIC)
	8	Requesting academic recognition of diplomas, certificates or other proof of studies or courses	Decision on the request for recognition
	9	Submitting an income tax declaration	Confirmation of the receipt of the declaration
Moving	10	Registering a change of address	Confirmation of the deregistration at the previous address and of the registration of the new address
	11	Registering a motor vehicle originating from or already registered in an EU Member State, in standard procedures <sup>30</sup>	Proof of registration of a motor vehicle
	12	Obtaining stickers for the use of the national road infrastructure: toll or vignette issued by a public body or institution	Receipt of toll sticker or vignette or other proof of payment
	13	Obtaining emission stickers issued by a public body or institution	Receipt of emission sticker or other proof of payment
Retiring	14	Claiming pension and pre-retirement benefits from compulsory schemes	Confirmation of the receipt of the claim or decision regarding the claim for a pension or pre-retirement benefits

	15	Requesting information on the data related to pension from compulsory schemes	Statement of personal pension data
Starting a business	16	Notification of business activity, permissions of business activity, changes of business activity and the termination of a business activity not involving insolvency or liquidation procedures, excluding the initial registration of a business activity with the business register and excluding procedures concerning the constitution of or any subsequent filing by companies or firms within the meaning of the second paragraph of Article 54 TFEU	Confirmation of the receipt of notification or change, or of the request for permission of business activity
	17	Registration of an employer (a natural person) with compulsory pension and insurance schemes	Confirmation of registration or social security registration number
	18	Registration of employees with compulsory pension and insurance schemes	Confirmation of registration or social security registration number
	19	Submitting a corporate tax declaration	Confirmation of the receipt of the declaration
Doing business	20	Notification to the social security schemes of the end of contract with an employee, excluding procedures for the collective termination of employee contracts	Confirmation of the receipt of the notification
	21	Payment of social contributions for employees	Receipt or other form of confirmation of payment of social contributions for employees

## 2) Local Government Services List (ESD)

The Service list is a catalogue of all services performed by Local Government in England and Scotland and Municipalities in Belgium, Netherlands, Norway, Sweden and Germany. The list contains 1800 public services. A service list provides a standard way of referring to each service when communicating within and between organisations. It uses unique numeric identifiers for each service, irrespective of the language and naming conventions that are used by different people and organisations to identify or describe services. The service list uses terminology that is recognised within the public sector but may not necessarily be understood by the customer.<sup>82</sup>



**Figure 21: Sample of the list of 1800 local public services.**<sup>83</sup>

The list can be found on a platform page with other controlled vocabularies (Figure 7).

<sup>82</sup> <https://standards.esd.org.uk/?uri=list%2Fservices&tab=details>

<sup>83</sup> <https://standards.esd.org.uk/?uri=list%2Fservices>



Identifier	Label	Description	Created	Modified	History notes	Type	Status
1	Home schooling	The education authority will arrange to visit a parent thinking about educating their child at home to help them plan the child's education. They will ensure that the child will receive efficient full-time education suitable to their age, ability and any special needs.	03/04/2013	03/04/2013	Added scope notes in version 2.02. Term name changed from 'Educating your child at home' to 'Schools - home schooling' in version 3.00. . Term name changed to 'Home schooling' in version 4.00	Service	Live
2	School clothing grants/vouchers	The award of clothing grants or vouchers to assist with the cost of school clothing for families who are on benefits or on low income.	03/04/2013	03/04/2013	Added scope notes in version 2.02. Term name changed from 'Educational awards and benefits- school clothing grants/vouchers' to 'Education - grants- school clothing grants/vouchers' in version 3.00. Term name changed to 'School clothing grants/vouchers' in version 4.00.	Service	Live
...	...	...	...	...	...	...	...
1798	Rent repayment order	A rent repayment order (RRO) is an order that allows a tenant or local authority to reclaim rent or housing benefit where a landlord rents out an unlicensed property such as a house in multiple occupation (HMO) or where a landlord has committed certain other offences in relation to a property they let.	20/03/2018	20/03/2018	Added in March 2018	Service	Live
1799	Cycle and motorcycle parking	Provision of stands and racks for parking cycles and motorcycles	20/03/2018	20/03/2018	Added in March 2018	Service	Live
1800	Homelessness assessment	Assessment of the circumstances of anyone in the authority area who is homeless or threatened with homelessness and may be eligible for assistance	16/05/2018	16/05/2018	Added in May 2018	Service	Live

**Figure 22: Existing list of public services from the ESD, first and last services**

## **B. Member states' initiatives**

### **1) Logius – Ministerie van Binnenlandse Zaken en Koninkrijksrelaties – The Netherlands**

The Netherlands has developed a full list of public services and products (Uniforme Productnamelijst or UPL)<sup>84</sup> relevant for all levels of public administrations within the country. The list is available in Dutch in different formats. It takes part of the standard of cooperative catalogues with unique uniform name for each product and service provided by the authorities<sup>85</sup>. The list is updated by default on a quarterly basis by the responsible agency, Logius, under the ministry of the Interior (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties). The list contains 840 public services currently offered to citizens and businesses which we translated automatically from Dutch to English for the analysis. The list is used as part of the catalogue of services proposed at national level.

Some observations can be made on the UPL:

- There is no definition or description provided with the public services name;
- The legal framework of each public service is indicated;
- The public services are not categorised;
- The translation from Dutch to English is not entirely reliable.

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<sup>84</sup> <http://standaarden.overheid.nl/owms/4.0/doc/waardelijsten/overheid.uniformeproductnaam> and <http://standaarden.overheid.nl/upl/doc/Toelichting-UPL.pdf>

<sup>85</sup> <https://www.logius.nl/diensten/samenwerkende-catalogi/detailinformatie/>

**Table 19: Existing list of public services from The Netherlands**

Uniforme Productnaam	URI	Rijk	Provincie	Waterschap	Gemeente	RVO	Grondslag	Grondslaglabel	Grondslaglink
aanleunwoning	<a href="http://standaarden.overheid.nl/owms/terms/aanleunwoning">http://standaarden.overheid.nl/owms/terms/aanleunwoning</a>				X				
aanpassing zelfgeboord vliegtuigmelding	<a href="http://standaarden.overheid.nl/owms/terms/aanpZelfbVliegtMeld">http://standaarden.overheid.nl/owms/terms/aanpZelfbVliegtMeld</a>	X					<a href="http://standaarden.overheid.nl/owms/terms/RegAmLuchtvaart_7">http://standaarden.overheid.nl/owms/terms/RegAmLuchtvaart_7</a>	Artikel 7 Regeling amateurboorvluchtvaartuigen	<a href="http://wetten.overheid.nl/jci1.3:c:BWBR0013494&amp;Paragraaf=4&amp;artikel=7">http://wetten.overheid.nl/jci1.3:c:BWBR0013494&amp;Paragraaf=4&amp;artikel=7</a>
aanschrijving	<a href="http://standaarden.overheid.nl/owms/terms/aanschrijving">http://standaarden.overheid.nl/owms/terms/aanschrijving</a>		X	X	X		<a href="http://standaarden.overheid.nl/owms/terms/PW_art_122">http://standaarden.overheid.nl/owms/terms/PW_art_122</a>	Artikel 122 Provinciewet	<a href="http://wetten.overheid.nl/jci1.3:c:BWBR0005645&amp;titeldeel=III&amp;hoofdstuk=VIII&amp;Paragraaf=4&amp;artikel=122">http://wetten.overheid.nl/jci1.3:c:BWBR0005645&amp;titeldeel=III&amp;hoofdstuk=VIII&amp;Paragraaf=4&amp;artikel=122</a>
aanschrijving	<a href="http://standaarden.overheid.nl/owms/terms/aanschrijving">http://standaarden.overheid.nl/owms/terms/aanschrijving</a>		X	X	X		<a href="http://standaarden.overheid.nl/owms/terms/Wschw_art_61">http://standaarden.overheid.nl/owms/terms/Wschw_art_61</a>	Artikel 61 Waterschapswet	<a href="http://wetten.overheid.nl/jci1.3:c:BWBR0005108&amp;titeldeel=III&amp;hoofdstuk=IX&amp;Paragraaf=4&amp;artikel=61">http://wetten.overheid.nl/jci1.3:c:BWBR0005108&amp;titeldeel=III&amp;hoofdstuk=IX&amp;Paragraaf=4&amp;artikel=61</a>

## 2) Agenzia per l'Italia Digitale - Italy

AgID, the Digital Italy Agency<sup>86</sup>, created a list of public services in 2015. The Italian list represents more than 1000 public services. The list is available on GitHub<sup>87</sup>. The list is divided between the different levels of administration (municipal, regional and national) and, for the national level, between the different ministries. Each part of the list is categorised in compliance with the Classification of Economic Activities in the European Community (NACE), Rev. 2<sup>88</sup>. The services are also described following the CPSV-AP and with the data theme recommended by DCAT-AP.

The Italian list of public services is in fact divided in multiple lists, one per national ministry plus one for the regional, provincial and local services. This causes some duplication of existing services when merging all lists together. Each public service has also some keywords and a description.

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<sup>86</sup> <https://www.agid.gov.it/>

<sup>87</sup> <https://github.com/italia/servizi-gov/tree/master/resources/service-templates>

<sup>88</sup> [http://ec.europa.eu/eurostat/ramon/nomenclatures/index.cfm?TargetUrl=LST\\_NOM\\_DTL&StrNom=NACE\\_REV2&StrLanguageCode=EN&IntPcKey=&StrLayoutCode=HIERARCHIC](http://ec.europa.eu/eurostat/ramon/nomenclatures/index.cfm?TargetUrl=LST_NOM_DTL&StrNom=NACE_REV2&StrLanguageCode=EN&IntPcKey=&StrLayoutCode=HIERARCHIC)

Table 20: Existing list of public services from Italy (AdE)

N. SERVIZIO	Authority code	TEMA DCAT-AP	NACE code L.1	NACE SOTTO-TEMA 1	SERVIZIO	DESCRIZIONE	PAROLE CHIAVE	CODICE LE	LIFE EVENTS	CODICE BE	BUSINESS EVENTS	PagoPA	SPID
2	TRAN	Trasporti	H	Trasporto e magazzinaggio	Noleggio occasionale di imbarcazioni e navi da diporto	Noleggio occasionale di imbarcazioni e navi da diporto	Navi, imbarcazioni						
3	ECON	Economia e finanze	M	Attività professionali, scientifiche e tecniche	Studi di settore e parametri (strumenti per la stima dei ricavi e compensi)	Studi di settore e parametri (strumenti per la stima dei ricavi e compensi)	settore, stima, compenso			BE/8	Pagamento tasse, iva e dogane		
4	TECH	Scienza e tecnologia	M	Attività professionali, scientifiche e tecniche	Consultazione banche dati - Sister	Consultazione banche dati - Sister	Banca, dati, Sister						

## C. Other initiatives

### 1) Government Enterprise Architecture - New Zealand

New Zealand has developed some taxonomies<sup>89</sup> on different topics:

- Business;
- Data and information;
- Application and software services;
- Infrastructure.

The latest version of the taxonomies were approved on the 25<sup>th</sup> of May 2017. Change requests to the taxonomies are collected and approved on a monthly basis or when required. The different taxonomies follow some reference principles among which:

- Principle 1 is that elements that make up the reference taxonomies should be recognised industry or NZ government terms. For example, Business Domains, Areas, and Categories should be recognised industry functional terms, or NZ government functional terms.
- Principle 2 is that taxonomies should not have more than 3 levels. Ideally the taxonomy should be meaningful at the area level (2nd level), with the category level (3rd level) providing a detailed view where required.
- Principle 3 is show or note the source of a term and or definition.
- Principle 4 is show related terms. Related terms should be listed in the element description with a heading "Related Terms". Related terms may be sometimes referred to as; also known as (AKA), or a synonym."<sup>90</sup>

The taxonomy of business terms from New Zealand is the most structured list among the different ones collected. Each public service has a unique identifier, a description and is categorized according to three different levels of genericity. Some examples of public services from New Zealand are shown in Table 21Annex VII.

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<sup>89</sup> <https://www.ict.govt.nz/guidance-and-resources/architecture/government-enterprise-architecture-for-new-zealand-framework/gea-nz-reference-taxonomies/>

<sup>90</sup> <https://www.ict.govt.nz/guidance-and-resources/architecture/government-enterprise-architecture-for-new-zealand-framework/gea-nz-reference-taxonomies/reference-taxonomy-principles/>

**Table 21: New Zealand taxonomy of public services (GEA)**

<b>Taxonomy Element ID</b>	<b>Taxonomy Element Name</b>	<b>Taxonomy Element Combined ID and Name</b>	<b>Taxonomy Element Description</b>
<b>B2</b>	<b>Individuals &amp; Communities</b>	<b>B2 Individuals &amp; Communities</b>	<b>In the Individuals &amp; Communities domain we have functions that deliver services specifically to New Zealand individuals and communities.</b>
<b>B2.01</b>	<b>Adoption and Fostering</b>	<b>B2.01 Adoption and Fostering</b>	<b>Adoption and fostering supports a person assumes the parenting of another, usually a child, from that person's biological or legal parent or parents.</b>
B2.01.01	Adoption	B2.01.01 Adoption	Manage adoption services; arranging, assessment, education, reporting, counselling, mediation, and approval of adoption-related matters. The three main options for adopting a child are: <ul style="list-style-type: none"> <li>- Adopting a child within New Zealand</li> <li>- Adopting a step or surrogate child</li> <li>- Adopting a child from overseas</li> </ul>
B2.01.02	Fostering	B2.01.02 Fostering	Support the fostering of children who can't live with their own family, and support foster families. It's a care arrangement, not a legal status - the family is responsible for caring for the child but has no legal rights over them.
B2.01.03	Whangai Adoption	B2.01.03 Whangai Adoption	Whangai is a customary Maori practice where a child is brought up by someone other than their birth parents - usually another relative. Whangai may be temporary or permanent. A parent who takes on a child is called a matua whangai, and the child is a tamaiti whangai. The child knows both its birth parents and whangai parents, and the whole community is usually involved in the decision.

## 1) Universal Menu – Japan

In Japan, a public-private partnership<sup>91</sup> is developing the Universal Menu. It has developed a service catalogue for citizens. The list contains a combination of themes (e.g. 'Education') and user journeys (e.g. the pregnancy 'user journey', where different services are listed the user can use before, during and after a pregnancy). The list of services is mapped against CPSV-AP, Estonian public services and the UK list of public services.

Figure 23: UM Map and UM Menu. Figure 23 shows the UM<sup>92</sup> for citizens. Public services, mixed with other entities (e.g. 'hospitals') are categorised by life event or clustered life events. This part is combined with the UM content patterns and items (Figure 24).

UM Map and UM Menu		
Life Event		Pregnant/ Birth UM
<b>1000 Pregnancy / Childbirth</b>	1100 Notification/ Procedure	1101 Pregnancy notification
2000 Childcare / Education		<b>1102 Maternal and Child Health Handbook</b>
3000 Marriage / Divorce	1200 Medical checkup	1103 Childbirth registration
4000 Moving / Housing		1104 National Health Insurance Program
5000 Employment / Unemployment	1300 Financial support	1105 Others
6000 Senior citizens / Nursing are		1201 Prenatal checkup
7000 Death		1202 Medical checkup for infants
8000 Others		1301 Subsidies for designated fertility treatments
		1302 Lump-sum birth allowance
		1303 Loans for delivery expenses
	1400 Support/ facilities	1304 Medical care benefits for the care of premature babies
		1305 Medical care benefits for infants
		1306 Others
		1401 Seminars
	1500 Consultations / Inquiries	1402 Delivery support
		1403 Midwifery services
	1600 Others	1404 Others
		1501 Consultations/ inquiries
		1601 Hospitals
		1602 Others

Provided by International Universal Menu Association

**Figure 23: UM Map and UM Menu.**<sup>93</sup>

<sup>91</sup> Asukoe + METI (Ministry of Economy, Trade and Industry)

<sup>92</sup> Universal Menu

<sup>93</sup> Full presentation of the UM can be found on Joinup: <https://joinup.ec.europa.eu/collection/semantic-interoperability-community-semic/event/catalogue-services-webinar-10-april-2019-930-1130-cet>



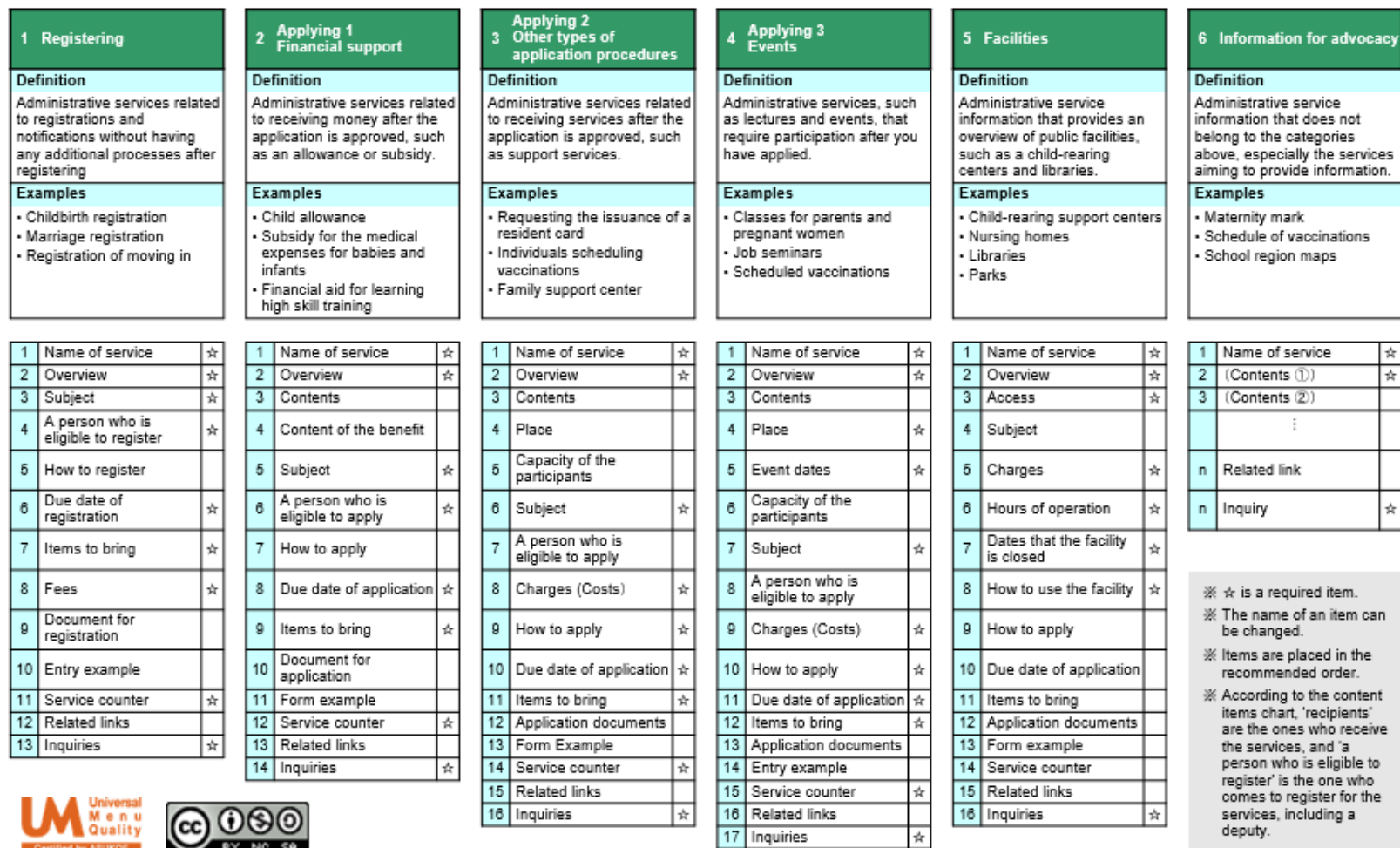


Figure 24: UM content patterns and item

## An action supported by ISA<sup>2</sup>

ISA<sup>2</sup> is a EUR 131 million programme of the European Commission which develops digital solutions that enable interoperable cross-border and cross-sector public services, for the benefit of public administrations, businesses and citizens across the EU. ISA<sup>2</sup> supports a wide range of activities and solutions, among which is the Semantic Interoperability Community (SEMIC) action.

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