Interoperability Maturity Model

Report on benchmark results. 2017 Edition

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EXECUTIVE SUMMARY

Short Abstract

Through the Interoperability Maturity Model (IMM), interoperability capabilities across Member States, Directorates General of the European Commission or any other public services taking the IMM survey was benchmarked, allowing for 50 concrete recommendations on how to improve governance of public services.

Over a period of two months, which covers all administrative levels, it was concluded that the public services benchmarked are in average at the level of Essential Interoperability. This means that the digital public service implements some indispensable practices for interoperability but it is desired that the benchmark be a level higher so as the digital public service is considered to have implemented interoperability according to good or best practice.

Objectives

The Interoperability Maturity Model (IMM) delivers a Self-Assessment interoperability Maturity Tool, and allows to provide benchmarks of interoperability capabilities across Member States, Directorates General of the European Commission or any other public services taking the IMM survey.

This interoperability maturity benchmark was carried out from May to July 2017, resulting in 68 valid public service benchmarks taken by public administrations from 23 countries, with 7 of them relating to cross-border services and 14 relating to non EU countries.

The services cover all administrative levels: National, Regional, Local, European or International. Three quarters of the benchmarked services are made available at National level.

Method

IMM attributes relate to one or several of the four **levels of interoperability of the European Interoperability Framework** (Legal, Organizational, Semantic and Technical interoperability). Legal interoperability-related attributes have yielded the highest maturity level, as shown in the figure below, followed by organizational, semantic and technical interoperability. This indicates that, for the public services benchmarked, **interoperability is hampered by semantic & technical challenges rather than by regulatory or organizational settings**.

Figure 1: IMM Benchmark Results 2017 – EIF interoperability level-related attributes - average score

Detailed IMM benchmark data shows that attributes related to **interoperability enablers** (these are enabling conditions such as having an appropriate governance or managerial setting in place) and **interoperability manifestations** (that is the actual interoperability performance/results of the public service) as defined in the IMM model show a similar maturity. This could allow to conclude that where suitable enablers are in place, a higher interoperability maturity is a logical consequence.

As defined in the IMM, the **complexity of a public service** is mirrored by the number of services the public service reuses. The most reused service is the authentication service, followed by the access management service and data exchange services. All three are reused by over half the public services benchmarked. While on average, services reuse 7 other services, the most cited

number of reused services is 4. The benchmark overall shows **that reuse of though available service components is still limited**, and that similarly, **only few public services make available service components for reuse.**

The IMM defines three 'areas' of interoperability: service delivery (how the service is delivered to end users), service consumption (the reuse of service components and how this reuse takes place) and service governance (architectural, procurement, organizational and managerial attributes). The interoperability maturity of **service delivery** is - on average - below the Essential level in the domains of service catalogues, cross-border delivery, multilingualism and accessibility. The benchmark thus allows to distill the following weaknesses in implementing public service delivery:

- Only few public services are publicized and thus find-able through service catalogues;
- There are still significant barriers to non-nationals/non-residents or the impaired to use public services;
- There is limited sharing of knowledge, artefacts, and IT components (such as API, code, software, run-time services, ...).

The interoperability maturity of **service consumption** is - on average - below the Essential level in the consumption of relevant services from public administrations whilst they are available for reuse. The interoperability maturity of **service management** is - on average - below the Essential level regarding the sharing of components and knowledge with the external environment.

Most of the IMM's attributes have been derived from or intrinsically relate to the EIF which includes nearly 50 concrete recommendations on how to improve governance of public services' interoperability activities, establish cross-organizational relationships, streamline processes supporting end-to-end digital services, and ensure that both existing and new legislation do not compromise interoperability efforts. The findings from this IMM benchmark give an indication of how well the EIF is being implemented.

Conclusions

The overall result of the benchmark concludes that the **public services benchmarked[1] are in average at the level of Essential Interoperability** (level 3 on a scale of 5), which means that the digital public service implements some indispensable practices for interoperability. The **desired** interoperability level, as suggested by the IMM model for a digital public service, is at least level 4: 'Sustainable'. As from this level upwards, the digital public service is considered to have implemented interoperability according to good or best practice.

As strong points appear that IMM attributes related to the **transparency and data privacy principles**, as well as to **semantic interoperability** score the highest in the 2017 benchmark.

This implies that:

- Public service users are generally well informed of what personal data is being managed about them, and under what conditions and can increasingly self-manage this data;
- Public services increasingly rely on a common semantic vocabulary.

It must be highlighted that given that the value distributions of i) all the attributes and ii) the second order IMM areas follow a normal distribution, it is suggested that the sample is representative of the population and, therefore, all findings can be extrapolated to the population.

[1] The benchmark exercise is based on voluntary contributions from Member States, as is the case of the NIFO and other ISA² observatories. The sample of the 68 services benchmarked is not chosen as a representative sample of all public services across the various countries. An analysis of the distribution of the results (see annex 4) emphasizes this conclusion that the 68 services are not representative because of the non-normal distribution of the results.

AUDIENCE

This document describes the IMM benchmark 2017 results.

This document is intended for the following audiences:

AUDIENCE	TARGETED IN THIS DOCUMENT
 **POLICY OFFICERS**	
 **IT PROVIDERS**	
 **SERVICE PROVIDERS**	
 **IT ARCHITECTS**	
 **COMM EXPERTS**	
 **LEGAL OFFICERS**	
 **IT ARCHITECTS**	

CONTENTS

1 Introduction

1. INTRODUCTION

The **Digital Agenda** for Europe has identified the lack of interoperable public services as a major obstacle for growth. Although Member States have accomplished significant work in this domain, it has proven difficult to assess the progress made so far by the different public administrations to reach greater interoperability.

In an agreement with Member States as part of the **European** interoperability **Strategy** (EIS) implementation review, it has been suggested to create an interoperability **Maturity Model (IMM)** to help verify the level of implementation of the vision laid out in the EIS. The interoperability Maturity Model would:

- Deliver a **Self-Assessment** interoperability Maturity **Tool**;
- Provide **peer reviews** of interoperability capabilities across Member States and Directorates General of the European Commission;
- Enable interoperability **audits**.

In the first phase of the Action (2011-2013), an **initial version** of the interoperability Maturity Model (covering a report documenting IMM method & process, an IMM questionnaire and guidelines to IMM users) was developed. Based on the definition of interoperability in the European Interoperability Framework (EIF), the IMM measures how well a Public Service is able to interact with other organizations to realize mutually beneficial and agreed common goals.

Sixteen Pan-European Public Services, covering different public sector domains and Trans-European Systems, as well as **four national public services** were benchmarked using the IMM model. Based on the results gathered from these evaluations, important recurring interoperability challenges and best practices in the provisioning of European Public Services were identified leading to a revision of the IMM.

In the period 2014-2015, the IMM was further fine-tuned through **alignment** of the model with nine other **ISA² Actions** and investigating its relationship vis-a-vis other **international initiatives** for measuring interoperability maturity. Moreover, an interoperability **checklist** was published intended for those involved in designing a public service to raise awareness on how to do so in an interoperable way by default.

From the second half of 2015 until the first half of 2016, the IMM was revised once more with as focal point to simplify it so it could more easily be used as a self-assessment tool. A more concise version of the IMM model (the "IMM Lite") was developed (and implemented using EUSurvey) in complement to the

full model. The "IMM Lite" was deployed by **11 EU and national level public administrations;** in parallel, **9 assessments** were conducted using the full version. Finally, the official professional training institution for the Greek Public Administration received support through the ISA[2] programme to develop an IMM-based interoperability training module and run IMM assessments – an activity which has been ongoing since.

The current contract (second half 2016 to first half 2017) abandons the full version of the IMM due to its user-reported complexity and focuses exclusively on the IMM Lite, from now on the sole version of the model (the IMM).

The contract's main objective is to **maximize the impact of the IMM** by providing it as a **fully-fledged, stand-alone self-assessment web survey to the widest possible audience,** in Europe & beyond, and encouraging its usage in **any context** users deem appropriate (as an individual assessment or comparative benchmark within a specific country or public domain, for training purposes, for assessing progress with implementing the European Interoperability Framework EIF at EU level, and so forth).

1.1. Document purpose

The report at hand presents the IMM benchmark 2017 results.

1.2. Reader

The report has 9 chapters and 3 annexes:

- Executive summary
- Introduction (this section)
- Number and description of benchmarks
- IMM benchmark on interoperability maturity levels
  - Areas of interoperability
  - IMM benchmarks on interoperability maturity levels
- IMM benchmark on EIF interoperability levels
- IMM benchmarks on interoperability enablers and manifestations
- IMM benchmarks on complexity of services
- IMM detailed benchmarks on service areas
  - Service delivery
  - Service Consumption
  - Service Management
- IMM benchmarks on EIF implementation
- Annex 1: IMM attributes mapped to the EIF
- Annex 2: IMM attributes and related categories
- Annex 3: IMM attributes and related recommendations

Number and description of benchmarks

2. Number and description of benchmarks

Number of benchmarks

The breadth and depth of the benchmark are illustrated by the numbers presented in the table and graph below. The benchmark has a **broad coverage** with 23 countries and 7 cross-border benchmarks, as well as **in-depth coverage** for 4 countries: Greece and Moldova with 10 benchmarks, Belgium with 7 benchmarks and Slovenia with 6 benchmarks.

Table 1. IMM benchmark 2017 in numbers

Total number of benchmark	Number of countries	Number of EU1 countries benchmarks	Number of cross-border benchmarks	Number of non-EU benchmarks
68	23	47	7	14

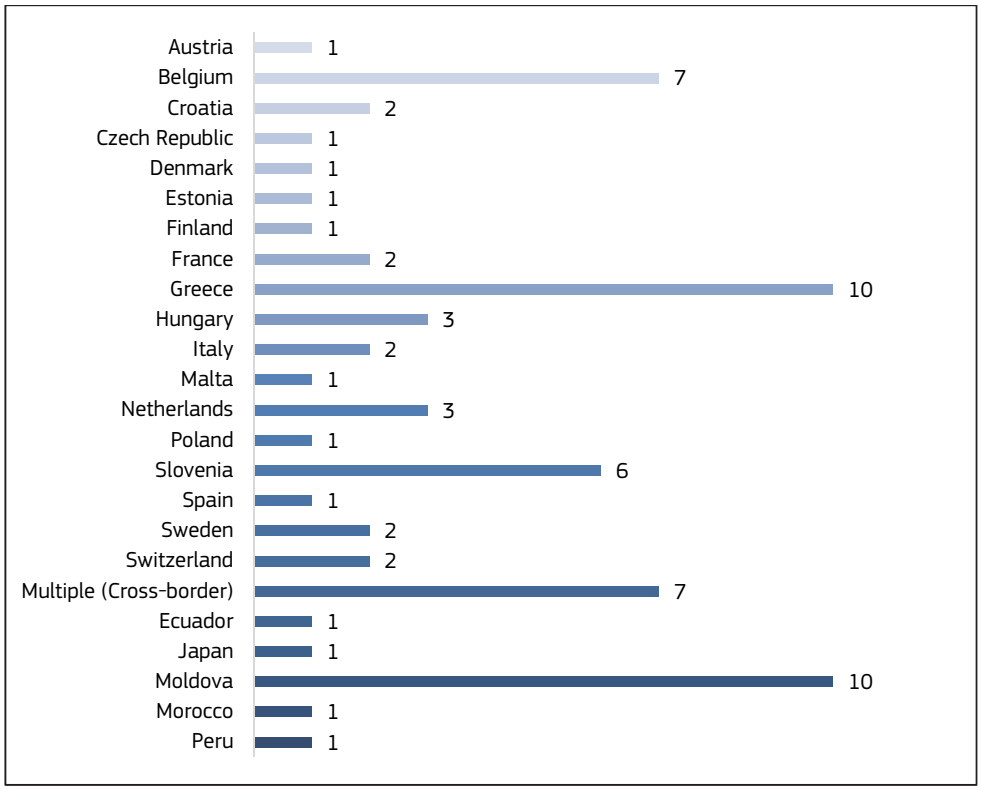

Figure 2: Number of Benchmarks per Country

[1] Incl. Switzerland

Description of services

- Level of administration

Benchmark data shows that the services benchmarked are available at different levels of administration. Three quarters of the services are at National level. The figure below details the number of services at each level - National, Regional, Local, European or International. Note: A few services are provided simultaneously at different levels.

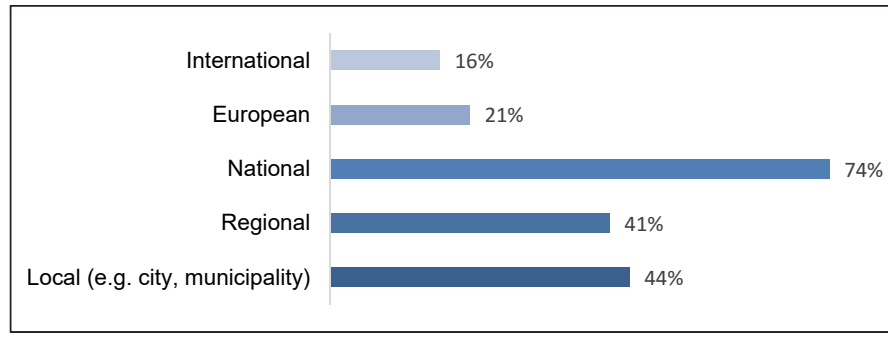

Figure 3: Administrative levels of IMM benchmarks

- Types of public services

The public services benchmarked are grouped into 23 types of services, described in an anonymous way[1] in the table below and presented in the figure below.

Table 2. IMM benchmark 2017 – types and description of services benchmarked

Type of public service	Description of public services benchmarked
Citizenship	▪ An internet voting system, an eCitizens platform providing documents regarding the civil status of citizen and a service for providing information to voters regarding their data on voters' lists
Data - Open Data	▪ An Open Data Catalogue, ▪ An Open Data Portal for enabling citizens and businesses to reuse public data
Data - Geo-data	▪ A service presenting geospatial data, ▪ A series of services related to statistics - such as provision of geostatistical information or electronic reporting for businesses ▪ A service enabling users to have direct access to the geographical information and various geo-services.
Data - Metadata	▪ Services related to standardization of vocabulary, schema, data model, character codes for government data, ▪ A National Metadata Platform

[1] The benchmark service guarantees anonymity to the user of the service.

Type of public service	Description of public services benchmarked
Document Management	▪ A service for e-Subscription to documents ▪ A digital public service that supports users for managing their administrative documents
Education	▪ Official website of a University, ▪ Provision of education online, ▪ ICT services to public administrations in education, sports, art and culture, ▪ Training for judges, prosecutors, and lawyers, ▪ A service for registering at schools, ▪ A university service to students and professors, ▪ Electronic recognition of teachers' payments ▪ Monthly salary slips for teachers of public schools
eInvoicing	▪ A digital platform that receives electronic invoices on behalf of all public services, ▪ A service for eInvoicing.
Employment	▪ Curriculum Vitae search, ▪ Job vacancy search ▪ Online registration of citizens' personal information in view of their recruitment.
Environment	▪ Environmental Performance Index
Finance	▪ A financial management information system, ▪ A service to public authorities for elaborating the budget, ▪ A service for payment execution
Funding	▪ Information on financial aid provisioning, ▪ Provision of subsidies to schools, ▪ A service to support citizens and companies in requesting scholarships and subsidies
General services	▪ A service supporting electronic procedures for companies and entrepreneurs, ▪ An e-certificate via an government portal, ▪ A central electronic platform for citizens where they can follow all electronic requests with the regional administration.
(Local) general services	▪ Various local public services, such as: change of residence, pre-school enrollment, self-reading meters, funding request, as civil registry (change of residence), building permit or base registries for streets.
Health	▪ Provision of information in a specific medical domain to pharmacists, patients, healthcare professionals, eHealth services to patients, prescription of a blood test
Internal	▪ Supporting services such as electronic identity and communication infrastructure and services between citizens and government, ▪ An unspecified administration-to-administration service, ▪ A disposition register used by several public services provided by the government,

Type of public service	Description of public services benchmarked
	▪ An electronic payment and settlement system used by several public services provided by the government, a document authentication service used by several public services provided by the government.
IT services	▪ General IT consulting and application services to public administrations, ▪ A suite of products and supporting services aimed at enabling online interaction of citizens and businesses with various government agencies.
Procurement	▪ Information about public procurement opportunities
Registry (Business)	▪ Various services to businesses such as the registration of a simple one-person company, registering a change of activity in the business register, a change of the company address, and web services to access data in the business registry.
Registry (Base)	▪ A shared distribution platform for base registry data, ▪ Web services provided to public administrations for accessing data in the base registries.
Registry (Land)	▪ A service providing official information on land parcels and other real estate from land cadaster and land registration
Safety	▪ Exchange of information with the public administration about safety, prevention of pollution and rescue services.
Simplification	▪ Various services related to administrative simplification such as a website requesting ideas to lower bureaucracy.
Social security	▪ Various services in the area of social security, such as requesting child benefits and pension, ▪ Provision of the status of the unemployed people, ▪ Renewal of the unemployment card, ▪ Online information provisioning on relevant jobs, ▪ Posting of vacancies on a job portal
Taxation	▪ A central government portal aggregating many services such as tax submissions, access to tax and fiscal data provided by the State Tax Service, provision of tax records data, data on real estate tax, data on taxpayers arrears.
Trademark	▪ Service allowing customers to request and pay for a trademark application
Transport	▪ Payment of parking tickets, ▪ Service to report the sale of a vehicle, ▪ An eAuthorization transport information system, a service issuing a traffic tickets by the police

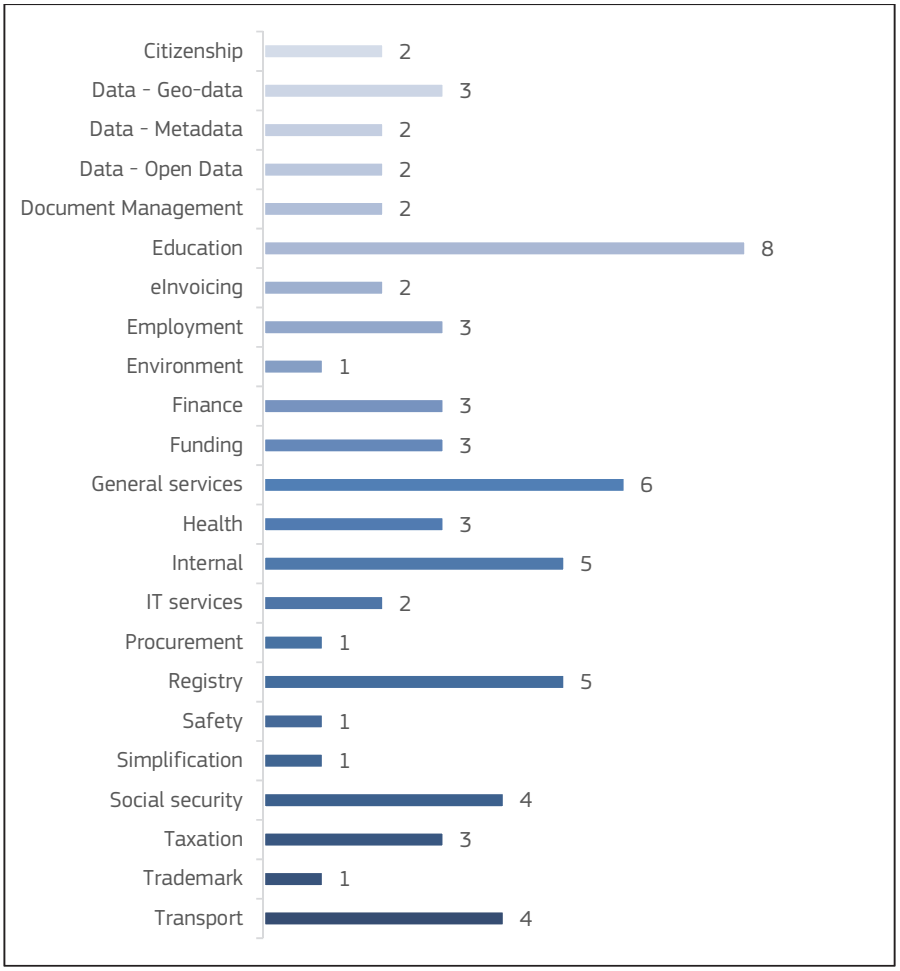

Figure 4: IMM Benchmark Results 2017 – EU benchmarks

IMM benchmarks on interoperability maturity levels

3. IMM benchmarks on interoperability maturity levels

3.1. Areas of interoperability

In the context of interoperability maturity, the IMM measures how well a digital public service is able to interact with other organisations to realise mutually beneficial and agreed common goals through the exchange of information and reuse of services.

Figure 3 displays all possible instances where interoperability with the outside world may occur from the viewpoint of a digital public service:

- *Service Delivery (B)* – Delivery of the digital public service[1];
- *Service Consumption (C)* – Consumption of reusable machine-to-machine services from other public administrations and businesses. This can include the consumption of functionalities, base registry information and security services;
- *Service Management (D)* – Controlling and monitoring the process flow related to service interactions with the external domain from trigger to outcome. This area includes Service Management aspects such as enterprise architecture, procurement, and service level management.

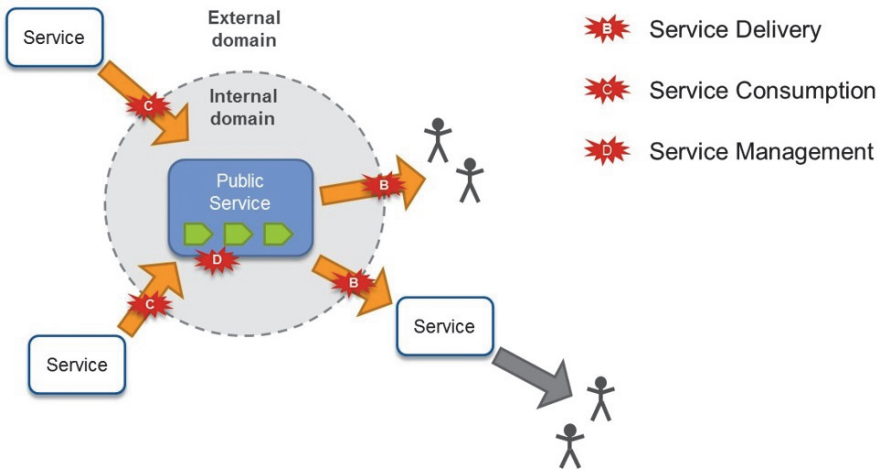

Figure 5: Overview of the interoperability areas of the IMM model

The areas (hereafter referred to as Interoperability Areas) indicated in the figure above are the object of measurement in the IMM, specifying where interoperability plays a role from a service management, service delivery and service consumption viewpoint.

[1] The numbering of the areas (B, C, D) is based on the sections of the questionnaire. As there is a service context section (A) in the questionnaire, the numbering of the areas starts at B.

- Service Delivery (B)

The public administration delivers the digital public service towards end users i.e. citizens, businesses or other administrations. We call this *Service Delivery*. The service that is being delivered represents the focal point of the IMM in terms of correctly scoping and delimiting the digital public service under evaluation. If service delivery is scoped correctly, the scoping of the other areas becomes more straightforward. The Service Delivery area focuses on the channels through which the digital public service is made available and on important interoperability aspects such as pre-filling, privacy, feedback and open semantic standards.

- Service Consumption (C)

For delivering the digital public service towards the end user, the digital public service may be required to consume services of other public administrations or businesses. This area is called *Service Consumption*.

There are various types of services that can be consumed by digital public services:

- *Functional service* – a common functionality (e.g. issuing a license, procurement, planning, a risk assessment module) shared across organisations;
- *Security service* – a specific type of functional service to share common security functions (e.g. identity management and authentication) across organisations;
- *Base registry service* – a specific type of functional service to share trusted, authentic and verified data (about e.g. citizens, land, vehicles) across public administrations.

Digital public services that consume (reuse) existing services where possible are considered more interoperable than organisations that produce (develop) their own proprietary services without reusing existing functionalities.

- Service Management (D)

This area focuses on important Service Management aspects on the area of sharing and reuse and design of the digital public service. Digital public services are considered more interoperable if documentation, source code, services and support is provided towards other administrations and business for reuse. In addition this area covers important design aspects that ensure future-proof interoperability such as architecture, processes, orchestration, procurement and service level management.

3.2. IMM benchmarks on interoperability maturity levels

Benchmark data (see Figure below) shows that the overall maturity average is at the "Essential" level with a result of 3.24. All areas – service delivery (3.23), service consumption (3.36) and service management (3.19), achieve a similar result, i.e. also their interoperability is at the essential level. The three interoperability areas are independent from each other, there is no link or overlap between their attributes.

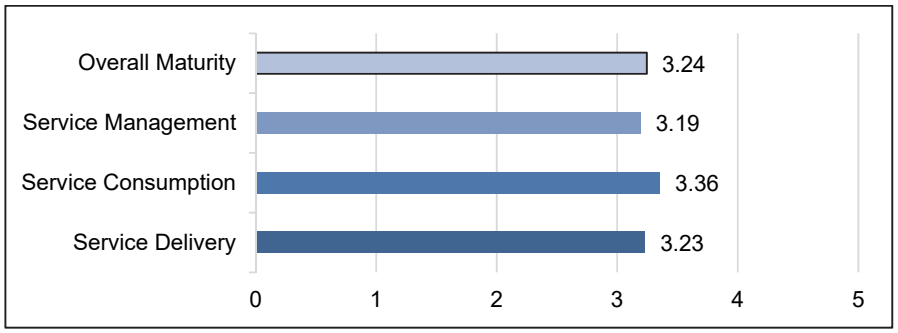

Figure 6: IMM Benchmark Results 2017 – all benchmarks[1]

It must be highlighted that:

- Given that the value distributions of i) all the attributes and ii) the second order IMM areas follow a normal distribution, it is suggested that the sample is representative of the population and, therefore, all findings can be extrapolated to the population.

The results stemming from EU-level public service benchmarks (see figure below) only are slightly higher in all areas and reach an overall maturity of 3.29[2].

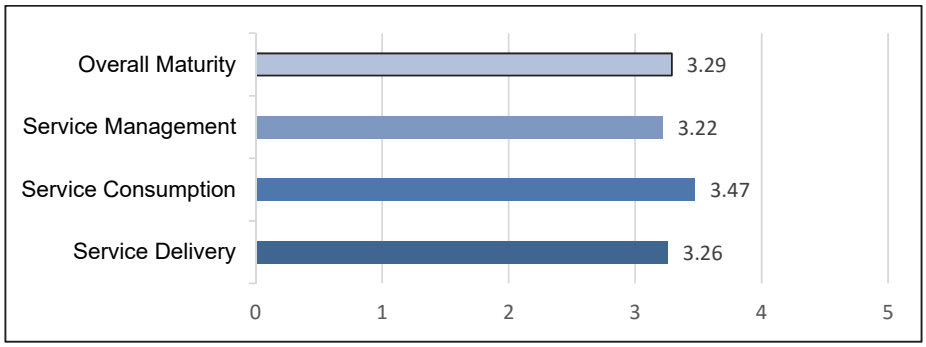

Figure 7: IMM Benchmark Results 2017 – EU benchmarks

The desired interoperability level as stipulated in the IMM model for a digital public service is at least level 4: 'Sustainable'. At this level, the digital public service is considered to have implemented key relevant best practices.

[1] The overall score is the average of the three areas, as in the current IMM model.
[2] The overall results and the EU results are very similar. The rest of this report therefore takes into account the maximum available data points for providing an analysis, which cover the overall results.

Table 3. IMM benchmark 2017 – required performance increase from Levels 3 to 4

Ad-Hoc Level 1	Opportunistic Level 2	Essential Level 3	Sustainable Level 4	Seamless Level 5
Poor interoperability – the digital public service cannot be considered interoperable	Fair interoperability – the digital public service implements some elements of interoperability best practices	Essential interoperability – the digital public service implements the essential best practices for interoperability	Good interoperability – all relevant interoperability best practices are implemented by the digital public service	Interoperability leading practice – the digital public service is a leading interoperability practice example for others
		Overall maturity – EU benchmarks	X Desired maturity level	
		Overall maturity –all benchmarks		
		Average service delivery		
		Average service consumption		
		Average service management		

The above Table indicates the shift required from Levels 3 to 4 in order to augment the public service's interoperability performance to a level that can be considered robust enough to systematically enable the reaping of interoperability benefits.

Each attribute is evaluated and a specific recommendation is provided to enhance interoperability maturity level. The detailed recommendations are available in annex 3.

IMM benchmarks on EIF interoperability levels

4. IMM benchmarks on EIF interoperability levels

IMM attributes each relate to one or several of the four **levels of interoperability of the European Interoperability Framework**[1] (Legal, Organizational, Semantic and Technical levels). Detailed IMM benchmark data shows that interoperability levels are implemented rather unevenly, as shown in the figure below[2]. The legal interoperability-related benchmarks are those with the highest score (3.33), followed by the organization interoperability-related benchmarks (3.27), and the semantic interoperability-related benchmarks (3.18. The technical interoperability-related benchmarks are those with the lowest score (3.13).

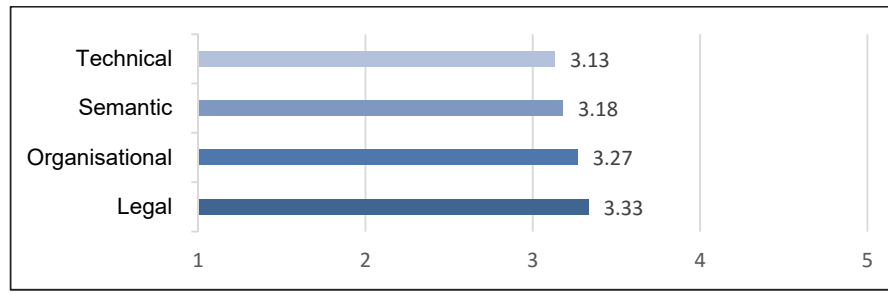

Figure 8: IMM Benchmark Overall Results 2017 – EIF interoperability level-related attributes - average score

There are 7 IMM attributes which relate to legal interoperability. They are presented in the figure below with their IMM benchmark 2017 score. Chapter 7 details each individual attribute in terms of what aspect of interoperability is being covered by it.

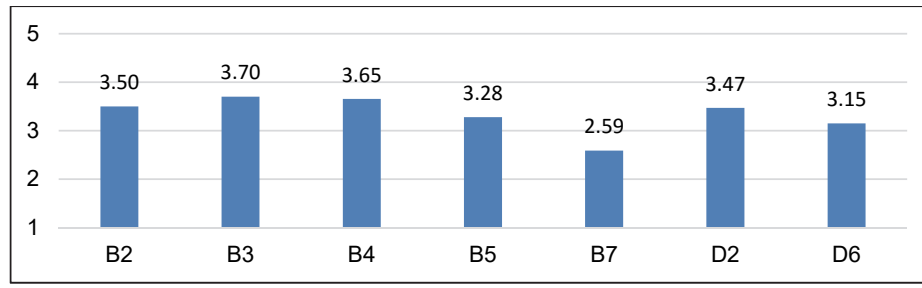

Figure 9: IMM Benchmark Overall Results – Average scores for legal interoperability related attributes

There are 16 IMM attributes which relate to organizational interoperability. They are presented in the figure below with their IMM benchmark 2017 score.

1 https://ec.europa.eu/isa2/eif_en
2 Each IMM attribute is related to one or several EIF interoperability levels, as listed in the tables in annex 1.

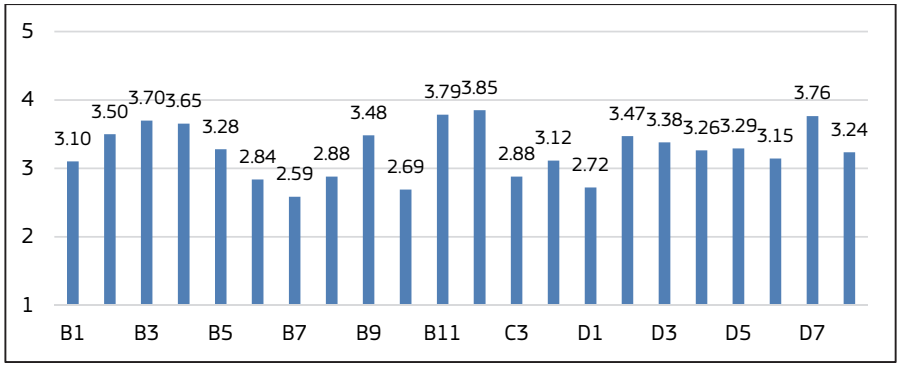

Figure 10: IMM Benchmark Overall Results – Average scores for Organizational Interoperability related attributes[1]

There are 9 IMM attributes which relate to semantic interoperability. They are presented in the figure below with their IMM benchmark 2017 score.

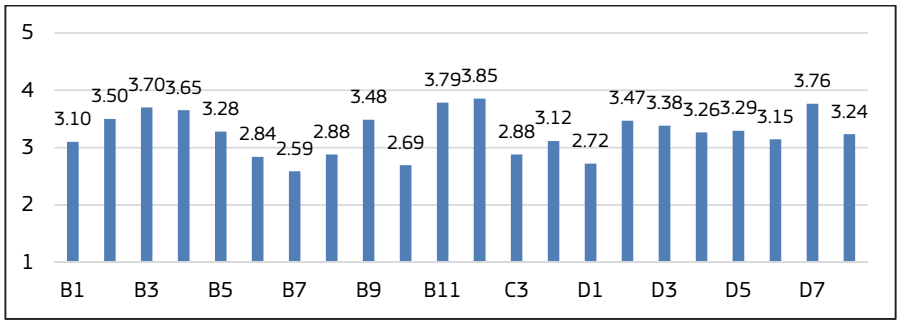

Figure 11: IMM Benchmark Overall Results – Semantic Interoperability related attributes[2]

There are 12 IMM attributes which relate to technical interoperability. They are presented in the figure below with their IMM benchmark 2017 score.

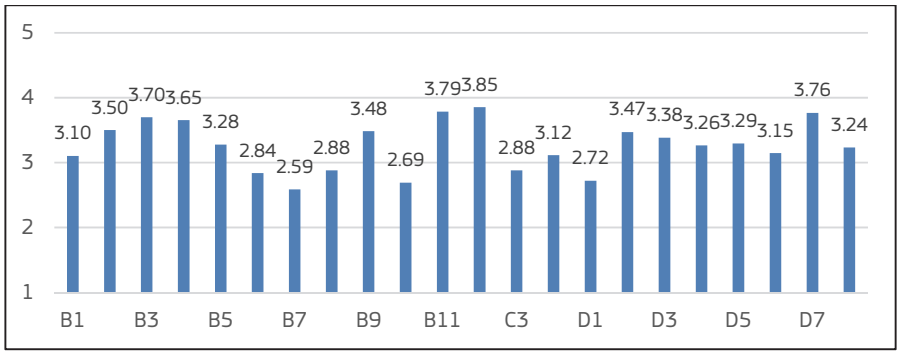

Figure 12: IMM Benchmark Results 2017 – Technical Interoperability related attributes[3]

[1] A description of IMM attributes is available in Annex 2.
[2] A description of IMM attributes is available in Annex 2.
[3] A description of IMM attributes is available in Annex 2.

IMM benchmarks on interoperability enablers and manifestations

5. IMM benchmarks on interoperability enablers and manifestations

An interoperability enabler relates to an attribute which, when it exists or is implemented, enables interoperability. An example is attribute D.2, which is at the highest interoperability level when procurement of the service is fully standards-based.

An interoperability manifestation relates to an attribute which shows interoperability. An example is attribute B.2, which is at the highest interoperability level when all possible forms are pre-filled.

The list of attributes which are enablers and which are manifestations are

Detailed IMM benchmark data shows that attributes related to interoperability enablers and attributes related to interoperability manifestations show similar maturity results. [1] The figure below illustrates the average maturity level of the interoperability manifestation attributes (3.28) and the interoperability enabler attributes (3.20).

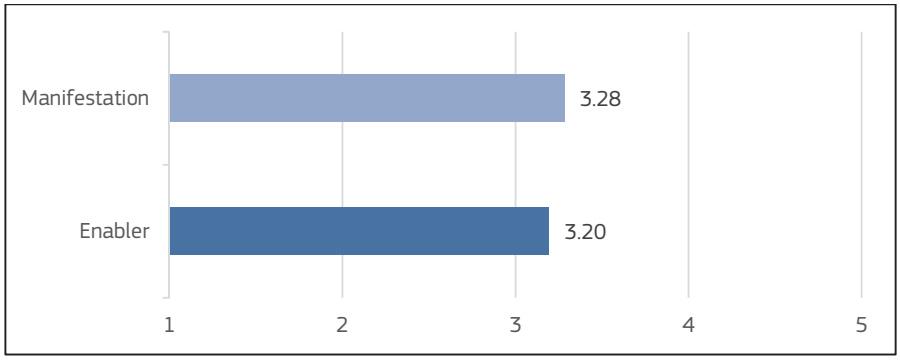

Figure 13: IMM Benchmark Results 2017 – Interoperability manifestation and enabler attributes' maturity level

[1] Details on the manifestation-related attributes and enabler-related attributes in terms of what they assess are given in annex 2

IMM benchmarks on complexity of services

6. IMM benchmarks on complexity of services

The complexity of a public service can be derived as a proxy in the IMM by the number of services it reuses. Detailed IMM benchmark data shows that many different types of services are reused, as listed in the figure below. The most reused service is the authentication service, followed by the access management service and the data exchange services. All three are reused by over half the public services benchmarked.

On the other side of the reuse spectrum, only 4% of the service use machine translation services, which mirrors the poor scoring of multilingualism attribute in service delivery - see section 7.1. This highlights an area of

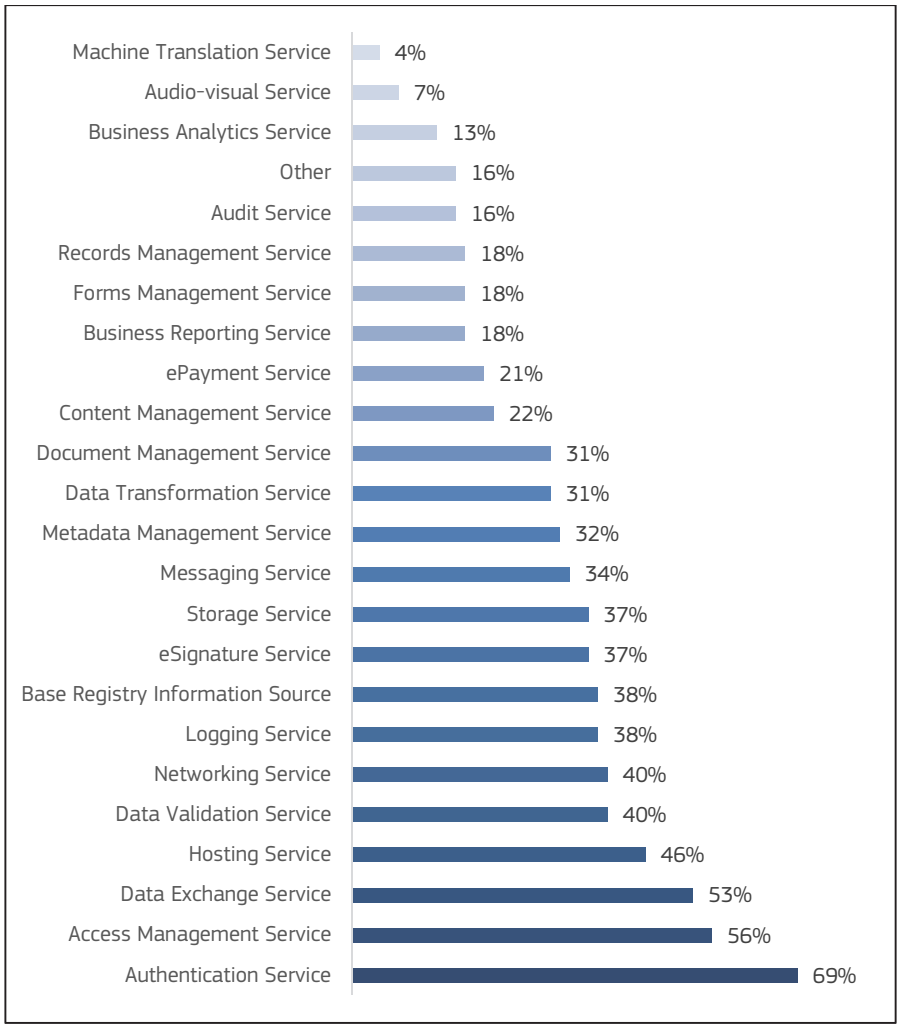

Figure 14: IMM Benchmark Results 2017 – Services reused by public services benchmarked

Detailed benchmark data shows, as illustrated in the figure below, that the maximum number of services reused is 23, the minimum is 1. While on average, services reuse 7 other services, the most cited number of reused services is 4.

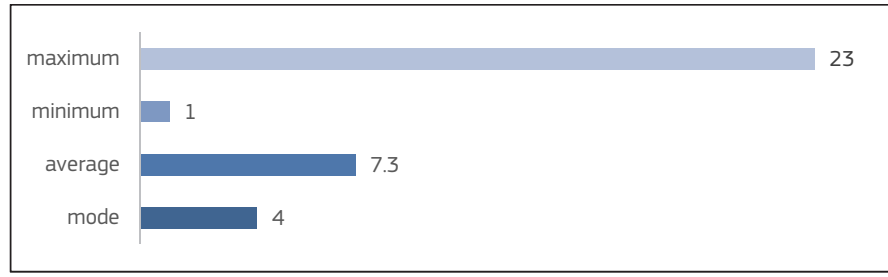

Figure 15: IMM Benchmark – Number of reused services by public service benchmarked

IMM detailed benchmarks on service areas

7. IMM detailed benchmarks on service areas

Detailed benchmark data shows that over half (14 out of the 22) of all the attributes are above level 3 – essential.

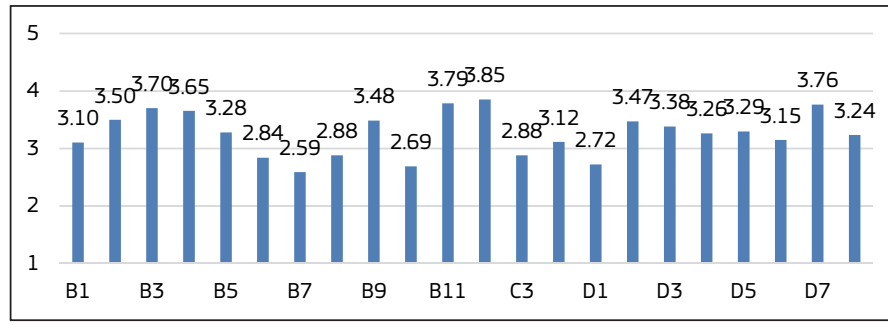

Figure 16: IMM Benchmark Results 2017 – average scores for each attribute

The sections below detail further the three areas of attributes: service delivery, service consumption and service management and the benchmark results achieved for them by attribute.

7.1. Service delivery

This section assesses how the digital public services benchmarked deliver their services to end users such as citizens, businesses or other public administrations.

In the service delivery area 4 attributes out of 11 are below essential level (3), as shown in the figure below. The highest score is of 3.79.

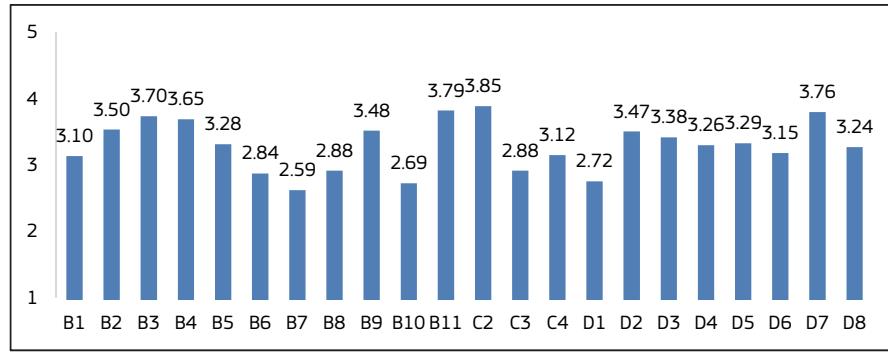

Figure 17: Average scores for each service delivery attributes

Detailed benchmark data shows (see figure below) that level 3 is the most often measured level (mode) of maturity for service delivery attributes. The maximum maturity level measured is 5 - the highest possible. The minimum maturity level measured is 1.8 which is close to the "Fair" level: the public services implement only very few interoperability best practices, in an ad hoc fashion. On average, service delivery is above the Essential level 3.

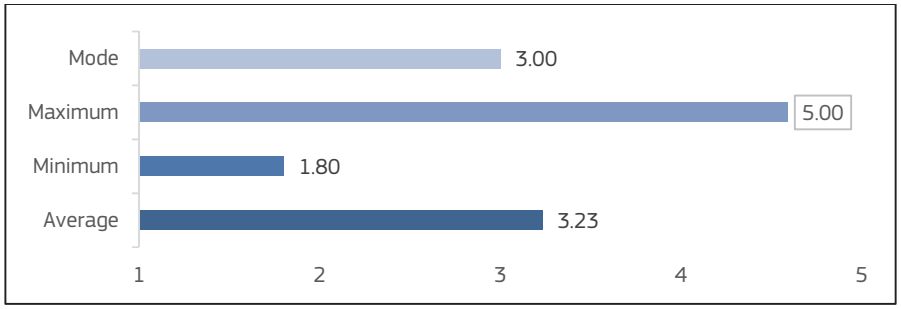

Figure 18: Scores for all service delivery attributes - mode, maximum, minimum and average

Detailed benchmark data shows that there are 6 service delivery attributes which are better performing (with a score above 3.2), 3 which have average scores and 2 which are lagging behind with scores below 2.8. The table below details these attributes and analyses their relation to the European Interoperability Framework (EIF).

The interoperability maturity of service delivery is - in average - below the Essential level in the domains of service catalogues, cross-border delivery, multilingualism and accessibility.

Table 4. Service delivery attribute benchmark landscape

#	Name	score	Analysis	EIF - related
Better performing service delivery attributes - scores > 3.2				
B11	Certification Organizational	3.79	Certification procedures are available	No
B3	Procedural transparency	3.70	The service is providing limited information on rules and processes that are in application towards its users	Yes – transparency principle
B4	Data privacy	3.65	There is partial to complete privacy information making it transparent to end users how and what data is being used about them	Yes – data privacy principle
B2	Pre-filling	3.50	Forms are partly pre-filled	Yes – reusability principle

#	Name	score	Analysis	EIF - related
B9	Data exchange	3.48	The service leverages some open semantic standards for data exchange	Yes – use of semantic specifications
B5	User feedback	3.28	Users can provide feedback on their user satisfaction with the service	No
Service delivery attributes - average scores between 3.2 and 2.8				
B1	Delivery channels	3.10	The service is available through multiple delivery channels	Yes – accessibility principle
B8	Multilingualism	2.88	The service is partly multilingual	Yes – multilingualism principle
B6	Accessibility	2.84	Some services provide some accessibility features, but they are in general only fairly compliant with an accessibility standard	Yes – accessibility principle
Service delivery attributes lagging behind				
B10	Service Catalogue	2.69	The public service is registered in a catalogue, but this catalogue is only accessible to a restricted user group (i.e. the public service catalogue is not publicly available)	Yes – conceptual model
B7	Cross border service delivery	2.59	There are still restriction for non-residents or foreigners using the digital public service	Yes – purpose of the EIF: services cross-border by default

7.2. Service consumption

This section assesses if and how services are consumed from other administrations and businesses. In the service consumption area, 1 attribute out of 3 is below essential level (3), as shown in the figure below. The highest score is of 3.85.

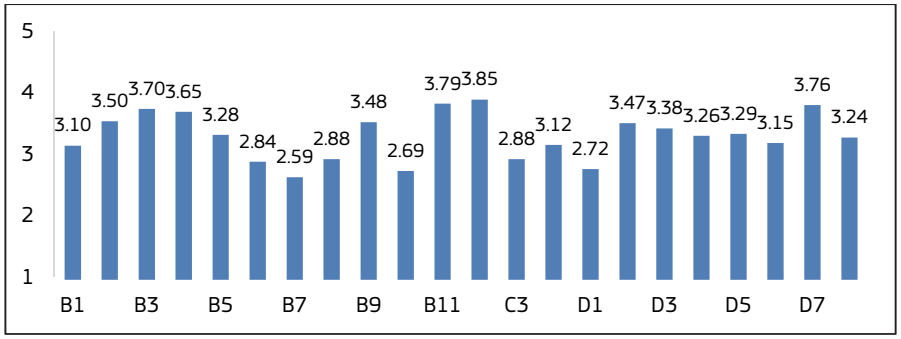

Figure 19: Average scores for each service consumption attribute

Detailed benchmark data shows (see figure below) that level 3 is the most often measured level (mode) of maturity for service consumption attributes. The maximum maturity level measured is 5 - the highest possible. The minimum maturity level measured is 1.4 which is close to the "Poor" interoperability level – the digital public service de facto cannot be considered interoperable. On average, service delivery is above the Essential level 3.

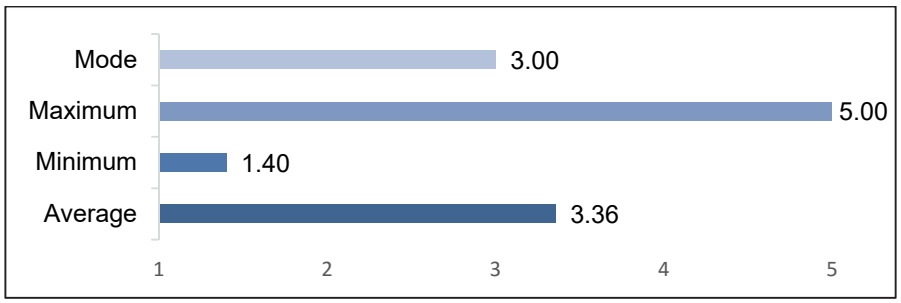

Figure 20: Scores for all service consumption attributes - mode, maximum, minimum and average

Detailed benchmark data shows that there is 1 service consumption attribute which is better performing (with a score above 3.2), and that there are 2 which have average scores and none which are lagging behind with scores below 2.8. The table below details these attributes and analyses their relation to the European Interoperability Framework (EIF).

The interoperability maturity of service consumption is - on average - below the Essential level in the consumption of relevant services from public administrations whilst they are available for reuse.

Table 5. Service consumption attribute benchmark landscape

#	Name	score	Analysis	EIF - related
Better performing service consumption attributes - scores > 3.2				
C2	Manual or digital consumption of services	3.85	Currently some public services are still consuming other services manually rather than in an automated fashion.	Yes – end-to-end digital services

#	Name	score	Analysis	EIF - related
Service consumption attributes - average scores between 3.2 and 2.8				
C4	Subscriptions to updates	3.12	Currently, the public services still rely on some manual intervention to integrate updates/up-to-date information or service flows.	No
C3	Reusing or producing services	2.88	The services are currently only consuming few relevant services from other public administrations whilst they are available for reuse.	Yes – reusability principle
Service consumption attributes lagging behind - scores < 2.8				
none				

7.3. Service management

This section assesses how the digital public service arranges the consumption and provisioning of external services and includes Service Management aspects such as architecture, procurement and service level management.

In the service management area, only 1 attribute out of 8 is below essential level (3), as shown in the figure below.

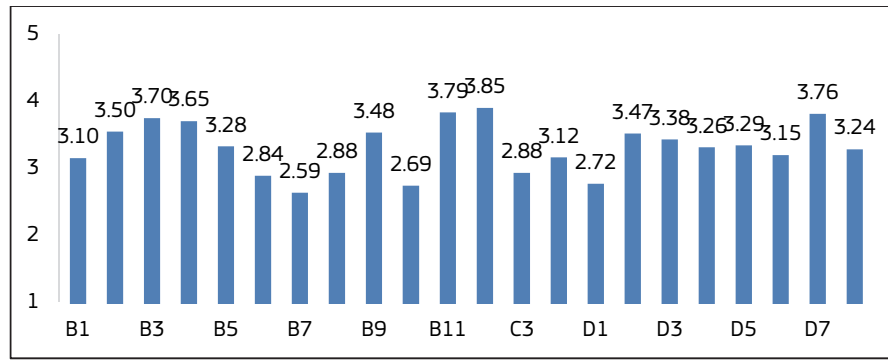

Figure 21: Average scores for each service management attribute

Detailed benchmark data shows (see figure below) that level 3 is the most often measured level (mode) of maturity for service management attributes. The maximum maturity level measured is 5 - the highest possible. The minimum maturity level measured is 1 which is the "Poor" interoperability level – the digital public service cannot be considered interoperable. On average, service delivery is above the Essential level 3.

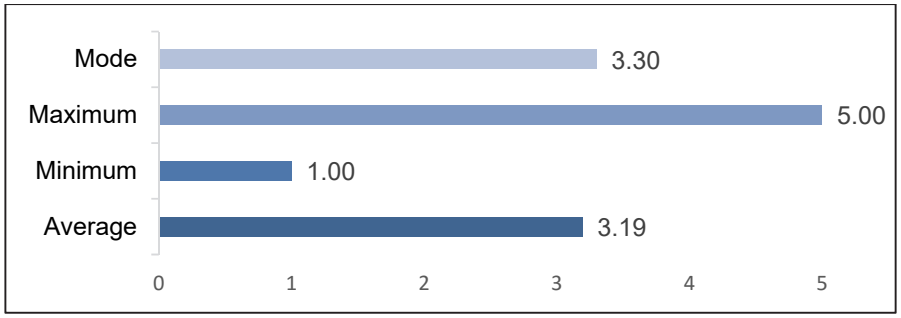

Figure 22: Scores for all service consumption attributes - mode, maximum, minimum and average

Detailed benchmark data shows that there are 6 service delivery attributes which are top performing (with a score above 3.2), 3 which have average scores and 2 which are lagging behind with scores below 2.8. The table below details these attributes and analyses their relation to the European Interoperability Framework (EIF).

The interoperability maturity of service management is - on average - below the Essential level regarding the sharing of components and knowledge with the external environment.

Table 6. Service management attribute benchmark landscape

#	Name	score	Analysis	EIF - related
Better performing service management attributes - scores > 3.2				
D7	Concept definitions	3.76	Public services are still using some proprietary definitions.	Yes – semantic interoperability
D2	Procurement criteria	3.47	Although there is a set of defined procurement criteria, not all components have been procured based on standards.	Yes - technological neutrality and data portability principle
D3	Service choreography	3.38	The service choreography of the digital public services is semi-automated and still requires some manual interference.	No
D5	Architectural Framework	3.29	Existing enterprise architecture frameworks are increasingly leveraged for the design of public services.	Yes – use of EIRA
D4	Business process model	3.26	Business processes and rules are increasingly streamlined but not yet always according to	Yes – process alignment recommendation

#	Name	score	Analysis	EIF - related
			Business Process Modelling standards.	
D8	Service Level Agreements (SLAs)	3.24	SLAs are used and Service Level Management processes are institutionalized.	Yes – interoperability agreements
Service management attributes - average scores between 3.2 and 2.8				
D6	Specification process	3.15	Within the specification process, stakeholders are typically invited once, at a specific moment in time, and with invitations being restricted to specific stakeholders, to express their concerns.	Yes – openness principle
Service management attributes lagging behind - scores < 2.8				
D1	Reuse and sharing	2.72	Currently, the digital public service shares no or only some components and knowledge with the external environment.	Yes – reusability principle

IMM benchmarks on EIF implementation

8. IMM benchmarks on EIF implementation

This section analyses the benchmark results in the light of the EIF implementation. The table below maps the IMM attributes to the EIF dimensions used in the NIFO[1]. While each attribute does not provide information on a complete dimension, it can give an indication on levels of implementation of a specific aspect of it.

As shown in the table below, IMM attributes related to **the transparency and data privacy principles,** as well as to **semantic interoperability** score the highest in the 2017 benchmark.

IMM attributes relating to the **principles** of technological neutrality and data portability, openness, accessibility (delivery channels) and reusability (prefilling) score above the "Essential" level. IMM attributes relating to the **principles** of accessibility (accessibility) and reusability (Reuse and sharing, reusing or producing services) and multilingualism score below the "Essential" level.

IMM attributes relating to the **interoperability levels** (semantic interoperability and process alignment recommendation) score above the "Essential" level.

IMM attributes relating to the **interoperability agreements** score above the "Essential" level.

The IMM attribute relating to the **interoperability governance** (use of an architecture framework) scores above the "Essential" level.

The IMM attribute relating to the **conceptual model** (service catalogue as part of the conceptual model) scores below the "Essential" level.

The IMM attribute relating to the **purpose of the EIF** (cross-border by default) scores below the "Essential" level.

Table 7. IMM benchmark data contributing to the evaluation of the implementation of the EIF

EIF dimension		Score	#	Name
Principles	Transparency principle	3.70	B3	Procedural transparency
	Data privacy principle	3.65	B4	Data privacy

[1] National Interoperability Framework Observatory.

EIF dimension		Score	#	Name
	Technological neutrality and data portability principle	3.47	D2	Procurement criteria
	Openness principle	3.15	D6	Specification process
	Accessibility principle	3.10	B1	Delivery channels
		2.84	B6	Accessibility
	Multilingualism principle	2.88	B8	Multilingualism
	Reusability principle	2.88	C3	Reusing or producing services
		3.50	B2	Pre-filling
		2.72	D1	Reuse and sharing
Interoperability levels	Semantic interoperability	3.76	D7	Concept definitions
	Process alignment recommendation	3.26	D4	Business process model
Interoperability Agreements	Use of semantic specifications	3.48	B9	Data exchange
	Interoperability agreements	3.24	D8	Service Level Agreements (SLAs)
Interoperability Governance	Use of the EIRA	3.29	D5	Architectural Framework
Conceptual model	Part of the conceptual model	2.69	B10	Service Catalogue
Purpose of the EIF	cross-border by default	2.59	B7	Cross border service delivery

Legend	Underperforming: below level 3 "Essential"	Achieved the Essential level 3	Over-performing: in the top three high scores