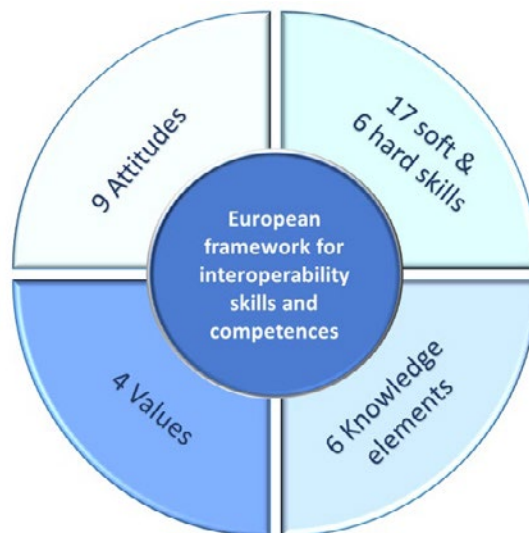




European
Commission

Study on the development of a European framework for interoperability skills and competences in the public sector (EIFISC)



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**Study on the development of a
European framework for
interoperability skills and
competences in the public sector
(EIFISC)**

European Commission

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This study was carried out for the European Commission by:



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Abbreviations

CEN	European Committee for Standardization
DigComp	digital competence framework for citizens
EFISC	European framework for interoperability skills and competences in the public sector
EIF	European interoperability framework
ESCO	European skills, competences, qualifications and occupations
EU	European Union
EUPAN	European Public Administration Network
ICT	information and communications technology
IT	information technology
OECD	Organisation for Economic Co-operation and Development
RO	research objective

1. Executive summary

This study was funded by the **ISA² programme** ⁽¹⁾ of the European Commission, which supports the development of digital solutions that enable public administrations, businesses and citizens in Europe to benefit from interoperable cross-border and cross-sector public services. Interoperability can help to make digitalisation more efficient by removing barriers between services, information technology systems and data.

One activity under this programme is the **Interoperability Academy**. Launched in 2019, the **Interoperability Academy** aims to improve the advanced digital skills of civil servants in the area of interoperability, in order to support integrated policy, service delivery and impact evaluation. In the context of this activity, the researchers conducted the current study on skills and competences frameworks in 2019–2020. The general objective of this study was to develop a **European framework for interoperability skills and competences in the public sector (EFISC)** that could be applied to **public sector administrations** in the region. To achieve this general objective, five specific research objectives (ROs) were pursued.

- RO1** | Identify the required skills and competences in the context of interoperability for civil servants and young professionals in the public sector.
- RO2** | Research and analyse existing skills and competences frameworks developed for public sector organisations, international and supranational institutions, and private sector organisations.
- RO3** | Match the identified skills and competences with the relevant framework, in order to develop a new skills and competences framework for interoperability in the public sector.
- RO4** | Validate the initial framework with test groups composed of target groups, including e-governance experts, young professionals and civil servants.
- RO5** | Revise the initial framework and tailor it to the target groups to create the final version of the **EFISC**, taking into account all feedback.

The final version of the **EFISC** is composed of four pillars and a total of 41 elements.

Attitudes	Values	Knowledge	Skills
9	4	6	23

The results of the validation process for the EFISC revealed that ‘collaboration’ was considered one of the most important soft skills, whereas ‘digital information’ was shown to be the most important hard skill. In terms of attitudes, ‘service oriented’ was identified as the most important attitude, and ‘information and communications technology’ (ICT) was considered one of the most relevant

⁽¹⁾ https://ec.europa.eu/isa2/home_en

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knowledge elements. These preliminary findings are consistent with the Living-in.eu principles ⁽²⁾, highlighting the importance of a government with a citizen-centric approach, and ethical and socially responsible access, use, sharing and management of data and technology.

The development of a competence framework enables us to define the knowledge, skills, attitudes and values that can favour interoperability, and it can also help public administration staff to improve their skills and competences in interoperability and digital work. The **EFISC** aims to support the public sector and does not have any legal force. It should be understood as a framework constructed using elements that the academic literature, experts and end-users in the area of interoperability consider of core importance to interoperability skills and competences in the public sector.

Although the framework presents these core elements that can favour interoperability, they must be complemented with learner profiles focused on specific interoperability requirements for each occupational background. In this sense, when selecting personnel for interoperability in the public sector, there should be careful consideration of the attitudes, values, skills and knowledge elements identified as part of the **EFISC**. Furthermore, the application of the **EFISC** in developing training programmes for public servants may vary according to their occupational background.

Further research is encouraged to investigate the applications of the **EFISC** in different occupational and sectoral areas in the public sector. As some interoperability skills and competences may prove necessary for specific domains, the potential to develop tailor-made and more effective human resources training programmes and academic curricula should be explored. In line with this, the development of curricula and training programmes on interoperability should exploit the compatibilities between the **EFISC** and the relevant frameworks for the design of learning activities and training methods.

This study was developed in close collaboration with the Project Officers. Georges LOBO and Victoria KALOGIROU by **Trasys International** and the **Katholieke Universiteit Leuven (KU Leuven)** under the contract ABC IV – Lot 3 Framework Contract, European Commission, Directorate-General for Informatics, D.2 – Interoperability Unit.

⁽²⁾ <https://www.living-in.eu/declaration>

2. Introduction

This study was funded by the **ISA² programme** ⁽³⁾ of the European Commission, which supports the development of digital solutions that enable public administrations, businesses and citizens in Europe to benefit from interoperable cross-border and cross-sector public services.

One activity under this programme is the **Interoperability Academy** ⁽⁴⁾. Launched in 2019, it aims to enhance advanced digital skills in the public sector in the area of interoperability and represents an essential milestone for e-government services. Improving the digital literacy of public sector employees is seen as a basis for developing more effective and efficient e-government services for citizens, businesses, public administrations and other societal actors.

For public administrations to fully grasp the added value of interoperability – be it legal, organisational, semantic or technical interoperability or a combination of these layers – public administration staff need to have a good understanding of interoperability.

Interoperability is the ability of organisations to interact towards mutually beneficial goals, involving the sharing of information and knowledge between these organisations, through the business process they support, by means of exchange of data between their information and communications technology (ICT) systems

(European Commission, 2017, p. 7)

This ability requires specific skills and competences; a lack of these could be a barrier to implementing interoperability policies. The development of a competence framework facilitates the definition of the knowledge, skills, attitudes and competences needed (NASC, 2018). One of the biggest advantages of interoperability is that it can help to make digitalisation more efficient by removing barriers between services, information technology (IT) systems and data, allowing those services to be not only digital but also interoperable (NIFO, 2019).

Because of the relevance of interoperability, it is important that public administration staff acquire the associated skills and competences. Furthermore, there is still a considerable digital gap between European Union public administrations and significant variation in the quality of digital public services – a factor that is heavily influenced by the lack of digital skills and competences in the European public sector (Chinn et al., 2020; European Union, 2020).

As part of the work on the **Interoperability Academy**, a team of researchers conducted the current study. The main objective was to analyse existing skills and competences frameworks for the public sector for the purpose of developing a specific **European framework for interoperability skills and competences in the public sector (EIFISC)**. This framework should help public administration staff to improve their skills and competences in all matters related to interoperability and digital work.

⁽³⁾ https://ec.europa.eu/isa2/home_en

⁽⁴⁾ <https://joinup.ec.europa.eu/collection/digital-skills-public-sector/solution/interoperability-academy/imaps-ex-interoperability-maturity-model-201637>

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To support the accomplishment of this goal, this study established five intermediate and consecutive research objectives (ROs). The structure of this report is based on these objectives, to allow the reader to gain a complete understanding of how the overarching objective was accomplished: the creation of the **EIFISC**. As such, the report is structured as follows.

- **Chapter 3, Methodology.** This chapter provides an overview of the methodological approach applied and explains how each RO was addressed. Each methodological step is described in detail, along with the attitudes, values, skills and knowledge elements that were selected for the construction of the **EIFISC**.
- **Chapter 4, Results.** This chapter outlines the results of Chapter 3, presents the final version of the framework and explains how it needs to be understood.
- **Chapter 5, Conclusion.** This chapter sets out the conclusions reached as a result of the development process.

Finally, the **Annexes** and **References** can be found at the end of the report.

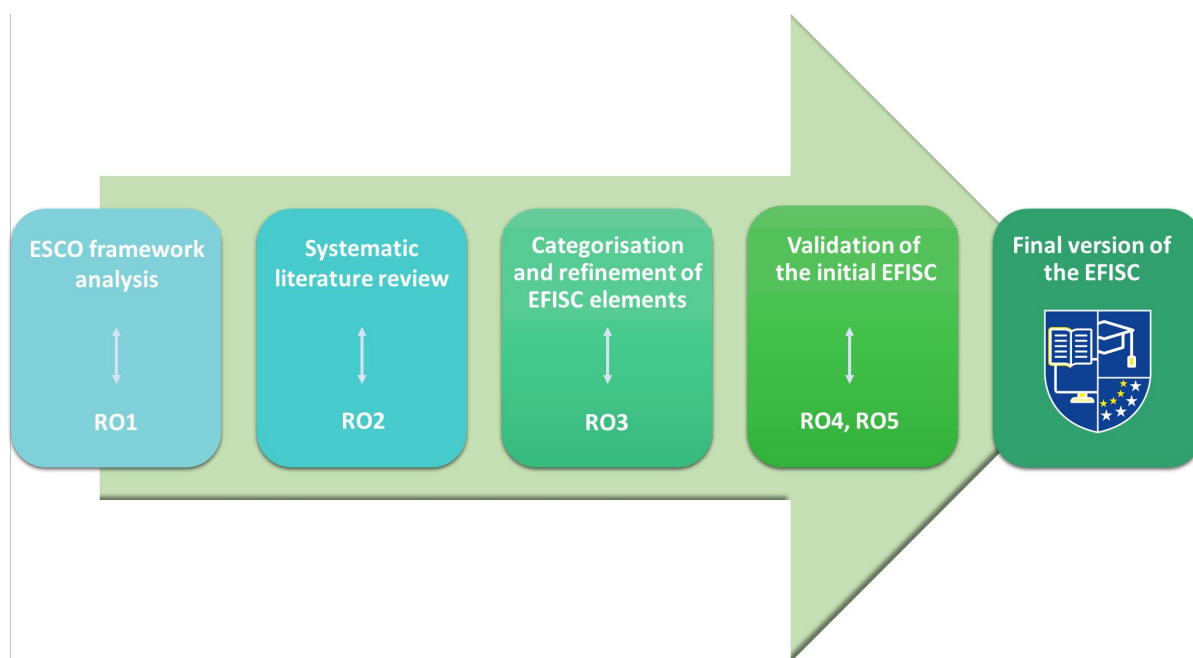
3. Methodology

In order to develop the **EFISC**, the researchers followed a rigorous methodological approach.

- **Step 1.** Analysis of the European skills, competences, qualifications and occupations (ESCO) framework ⁽⁵⁾.
- **Step 2.** Systematic literature review of existing skills, competences, qualifications and occupations frameworks in the public sector.
- **Step 3.** Categorisation and refinement of the selection of the **EFISC** elements.
- **Step 4.** Validation of the framework with target groups.
- **Step 5.** Creation of the final version of the **EFISC**.

Figure 1 shows the methodological steps that were followed and their relationship with the ROs. Sections 3.1–3.5 provide detailed descriptions of each methodological step.

Figure 1 – Relationship between the methodological steps and the ROs



3.1. Step 1 – ESCO framework analysis

This first methodological step relates to the following RO.

- RO1** | Identify the required skills and competences in the context of interoperability for civil servants and young professionals in the public sector.

⁽⁵⁾ See the dedicated web page (<https://ec.europa.eu/esco>) (accessed 9 May 2020).

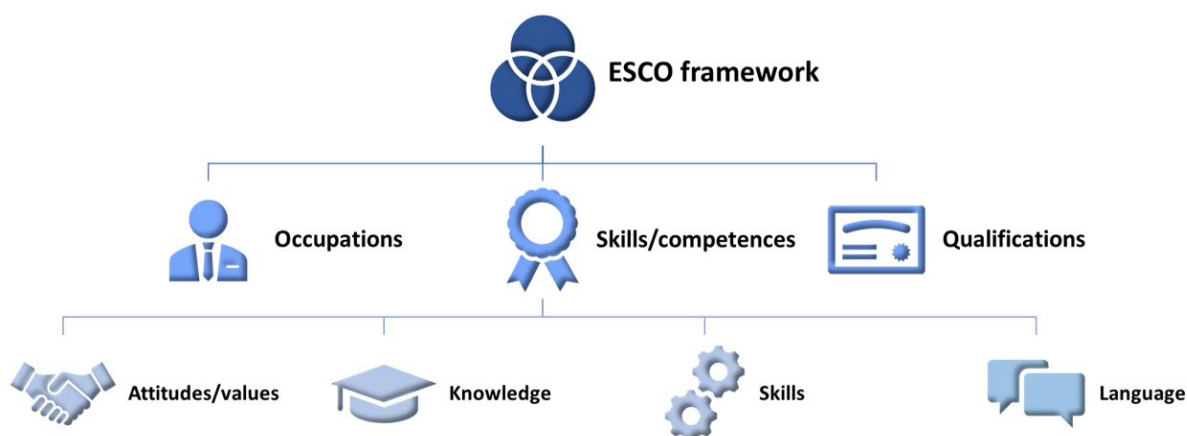
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To make sure that the resulting interoperability competences and skills framework would be aligned with the existing skills and competences frameworks at EU level, this research started the data collection process by selecting the relevant elements from the ESCO framework (European Commission, 2020a). The ESCO framework was reviewed for three reasons.

1. It is relevant and useful, as it is comprehensive and systematic in categorising a wide array of skills and competences in the European labour market.
2. The ESCO framework allows a standardised approach to categorising the results of the systematic literature review, which is addressed in the next step – [Step 2 – Systematic literature review](#).
3. The ESCO framework itself is built on the International Standard Classification of Occupations, thus ensuring international alignment.

As shown in [Figure 2](#), the ESCO framework includes three pillars (European Commission, 2020a): occupations, skills/competences and qualifications.

Figure 2 – Pillars of the ESCO framework



The qualifications pillar refers to the 'formal outcome of an assessment and validation process which is obtained when a competent body determines that an individual has achieved learning outcomes to given standards' (European Commission, 2020a). It refers to the outcome of acquiring certain skills and competences, and not to the skills and competences as such. In this study, qualifications are conceptualised by the learning outcomes according to the occupational area and standards (see Section 3.3.2); therefore, this research focused on two pillars – occupations and skills/competences.

In the occupations pillar, different occupations are described, and for each of those occupations a list of relevant knowledge, skills and competences is given. In the occupations pillar, the identification of knowledge and skills per occupation consisted of two processes. The first process involved selecting from an exhaustive list of almost 3 000 distinct professions identified in the ESCO framework. From this domain, two specific categories, the 'Public Administration/Manager' and 'ICT System Administrator', were selected as the most pertinent occupations for interoperability. In order to make this selection, the professions were assessed in terms of how they covered all layers of interoperability and how they fit with the presumed skills and competences that the [EIFISC](#) would comprehend. As a result, these two categories were evaluated as the most suitable categories,

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because they encompassed the different layers of interoperability (i.e. legal, organisational, semantic or technical interoperability) and fitted best with the presumed skills and competences required for both civil servants and young professionals to deal with the framework. The second process involved the incorporation of additional occupational categories gathered from the literature review and the **Interoperability Academy** learner profiles. The occupational skills that were matched to the resulting set of occupational categories are presented in **Table 17** and **Table 18**, and further explained in Section 4.2.

Finally, regarding the skills/competences pillar, four categories of elements are considered (**Figure 2**):

1. attitudes and values
2. knowledge
3. skills
4. language.

The ESCO framework refers to the category of 'language' only in terms of the knowledge or domain of a spoken language. In the case of the public sector, it must be emphasised that language requirements for public administrations vary according to the language policy being enforced in each country. As such, acknowledging the importance of public servants having the ability to work in a multilingual environment for interoperability, this study opted for considering 'language' as part of the 'cultural openness attitude' in the **EIFISC**.

Overall, this study decided to focus on the categories of attitudes, values, knowledge and skills, under the ESCO skills/competences pillar.

3.2. Step 2 – Systematic literature review

In the second methodological step, a systematic literature review of all existing studies on skills and competences frameworks for the public sector was conducted. This step relates to the following RO.

RO2

Research and analyse existing skills and competences frameworks developed for public sector organisations, international and supranational institutions, and private sector organisations.

The systematic literature review was based on the identification of existing skills and competences frameworks that are relevant in the context of this study. In particular, the literature review focused on the identification and analysis of skills and competences frameworks in three predetermined categories:

1. frameworks from public sector organisations
2. frameworks from intergovernmental organisations
3. frameworks grounded in the academic literature.

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The search strategy of the literature review involved two stages.

1. **Stage 1:** search high-ranked peer-reviewed journals on the topic(s) of human resources and public management.
2. **Stage 2:** search in Scopus and Google Scholar. Using the filter 'most relevant', the 50 first publications since 2011/2012 were identified.

The following concepts were used for desk research:

1. competenc(e/y) ⁽⁶⁾ framework
2. skills framework
3. competenc(e/y) civil servants
4. skills civil servants
5. digital skills civil servants
6. interoperability skills
7. interoperability competence.

An overview of the literature used in the identification of existing skills and competences frameworks can be found in **Table 1**.

The information regarding attitudes, values, knowledge and skills obtained through the analysis of the documents in **Table 1** was categorised for the creation of the initial version of the **EIFISC**. This step is elaborated on in the next section.

⁽⁶⁾ Despite the slightly different meanings of the words – that is, 'competence' is usually skills based and 'competency' is behaviour based – the researchers decided to consider both concepts in the search query. The concepts were found to be used interchangeably by different sources. This allowed the researchers to gain a broader understanding of the topic and how it is approached by different entities. However, for the construction of the EIFISC, the researchers opted for the use of 'competence/s', in order to be consistent with the ESCO framework.

Table 1 – Studies and frameworks identified and reviewed

Country/organisation / author	Title	Publication year	Reference
Category 1: Frameworks from public sector organisations			
Belgium	Competentiemanagement (Competence management – author’s translation)	2019	Belgian federal government, 2019
Belgium	Dictionnaire des compétences de l’Administration fédérale	2018	(Belgian federal government, 2018)
Brazil	<i>Innovation Skills and Leadership in Brazil’s Public Sector</i>	2019	(OECD, 2019a)
Estonia	Competency framework	2017	(Riigikantselei, 2017)
Ireland	<i>PAS Civil Service Competency Models</i>	2017	(Irish government – Public Appointments Service, 2017)
Kazakhstan	<i>Benchmarking Civil Service Reform in Kazakhstan</i>	2018	(OECD, 2018)
Nepal	<i>Competency Framework of Civil Service of Nepal</i>	2018	(NASC, 2018)
Netherlands	Functiegebouw Rijksoverheid – Direct aan de slag (Function building state government – Directly at work)	No date provided	(Dutch government, n.d.)
New Zealand	Policy skills framework	2019	(New Zealand Government – Department of the Prime Minister and Cabinet, 2019)
Northern Ireland	<i>Northern Ireland Civil Service Competency Framework</i>	2014	(Northern Ireland Executive – Department of Finance, 2014)
Romania	<i>Competencies Necessary for eGovernment</i>	2019	(Pantiru, 2019)
Singapore	<i>A Guidebook on Competency-based Framework for Civil Service</i>	2019	(Government of Singapore – Royal Civil Service Commission, 2019)
United Kingdom	<i>Civil Service Competency Framework 2012–2017</i>	2012	(UK government, 2012)
Category 2: Frameworks from intergovernmental organisations			

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Country/organisation / author	Title	Publication year	Reference
EUPAN	<i>Competencies Necessary for eGovernment</i>	2019	(Pantiru, 2019)
OECD	<i>Skills for a High Performing Civil Service</i>	2017	(OECD, 2017a)
OECD (co-funded by EU Horizon 2020)	<i>Core Skills for Public Sector Innovation</i>	2017	(OECD – Observatory of Public Sector Innovation, 2017)
Category 3: Frameworks grounded in the academic literature			
Baranov, A., Ovakimyan, M. and Kotlyarova, O.	'Intersection of technological skills and strategic competences in developing the human resource policy in contemporary Russia', in <i>CBU International Conference Proceedings</i>	2018	(Baranov et al., 2018)
Borisova, L.	'Professional and emotional competence of civil servants', in <i>Economic Alternatives</i>	2015	(Borisova, 2015)
Brown, B.	'Twenty first century skills: a Bermuda College perspective', in <i>Twenty First Century Skills</i>	2015	(Brown, 2015)
Kruyen, P. M. and Van Genugten, M.	'Opening up the black box of civil servants' competencies', in <i>Public Administration Review</i>	2019	(Kruyen & Van Genugten, 2020)
Monang, J., Sudirman, I. and Siswanto, J.	'In search for a public servant competency model: a literature review', paper presented at 17th APIEMS Conference	2016	(Monang et al., 2016)
Ogonek, N., Gorbacheva, E., Räckers, M., Becker, J., Krimmer, R., Broucker, B. and Cromptvoets, J.	'Towards efficient eGovernment: identifying important competencies for eGovernment in European public administrations', in <i>Proceedings of the Electronic Government and Electronic Participation Conference 2016</i>	2016	(Ogonek et al., 2016)
Parkhomenko-Kutsevil, O. I.	'Theoretical ground of professional competence formation for public servants', in <i>Actual Problems in Economics</i>	2016	(Parkhomenko-Kutsevil, 2016)
Sudirman, I., Siswanto, J., Monang, J. and Aisha, A. N.	'Competencies for effective public middle managers', in <i>Journal of Management Development</i>	2019	(Sudirman et al., 2019)

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Country/organisation / author	Title	Publication year	Reference
van Laer, E., van Deursen, A. J. A. M., van Dijk, J. A. G. M. and de Haan, J.	'The relation between 21st-century skills and digital skills: A systematic literature review', in <i>Computers in Human Behavior</i>	2017	(van Laar et al., 2017)

NB: EUPAN, European Public Administration Network; OECD, Organisation for Economic Co-operation and Development.

3.3. Step 3 – Categorising and refining the elements for the initial version of the EFISC

In the third methodological step, the results from the ESCO framework analysis and systematic literature review were synthesised, refined and connected to the European interoperability framework (EIF) (European Commission, 2017) principles. This step relates to the following RO.

RO3

Match the identified skills and competences with the relevant framework, in order to develop a new skills and competences framework for interoperability in the public sector.

This research step is focused on an initial categorisation of the elements for the **EFISC**. To this end, a series of consecutive processes, which are described in detail below, were followed.

3.3.1. Synthesising the ESCO framework with the literature review

This research step focused on synthesising the skills and competences identified in the literature with the categories specified in the ESCO framework. If a certain skill/competence identified in the systematic literature review was covered by the categories in the ESCO framework, the relevant ESCO categories were kept. Any skill/competence not covered by the ESCO framework was included in the list as an additional element. Through this exercise, a broader pool of skills and competences was created for further analysis while complying with the categories standardised by the ESCO framework.

3.3.2. Connecting 2017 EIF principles to the EFISC

The skills and competences identified in the ESCO framework (see Section 3.1) were assessed according to the principles listed in the 2017 EIF (European Commission, 2017). These 12 principles are the main building blocks defining the direction of the EIF. They have been accepted by EU Member States and regional governments in their interoperability policies, and they are fundamental behavioural aspects designed to support interoperability for European public services. These principles are listed in **Table 2**.

Table 2 – List of EIF principles

#	Principle
1	Subsidiarity and proportionality
2	Openness
3	Transparency
4	Reusability
5	Technological neutrality and data portability
6	User-centricity
7	Inclusion and accessibility
8	Security and privacy
9	Multilingualism
10	Administrative simplification
11	Preservation of information
12	Assessment of effectiveness and efficiency

The **EFISC** is intended to support public administration staff from all EU Member States. It is therefore important to underline that the EIF and the **EFISC** are connected: enhancing of the implementation of the EIF by public administration staff requires that they have the necessary skills and competences. The **EFISC** therefore aims to develop an overview of the relevant skills and competences required to work on interoperability. Furthermore, the **EFISC** aims to provide public administrations with the necessary information on the relevant skills and competences required for interoperability, independently of occupational profiles. Consequently, the principles guiding the EIF are also fundamental to the **EFISC**.

Despite the fact that the latest version of the EIF dates from 2017 and is focused on EU- and national-level public administrations, it can be argued that the EIF principles are also highly relevant to other levels of public administration. Consequently, because of its coherence with the EIF principles, the **EFISC** resulting from this study should also be able to be reused at different levels of public administration, including local and regional contexts.

3.3.3. Refining the selection

From the ESCO elements, the selected skills and competences were refined according to their relevance to the EIF principles. In order to create and provide a more comprehensive first draft of the **EFISC**, the researchers added elements identified in the literature listed in **Table 1** to the ESCO categories on which this study decided to focus: knowledge, skills, attitudes and values. The process of selecting these elements is as follows.

1. Different elements mentioned in the literature were compiled, and special attention was paid to those elements mentioned several times in different documents. **Table 3** provides an illustrative example of how this process was conducted.

Table 3 – Compilation process of skills and competences

Source 1	Source 2	Source 3	Source 4
Working in a team	Information management	Future designer	Integrity
Service oriented	Task management	Value builder	Leading people
Show reliability	Employee management	Empowerer	Communication
Develop oneself	Relationship management	Achiever	Service orientation
Achieve objectives	Management of personal functioning	Self-leader	Result orientation
Technical expertise		Innovation booster	

2. The elements identified in the literature listed in **Table 1** were used to complete the ESCO elements, to enrich the scope of the framework. A total of 12 knowledge elements, together with 67 skills and 59 attitudes and values, were identified.
3. Once the elements from the ESCO framework and the elements from the literature review were merged, it was possible to identify that, in many cases, there were similarities among them, and it was decided that categorisations would be created that allowed the framework to be presented in a more simplified way without compromising its quality. Section 3.3.4. presents the initial version of the **EFISC**.

3.3.4. Initial version of the EFISC resulting from the refined selection

This subsection presents the result of the desk research and the categorisation of the elements for the initial version of the **EFISC**. The framework followed the classification of the ESCO framework. Therefore, the initial version of the **EFISC** was based on ESCO categories, which were grouped into four pillars: attitudes, values, knowledge and skills.

These pillars are also known as intentional learning (Eurostat, 2016). Intentional learning is defined as ‘a deliberate search for knowledge, skills, competences or attitudes of lasting values’ (Eurostat, 2016). Despite the fact that the framework focuses on intentional learning, it is important to highlight that a good instructional design and an appropriate context are important for an effective learning process (ICAO, 2016). The initial selection of the elements that are part of each pillar of the **EFISC** are explained below.

3.3.4.1. Attitudes and values

Attitudes and values refer to the individual work styles, beliefs and preferences that support behaviour, and they allow knowledge and skills to be applied in an effective manner (European Commission, 2020a). Each organisation or government tends to establish values under which they want to shape the work style of their public servants. For example, the Government of Canada ⁽⁷⁾ establishes the expected behaviour under the following values: respect for democracy, respect for people, integrity, stewardship and excellence; whereas the Organisation for Economic Co-operation and Development (OECD, 2019b) considers the following values to be core values: accountability, impartiality, the rule of law, integrity, transparency, equality and inclusiveness.

Attitude refers to the individual work styles that can influence job performance (European Commission, 2020a). However, values refer to principles or a standard behaviour that reveals one's judgement and what is important (European Commission, 2020a). **Table 4** shows the attitudes selected for the initial version of the **EFISC**.

Table 4 – Attitudes selected after the ESCO framework analysis and literature review

No	Selected attitudes
1	Flexible
2	Precise
3	Self-development oriented
4	Enthusiastic
5	Responsible
6	Persistent
7	Efficient
8	Independent
9	Innovative
10	Service oriented
12	Results oriented
12	Evidence based
13	Teamwork oriented
14	Leadership
15	Influencer
16	Communicative
17	Future oriented
18	Proactive
19	Analytical and critical thinking
20	Courageous
21	Empathetic

Table 5 outlines the values selected for the initial version of the **EFISC**.

⁽⁷⁾ <https://www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=25049>

Table 5 – Values selected after the ESCO framework analysis and literature review

No	Selected values
1	Demonstrate good manners
2	Follow ethical code of conduct
3	Demonstrate the added value of interoperability
4	Contribute to public values
5	Demonstrate responsibility
6	Demonstrate accountability
7	Demonstrate public service motivation
8	Demonstrate discipline
9	Demonstrate consciousness

3.3.4.2. Knowledge

Knowledge ‘includes theoretical concepts and ideas in addition to practical understanding based on the experience of having performed certain tasks’ (OECD, 2020). **Table 6** presents the selected knowledge elements, which are diverse and can be important for any individual, independently of the types of task involved.

Table 6 – Knowledge elements selected after the ESCO framework analysis and literature review

No	Selected knowledge elements
1	Information and communications technology
2	Expertise in administrative workflows
3	EIF knowledge
4	National interoperability framework knowledge
5	Knowledge of the regulations related to their field
6	Ethical awareness
7	Cultural awareness

3.3.4.3. Skills

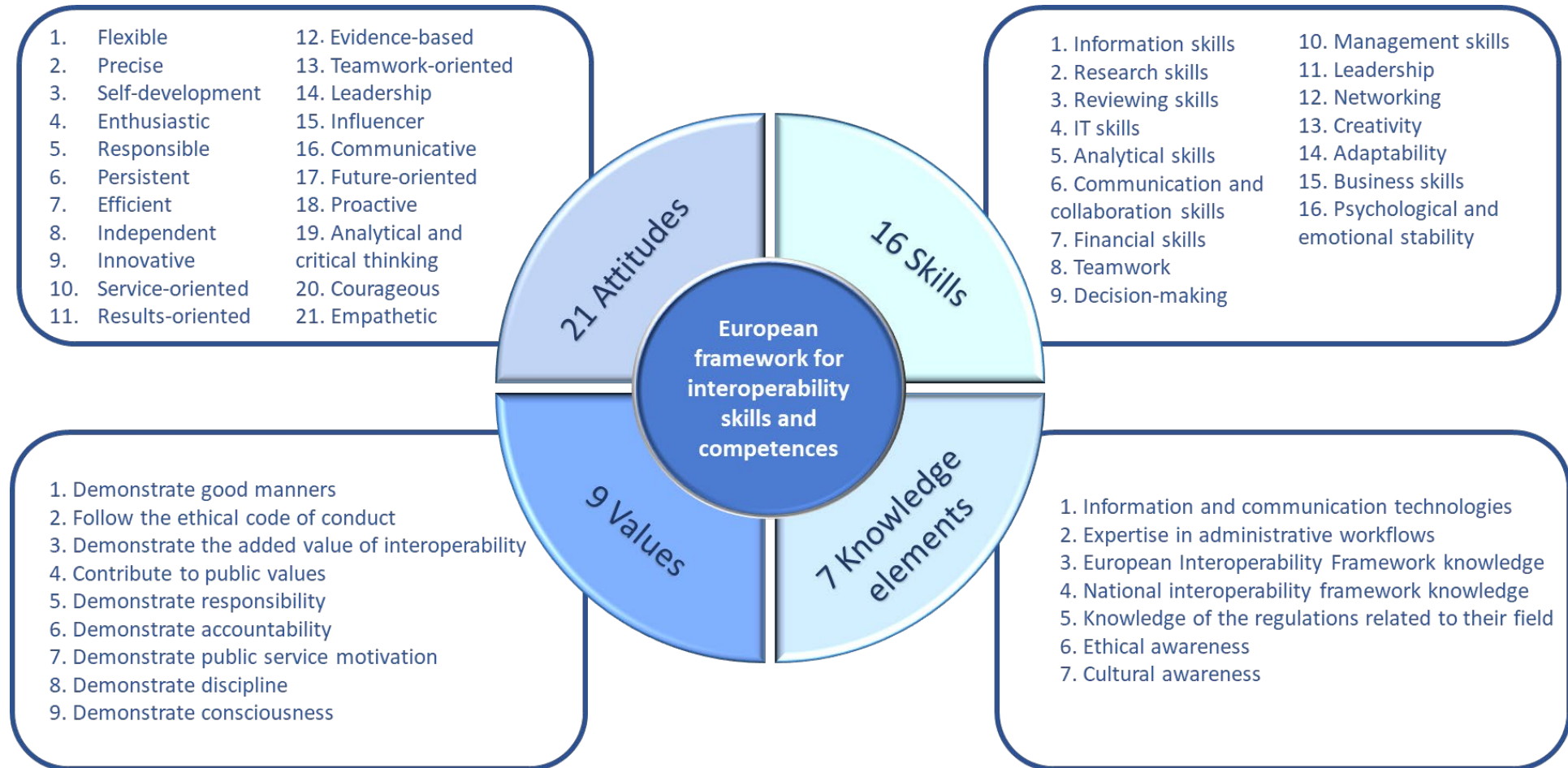
Skills are defined as ‘developed capacities that an individual must have to be effective in a job, role, function, task, or duty’ (Government of Canada, 2020). **Table 7** refers to these elements, which can be applied to any person independently of the specific tasks of which they are in charge. The skills can be divided into hard skills and soft skills. Hard skills are referred to as technical skills, whereas soft skills are referred to as intrapersonal and interpersonal aspects (Laker and Powell, 2011). Soft skills are currently considered desirable by employers (Majid et al., 2012) and key when considering technological changes (Snape, 2017).

Table 7 – Skills selected after the ESCO framework analysis and literature review

No	Selected skills
1	Information skills
2	Research skills
3	Reviewing skills
4	IT skills
5	Analytical skills
6	Communication and collaboration skills
7	Financial skills
8	Teamwork
9	Decision-making
10	Management skills
12	Leadership
12	Networking
13	Creativity
14	Adaptability
15	Business skills
16	Psychological and emotional stability

The resulting combination of the four pillars (i.e. attitudes, values, knowledge and skills) formed the initial version of the **EIFISC**. **Figure 3** shows this initial version.

Figure 3 – Initial version of the EIFISC in the public sector



3.4. Step 4 – Validation of the EIFISC in the public sector

In this fourth methodological step, two consecutive rounds of validation took place. More specifically, the initial selection of the **EIFISC** elements was shared with experts in the fields of digital skills and e-government, who suggested potential changes. Then, the revised **EIFISC** elements were shared with public servants and target groups with diverse backgrounds for the second round of validation. This step relates to the following ROs.

- RO4** | Validate the initial framework with test groups composed of target groups, including e-governance experts, young professionals and civil servants.
- RO5** | Revise the initial framework and tailor it to the target groups to create the final version of the **EIFISC**, taking into account all the feedback.

3.4.1. First round of validation

Initially, an EU survey was created to present the **EIFISC** elements, and it was shared with eight selected experts with diverse backgrounds. The experts were asked to validate the selected elements for the initial version of the framework. Five out of the eight experts responded to the survey. The survey, which was sent to the experts, can be found in [Annex 1](#) .

The survey had four sections.

- **Section 1** included the introduction and presented general information about the questionnaire.
- **Section 2** set the scene and contained questions that allowed the respondents to be identified.
- **Section 3** presented the scope and background of the survey and explained the methodological steps that were taken into account when developing the initial version of the framework.
- **Section 4** had five questions related to the selected elements that made up the framework.

The results from this first validation process confirmed the existence of different and, in some cases, contrasting perspectives on the type of elements that make up the framework. For example, although some experts were in favour of reducing the number of elements, others considered them an appropriate selection, and others suggested potential additions. Still, these findings helped to confirm that the framework is strongly linked to the ESCO framework. This is an important finding, as one of the experts suggested a different alignment that could make the framework much narrower. Although this is a very insightful observation, it will deviate the proposed framework from one of its main bases – the ESCO framework. However, this comment, together with the feedback from the other experts, helped in rethinking the elements and their categorisation.

The survey provided important insights into the attitudes' category, which helped the researchers reconsider the elements of this pillar. Based on the suggestions received, and taking into account the literature review, it was considered important to align the attitudes primarily with those that favour soft skills and collaboration, which are key to interoperability. Hence, the researchers proceeded to

eliminate the attitudes ‘flexible’, ‘independent’, ‘influencer’ and ‘courageous’ and added ‘holistic minded’ and ‘culturally open’. This last attitude is part of the 2016 *Competences for Democratic Culture*, published by the Council of Europe (2016). Finally, ‘analytical and critical thinking’ and ‘leadership’ were moved to the skills pillar. The reason for this last action is explained in the skills section. **Table 8** contains a refined selection of attitudes.

Table 8 – Attitudes selected after the first validation process

No	Selected attitudes
1	Precise
2	Self-development oriented
3	Enthusiastic
4	Responsible
5	Persistent
6	Efficient
7	Innovative
8	Service oriented
9	Results oriented
10	Evidence based
11	Teamwork oriented
12	Communicative
13	Future oriented
14	Proactive
15	Empathetic
16	Holistic minded
17	Culturally open

In terms of values, the reviewers considered some values to be very generic. Taking into account this observation and noticing that some values had already been encapsulated by the attitudes pillar, the researchers eliminated the following: ‘demonstrate good manners’, ‘follow ethical code of conduct’, ‘demonstrate responsibility’, ‘demonstrate accountability’, ‘demonstrate public service motivation’ and ‘demonstrate discipline’. Instead, the researchers added ‘understanding the value of common standards’ and related ‘demonstrate consciousness’ to interoperability, renaming this element ‘demonstrate consciousness of the relevance of interoperability’. It is also worth emphasising that the **EIFISC** respects and follows the values of the EU ⁽⁸⁾. Consequently, four core values were selected after the first validation process, as shown in **Table 9**.

⁽⁸⁾ <https://ec.europa.eu/component-library/eu/about/eu-values/>

Table 9 – Values selected after the first validation process

No	Selected values
1	Demonstrate the added value of interoperability
2	Contribute to public values
3	Understand the value of common standards
4	Demonstrate consciousness of the relevance of interoperability

Following the comments from the experts, it was decided that ‘ethical awareness’ and ‘cultural awareness’ would be excluded from knowledge elements. The knowledge element ‘expertise in administrative workflows’ was renamed ‘knowledge in administrative workflows’. The knowledge elements are presented in **Table 10**.

Table 10 – Knowledge elements selected after the first validation process

No	Selected knowledge elements
1	Information and communications technology
2	Knowledge in administrative workflows
3	European interoperability framework knowledge
4	National interoperability framework knowledge
5	Knowledge of the regulations related to their field

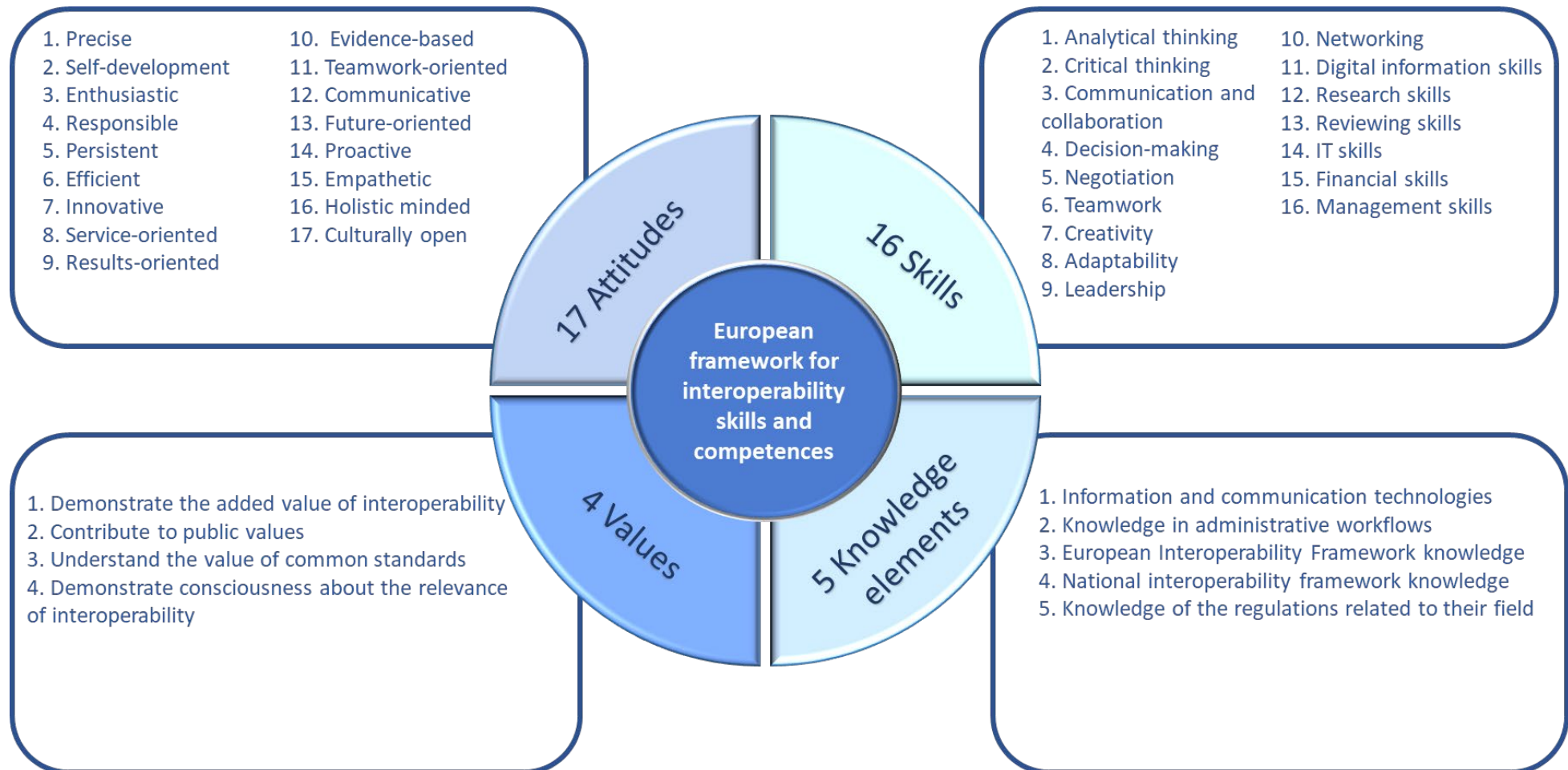
Finally, the elements in the skills pillar were revised and divided into soft skills and hard skills, based on the feedback received from the validation process. For the categorisation of skills, we revisited the literature on hard and soft skills (Majid et al., 2012; Snape, 2017). Hard skills are referred to as technical skills, whereas soft skills are referred to as intrapersonal and interpersonal aspects (Laker and Powell, 2011). As a result, ‘psychological and emotional stability’ was excluded, as it was considered too generic, and ‘business skills’ was changed to ‘negotiation’ skills. In addition, based on the experts’ recommendations and the literature review, ‘analytical and critical thinking’ was moved from the attitudes pillar to the skills pillar. Finally, to be more precise, the notion of ‘digital’ was added to ‘information skills’. **Table 11** shows the selected skills and their categorisation.

Table 11 – Skills selected and categorised after the first validation process

#	Selected soft skills
1	Analytical thinking
2	Critical thinking
3	Communication and collaboration
4	Decision-making
5	Negotiation
6	Teamwork
7	Creativity
8	Adaptability
9	Leadership
10	Networking
#	Selected hard skills
1	Digital information skills
2	Research skills
3	Reviewing skills
4	IT skills
5	Financial skills
6	Management skills

Based on the changes made to the framework, the revised version of the **EFISC** for the second validation process included 17 attitudes, 4 values, 5 knowledge elements, 10 soft skills and 6 hard skills. **Figure 4** presents the first validated version of the **EFISC**.

Figure 4 – Revised version of the EIFISC after the first validation process



3.4.2. Second round of validation

In the second round of validation, and in addition to assessing the relevance of the framework in practice, a subgroup from the potential users of the framework was selected. Annex 2 e contains the questionnaire. A total of 13 respondents from EU authorities, national authorities, academia and industry shared their opinions and preferences via a structured online questionnaire. The results allowed the researchers to refine the elements of the framework and to identify which attitudes, values, skills and knowledge elements are considered the most important.

The feedback collected from the second validation process was used to readapt the framework. For example, the 'organisational knowledge' element was incorporated. The element 'national interoperability framework knowledge' was renamed 'knowledge of national interoperability framework and cross-boundary interoperability legislation/models'. The element 'knowledge of the regulations' was amended so that it specified 'including general data protection regulation'⁹. This addition emphasises the relevance of data protection when processing the data of natural persons. In addition, skills and attitudes were realigned with the ESCO framework. This realignment allowed the researchers to provide a specific meaning for the different elements of the **EIFISC**. Those elements that were not identified in the ESCO framework were defined based on the relevant literature.

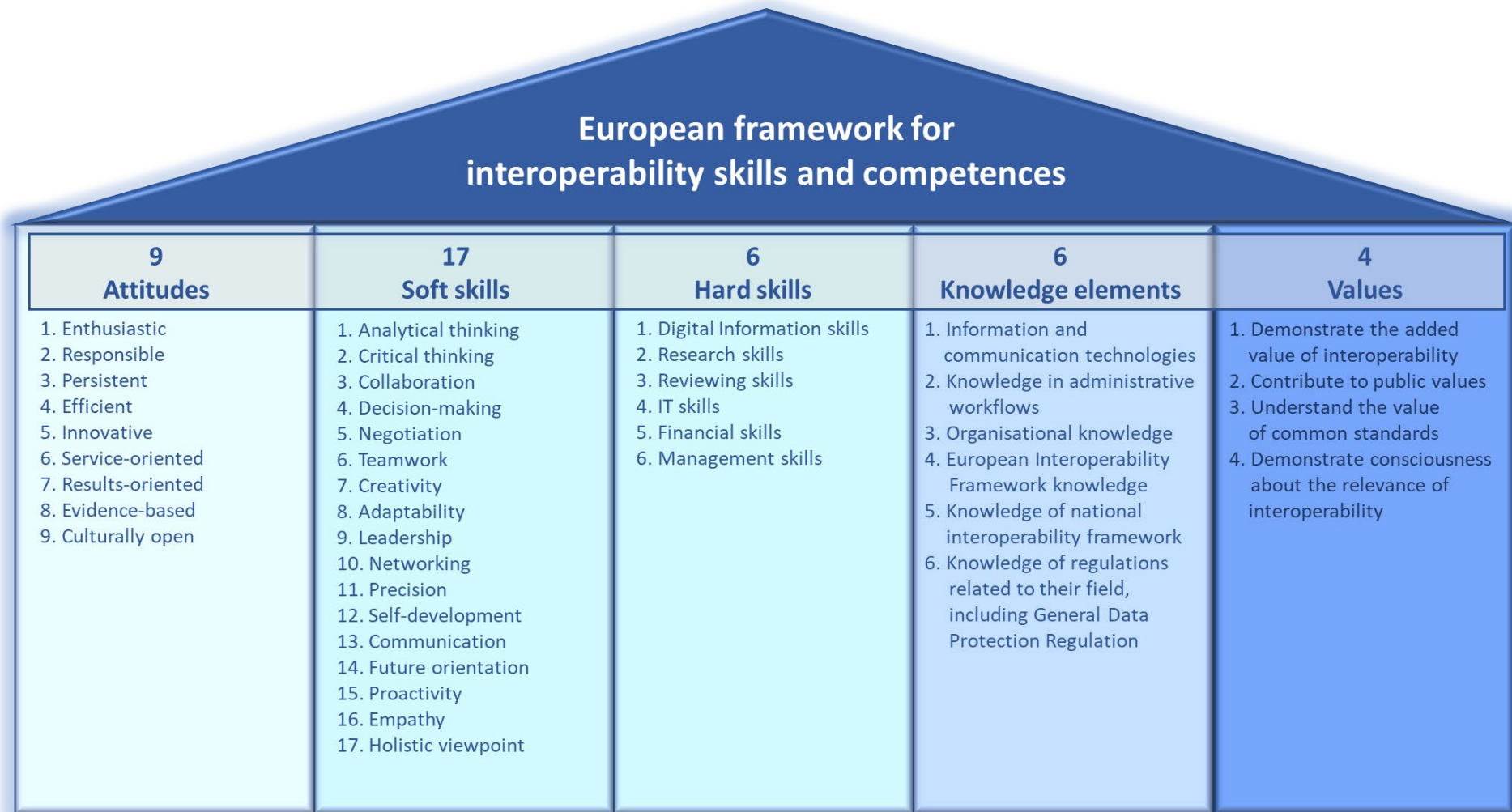
The process also helped in understanding which elements of the **EIFISC** can be considered of key importance by the different target groups. It is difficult to extrapolate a wider theoretical deduction from the limited sample size, but it was possible to observe that some elements are deemed more important, independently of the background of the respondents. For example, in terms of attitudes, 'service oriented' was selected by eight participants as one of their five main attitudes. For soft skills, 'communication and collaboration' was the top choice for five participants, whereas 'digital information skills' was chosen by six as the top hard skill. Finally, regarding the knowledge elements, 'information and communications technology' was the main choice for seven participants. Therefore, it is possible to state that a service-oriented attitude, collaboration, digital information skills and knowledge of ICT are key to interoperability. These preliminary findings are consistent with the Living-in.eu⁽¹⁰⁾ principles.

3.5. Step 5 – Finalisation of the EIFISC in the public sector

Once the validation rounds were concluded, the results were gathered and the final version of the **EIFISC** was created. The final selection includes 9 attitudes, 4 values, 17 soft skills, 6 hard skills and 6 knowledge elements. The pillars with their corresponding sets of elements are presented in **Figure 5**.

⁹ <https://eur-lex.europa.eu/eli/reg/2016/679/oj>
⁽¹⁰⁾ <https://www.living-in.eu/declaration>

Figure 5 – Final version of the EIFISC after the second validation process



4. Results

This chapter presents the final results of the research conducted to develop the **EFISC**. The final results are based on the second round of the validation process. This chapter is divided into two sections: the first section presents and defines each element of the final version of the framework, whereas the second section explains how the framework should be understood in relation to concrete occupational categories.

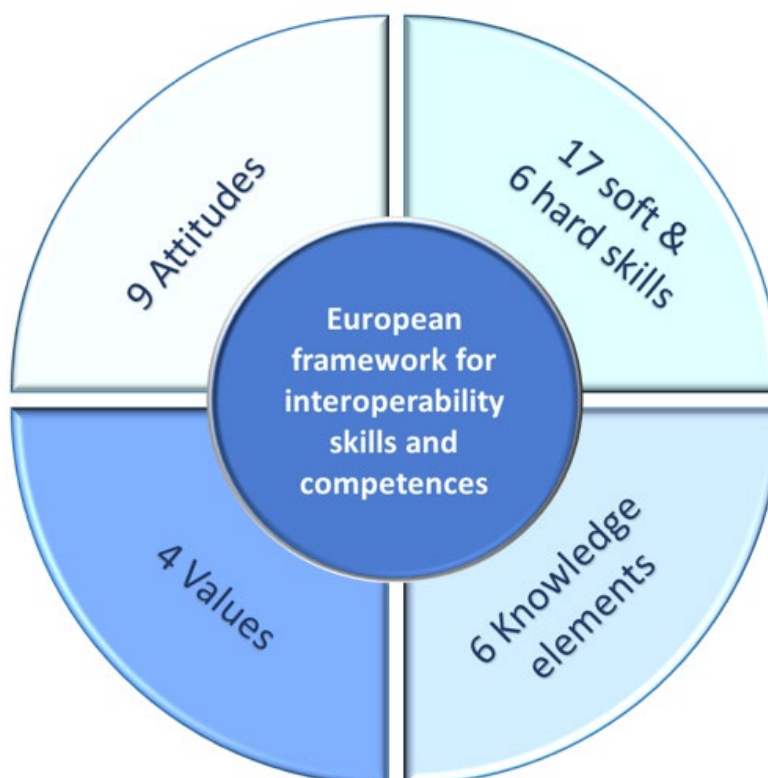
4.1. The final version of the EFISC

The final version of the **EFISC** is composed of four pillars and a total of 41 elements.

Attitudes	Values	Knowledge	Skills
9	4	6	23

Attitudes and values refer to the individual work styles, beliefs and preferences that support behaviour, and they allow knowledge and skills to be applied in an effective manner (European Commission, 2020a). **Figure 6** presents the final framework, including 9 attitudes, 4 values, 17 soft skills, 6 hard skills and 6 knowledge elements.

Figure 6 – The final version of the EFISC



The meaning of each element is explained in **Table 12** (attitudes), **Table 13** (values), **Table 14** (knowledge elements), **Table 15** (soft skills) and **Table 16** (hard skills).

Table 12 – Attitudes selected for the EFISC and their meanings

No	Selected attitude	Meaning
1	Enthusiastic ^(a)	'Display great effort driven by an interest or enjoyment in work itself, in the absence of external pressures.'
2	Responsible ^(b)	'Accept responsibility and be accountable for professional decisions of yourself or others as part of a job or one's role.'
3	Persistent ^(c)	'Stick to one's tasks in spite of fatigue or frustration.'
4	Efficient ^(d)	'Achieve objectives using minimum amount of time, effort, or cost.'
5	Innovative ^(e)	'Search for improvements and present innovative solutions, creativity and alternative thinking to develop new technologies, methods or ideas for and answers to work-related problems.'
6	Service oriented ^(f)	'Respond to the expectations of clients and customers in a professional manner, anticipating and addressing their needs and desires, to ensure customer satisfaction and loyalty.'
7	Results oriented	Continue monitoring accomplishments and comparing them with primary objectives. Ensure effective time use and available resources (Parkhomenko-Kutsevil, 2016, p. 297).
8	Evidence based	Use data to make decisions: 'the data revolution provides new opportunities to ensure that information, evidence and data are used to drive decision making not opinion, assumptions, hunches and guesses' (OECD, 2017a, p. 126).
9	Culturally open ^(g)	'Understand and respect people who are perceived to have different cultural affinities and respond effectively and respectfully to them. This includes openness to learn and speak foreign languages.'

^(a) <http://data.europa.eu/esco/skill/A1.7.0>

^(b) <http://data.europa.eu/esco/skill/199f7919-5114-41b6-b6a5-41e0e4896ec1>

^(c) <http://data.europa.eu/esco/skill/A1.14>

^(d) <http://data.europa.eu/esco/skill/A1.15.0>

^(e) <http://data.europa.eu/esco/skill/f975091a-e5a5-4472-ac17-11680e53e98f>

^(f) <http://data.europa.eu/esco/skill/A1.12.3>

^(g) <http://data.europa.eu/esco/skill/c10d5d87-36cf-42f5-8a12-e560fb5f4af8>

Table 13 – Values selected for the EFISC and their meanings

No	Selected value	Meaning
1	Demonstrate the added value of interoperability	Interoperability helps to deliver more efficient, less costly and borderless services. Data and information play an important role as enablers of interoperability.
2	Contribute to public values ^(a)	The EU's fundamental values are respect for human dignity and human rights, freedom, democracy, equality and the rule of law.
3	Understand the value of common standards	The Commission is setting up ICT standardisation priorities for the Digital Single Market ^(b) .
4	Demonstrate consciousness about the relevance of interoperability	Interoperability is crucial to facing challenges such as climate change, health pandemics and urban transport. It plays a key role in achieving climate neutrality ^(c) .

^(a) https://europa.eu/european-union/about-eu/eu-in-brief_en

^(b) <https://ec.europa.eu/digital-single-market/en/standards>

^(c) https://ec.europa.eu/clima/policies/eu-climate-action_en

Table 14 – Knowledge elements selected for the EFISC

No	Selected knowledge element
1	Information and communications technology – this underpins innovation and competitiveness in a wide range of private and public markets and sectors (European Commission, 2020b).
2	Knowledge in administrative workflows – this involves repetitive, predictable processes with simple task coordination rules, such as routing an expense report or travel request through an authorisation process (Prieto and Lozano-Tello, 2009).
3	Organisational knowledge, including its regulations and processes.
4	European interoperability framework ^(a) knowledge.
5	Knowledge of national interoperability framework and cross-boundary interoperability legislation/models.
6	Knowledge of the regulations related to their field, including general data protection regulation ^(b) .

^(a) https://ec.europa.eu/isa2/eif_en

^(b) European Union, Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC, OJ L 119 final, 4.5.2016, p. 1–88 (<https://eur-lex.europa.eu/eli/reg/2016/679/oj>).

Table 15 – Soft skills selected for the EFISC and their meanings

No	Selected soft skill	Meaning
1	Analytical thinking ^(a)	'Analyse information flows to reconstruct messages quickly and precisely. Navigate a language to explain the same sense or feeling in situations where there is no definite word or literal translation.'
2	Critical thinking ^(b)	'Identify the strengths and weaknesses of various abstract, rational concepts, such as issues, opinions, and approaches related to a specific problematic situation in order to formulate solutions and alternative methods of tackling the situation.'

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No	Selected soft skill	Meaning
3	Collaboration ^(c)	'[...] collaborating, liaising, and negotiating with other people; developing solutions to problems, creating plans or specifications for the design of objects and systems, composing text or music, performing to entertain an audience, and imparting knowledge to others.'
4	Decision-making ^(d)	'Make a choice from several alternative possibilities.'
5	Negotiation ^(e)	'Exchanging ideas while analysing issues and interests at stake, enabling opposing sides to resolve disputes and reach agreement, or making decisions to resolve disputes or impose justice.'
6	Teamwork ^(f)	'Working confidently within a group with each doing their part in the service of the whole. Understanding and respecting the roles and competences of other team members.'
7	Creativity ^(g)	'Generate new ideas or combine existing ones to develop innovative, novel solutions.'
8	Adaptability ^(h)	'Alter one's attitude or behaviour to accommodate modifications in the workplace.'
9	Leadership ⁽ⁱ⁾	'Reinforcing an organisation's vision, inspiring and enthusing others to achieve positive outcomes. The focus of this group is on skills in motivating and inspiring others, rather than on managing and supervising a team.'
10	Networking ^(j)	'Developing alliances, contacts or partnerships, and exchanging information with others.'
11	Precision ^(k)	'Accomplish a task with concern for all the areas involved, no matter how small.'
12	Self-development ^(l)	'Set goals for personal development and act accordingly. Plan personal development by analysing work experience and establishing areas that need development. Takes part in training sessions considering his/her abilities, possibilities and feedback.'
13	Communication ^(m)	'Exchanging and conveying information, ideas, concepts, thoughts, and feelings through the use of a shared system of words, signs, and semiotic rules via a medium.'
14	Future orientation	To be able to foresee and understand potential future scenarios in order to identify solutions that are resilient to uncertainties in the future and sustainable over time (OECD, 2017b).
15	Proactivity ⁽ⁿ⁾	'Take initiatives to come up with improvements.'
16	Empathy ^(o)	'Show empathy in order to prevent any kind of symbolic violence and isolation and to guarantee a considerate attention to everyone. It should include a capacity to understand various verbal and non-verbal communication of sentiment and feeling.'
17	Holistic viewpoint ^(p)	'Consider the social service user in any situation, recognising the connections between micro-dimension, meso-dimension, and macro-dimension of social problems, social development and social policies.'

^(e) <http://data.europa.eu/esco/skill/54173a92-b781-4a3f-880b-70fa3a375417>

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^(b) <http://data.europa.eu/esco/skill/b9f16465-56a9-426b-a047-0f9f1f95ec92>

^(c) <http://data.europa.eu/esco/skill/S1>

^(d) <http://data.europa.eu/esco/skill/d62d2b4c-a6f8-439e-8a1b-4f29ab5f2c47>

^(e) <http://data.europa.eu/esco/skill/S1.1.0>

^(f) <http://data.europa.eu/esco/skill/S1.8.1>

^(g) <http://data.europa.eu/esco/skill/c624c6a3-b0ba-4a31-a296-0d433fe47e41>

^(h) <http://data.europa.eu/esco/skill/A1.1.0>

⁽ⁱ⁾ <http://data.europa.eu/esco/skill/S4.5>

^(j) <http://data.europa.eu/esco/skill/S1.2>

^(k) <http://data.europa.eu/esco/skill/A1.2.0>

^(l) <http://data.europa.eu/esco/skill/1835a7c1-600e-4b16-a0af-fb4f7d8d77b9>

^(m) <http://data.europa.eu/esco/skill/15d76317-c71a-4fa2-aadc-2ecc34e627b7>

⁽ⁿ⁾ <http://data.europa.eu/esco/skill/e186976a-64f0-4052-a25b-297d19e1d0ec>

^(o) <http://data.europa.eu/esco/skill/77b636e8-fab3-41a8-8022-1e0a354059dc>

^(p) <http://data.europa.eu/esco/skill/afa3b020-a48c-45a8-a2ff-77d0b9df5381>

Table 16 – Hard skills selected for the EIFISC and their meanings

No	Selected hard skill	Meaning
1	Digital information skills	Digital competences ^(a) : ‘Ability to use information and communications technology effectively to achieve work objectives.’ Information skills ^(b) : ‘Collecting, storing, monitoring, and using information; Conducting studies, investigations and tests; maintaining records; managing, evaluating, processing, analysing and monitoring information and projecting outcomes.’
2	Research skills ^(c)	‘Conducting studies, investigations, and examinations to increase knowledge and understanding, diagnose problems or identify needs and requirements.’
3	Reviewing skills ^(d)	‘Proofread and give feedback to technical [and non-technical] drawings or drafts.’
4	IT skills ^(e)	‘Using computers and other digital tools to develop, install and maintain ICT software and infrastructure and to browse, search, filter, organise, store, retrieve, and analyse data, to collaborate and communicate with others, to create and edit new content.’
5	Financial skills ^(f)	‘Financial operations such as calculations, cost estimations, budget management taking relevant commercial and statistical data into account such as data for materials, supplies and manpower.’
6	Management skills ^(g)	‘Understand project management and the activities which comprise this area. Know the variables implied in project management such as time, resources, requirements, deadlines, and responding to unexpected events.’

^(a) <http://data.europa.eu/esco/skill/aeccc330-0be9-419f-bddb-5218de926004>

^(b) <http://data.europa.eu/esco/skill/S2>

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(^c) <http://data.europa.eu/esco/skill/S2.1>

(^d) <http://data.europa.eu/esco/skill/c290c45c-b8da-4517-be4a-b16fdce26cb2>

(^e) <http://data.europa.eu/esco/skill/S5>

(^f) <http://data.europa.eu/esco/skill/811bdb9d-5bf7-4b5a-a3f5-4fc2002f6d57>

(^g) <http://data.europa.eu/esco/skill/7111b95d-0ce3-441a-9d92-4c75d05c4388>

With the framework and its components and their meanings having been presented, Section 4.2 will elaborate on how the **EFISC** should be understood and applied to a specific selection of occupational categories.

4.2. Understanding the EFISC

The **EFISC** aims to be a supportive framework for the public sector and does not have any legal force. It should be understood as a framework that has been constructed using elements that the academic literature, experts and end-users in the area of interoperability consider of core importance to interoperability skills and competences in the public sector. Therefore, the **EFISC** should not be understood as inflexible or limiting.

The nature of the **EFISC** can be further exemplified by work on the **Interoperability Academy**, through which learner profiles and learning paths have been developed (¹¹). Although the framework presents core elements that can favour interoperability, the learner profiles are focused on specific interoperability requirements for occupational backgrounds. In this sense, when selecting personnel for interoperability in the public sector, the attitudes, values, knowledge elements and skills identified as part of the **EFISC** can provide guidance. Furthermore, the application of the **EFISC** in developing training programmes for public servants may vary according to their occupational background. Therefore, it is important to understand how some occupations are related to certain interoperability skills or knowledge elements. **Table 17** refers to the type of skills that are relevant to people who hold specific positions, based on occupation.

Table 17 – Final selection of occupational skills per occupation resulting from the ESCO framework, the literature review and the Interoperability Academy

Occupation	Selected occupational skills		
Public administration manager	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; vertical-align: top;"> <ol style="list-style-type: none"> 1. Liaise with local authorities 2. Liaise with politicians 3. Maintain relationships with government agencies 4. Manage budgets 5. Manage government policy implementation </td> <td style="width: 50%; vertical-align: top;"> <ol style="list-style-type: none"> 6. Manage staff / supervise staff 7. Manage resources used for implementation 8. Write reports on the implementation process 9. Communicate with government officials and the public to inform them about the policies 10. Administrative sensitivity </td> </tr> </table>	<ol style="list-style-type: none"> 1. Liaise with local authorities 2. Liaise with politicians 3. Maintain relationships with government agencies 4. Manage budgets 5. Manage government policy implementation 	<ol style="list-style-type: none"> 6. Manage staff / supervise staff 7. Manage resources used for implementation 8. Write reports on the implementation process 9. Communicate with government officials and the public to inform them about the policies 10. Administrative sensitivity
<ol style="list-style-type: none"> 1. Liaise with local authorities 2. Liaise with politicians 3. Maintain relationships with government agencies 4. Manage budgets 5. Manage government policy implementation 	<ol style="list-style-type: none"> 6. Manage staff / supervise staff 7. Manage resources used for implementation 8. Write reports on the implementation process 9. Communicate with government officials and the public to inform them about the policies 10. Administrative sensitivity 		

(¹¹) <https://joinup.ec.europa.eu/collection/digital-skills-public-sector/solution/interoperability-academy/document/updated-learner-profiles-and-learning-paths>

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Occupation	Selected occupational skills	
ICT system administrator	1. Working with computers 2. Apply system organisational policies 3. Integrate system components	4. Management skills 5. Migrate existing data 6. Monitor system performance
Legal advisor	1. Advise on legal decisions 2. Analyse enforceability 3. Compile legal documents 4. Ensure law application	5. Identify clients' needs 6. Interpret law 7. Protect client interests 8. Provide legal advice
Town/city councillor	1. Advise on legislative acts 2. Analyse legislation 3. Build community relations 4. Liaise with local authorities	5. Maintain relationships with government agencies 6. Observe confidentiality 7. Perform political negotiation
Civil engineer	1. Adjust engineering designs 2. Approve engineering designs 3. Perform scientific research 4. Use technical drawing software	5. Compile geographic information system (GIS) data 6. Conduct quality control analysis 7. Develop geological databases
Financial manager	1. Advise on financial matters 2. Analyse financial performance 3. Analyse market financial trends 4. Create a financial plan	5. Enforce financial policies 6. Follow company standards 7. Liaise with managers 8. Strive for company growth

Table 18 presents the type of knowledge that is relevant to those individuals who hold specific positions, based on occupation. Along with the development of the **EFISC**, two learner profiles were developed. These are ‘public administration manager’ and ‘ICT system administrator’, which were selected as the most pertinent occupations for interoperability. However, as part of the **Interoperability Academy**, more profiles with the required skills and knowledge elements were created. They are chief information officer, systems architect, software developer, policy manager, project manager, public administration manager, town/city councillor, legal advisor, civil engineer and financial manager ⁽¹²⁾.

For these learner profiles, the European e-competence framework (e-CF) ⁽¹³⁾, the European Committee for Standardization (CEN) CEN Workshop Agreement 16458–1 European ICT professionals role profiles ⁽¹⁴⁾, the ESCO classification, the digital competence framework for citizens (DigComp), interoperability solutions administrations ⁽¹⁵⁾ and the Joint Research Centre’s user- and learner-centricity work were used as the baseline.

Table 18 – Final selection of knowledge elements per occupation resulting from the literature review and the Interoperability Academy ^(a)

Occupation	Selected knowledge elements	
Public administration manager	1. Budgetary principles	6. Project management principles 7. Public finance

⁽¹²⁾ <https://joinup.ec.europa.eu/collection/digital-skills-public-sector/solution/interoperability-academy/document/updated-learner-profiles-and-learning-paths>

⁽¹³⁾ <https://www.ecompetences.eu/>

⁽¹⁴⁾ ftp://ftp.cencenelec.eu/CEN/WhatWeDo/Fields/ICT/eEducation/WS/eSkills/ICTskills/CWA_16458-1_2018.pdf

⁽¹⁵⁾ https://ec.europa.eu/isa2/home_de

Study on the development of a European framework for interoperability skills and competences in the public sector (EIFISC)

Occupation	Selected knowledge elements	
	2. Government policy implementation 3. Public policy implementation 4. Legislation procedure 5. Accounting techniques	8. Public law 9. Expertise in politics of e-government 10. Human resources management
ICT system administrator	1. ICT knowledge 2. Hardware components 3. Organisational policies	4. Quality assurance methodologies 5. Software component libraries 6. Expertise in information systems design
Legal advisor	1. Legal terminology 2. Business law 3. Civil law 4. Contract law	5. Corporate law 6. Court procedures 7. Legal case management 8. Legal research
Town/city councillor	1. Government policy implementation 2. Budgetary principles 3. Election law 4. Political parties	5. Project management principles 6. Public finance 7. Public law
Civil engineer	1. Civil engineering 2. Engineering principles 3. Engineering processes 4. Mining, construction and civil engineering 5. Machinery products	6. Technical drawings 7. Project management 8. Surveying 9. Urban planning
Financial manager	1. Financial analysis 2. Financial management 3. Financial statements 4. Accounting 5. Budgetary principles	6. Business evaluation techniques 7. Cost management 8. Fraud detection 9. Public finance

(^e) <https://joinup.ec.europa.eu/collection/digital-skills-public-sector/solution/interoperability-academy/document/updated-learner-profiles-and-learning-paths>

When looking at the different profiles in **Table 17** and **Table 18**, we can observe that the skills and knowledge elements are mainly related to the tasks of each occupation, and the **EIFISC** completes those occupations from an interoperability perspective. If we take town/city councillor as an example, the selected skills are ‘advise on legislative acts’, ‘analyse legislation’, ‘build community relations’, ‘liaise with local authorities’, ‘maintain relationships with government agencies’, ‘observe confidentiality’ and ‘perform political negotiation’. These occupational skills are complementary to the interoperability skills that are provided by the **EIFISC**, such as analytical skills, critical thinking, collaboration skills, decision-making competences, negotiating, teamwork, creativity, adaptability, leadership, networking, precision, self-development, communication, future orientation, proactivity, empathy and holistic viewpoint. Therefore, the elements of the framework should be considered guidelines that are key to interoperability, independently of the specific skills and knowledge that each specific occupation requires.

5. Conclusion

This chapter presents concluding remarks, highlights the main results of this study and includes suggestions for further research.

This study was funded by the **ISA² programme** ⁽¹⁶⁾, which supports the development of digital solutions that enable public administrations, businesses and citizens in Europe to benefit from interoperable cross-border and cross-sector public services. Interoperability can help to make digitalisation more efficient by removing barriers between services, IT systems and data.

Under this programme, the **Interoperability Academy** aims to improve the advanced digital skills of civil servants in the area of interoperability. In the context of this activity, the researchers conducted the current study on skills and competences frameworks. The general objective of this study was to develop an **EIFISC** that could be applied to **public sector administrations** in the region. To achieve this general objective, five specific ROs were pursued.

- RO1** | Identify the required skills and competences in the context of interoperability for civil servants and young professionals in the public sector.
- RO2** | Research and analyse existing skills and competences frameworks developed for public sector organisations, international and supranational institutions, and private sector organisations.
- RO3** | Match the identified skills and competences with the relevant framework, in order to develop a new skills and competences framework for interoperability in the public sector.
- RO4** | Validate the initial framework with test groups composed of target groups, including e-governance experts, young professionals and civil servants.
- RO5** | Revise the initial framework and tailor it to the target groups to create the final version of the **EIFISC**, taking into account all feedback.

The final version of the **EIFISC** is composed of four pillars: attitudes, values, knowledge elements and skills. Attitudes and values are placed at the extremes of the model, as they refer to the individual work styles, beliefs and preferences that support the behaviour that can help in creating a digital culture (see **Figure 5**). Although the initial version of the **EIFISC** started with 21 attitudes, 9 values, 7 knowledge elements and 16 skills, the final version of the **EIFISC** contains 9 attitudes, 4 values, 6 knowledge elements and 23 skills.

The process of the framework development, from the literature review to the feedback from the different groups of interest, provided important lessons. In terms of attitudes, one relevant addition was 'culturally open', considering its role in the competences for democratic culture framework developed by the Council of Europe (2016). Regarding values, it is important to highlight the

⁽¹⁶⁾ https://ec.europa.eu/isa2/home_en

connection between the final version and the EU values and the value of interoperability; interoperability is key to facing challenges such as climate change and the development of smart cities safeguarding data privacy. When looking at skills, the validations and internal review process were key to creating two subcategories: soft skills and hard skills. According to the feedback received, it is important to highlight that soft skills seem to have a prominent role in interoperability. Finally, in terms of knowledge elements, the validation process helped to ensure the inclusion and highlight the relevance of the EIF⁽¹⁷⁾ and the general data protection regulation⁽¹⁸⁾.

Besides the refinement of the framework, the last validation process shed light on which elements of the framework were considered more important for the interoperability target groups. The results revealed that ‘collaboration’ was considered one of the most important soft skills, whereas ‘digital information’ was shown to be the most important hard skill. In addition, ‘service oriented’ was identified as the most important attitude, and ‘information and communications technology’ was considered one of the most relevant knowledge elements.

These findings are consistent with other European frameworks of skills and competences, as well as with the Living-in.eu⁽¹⁹⁾ principles, which underlie the importance of sustaining a citizen-centric approach, with ethical and socially responsible management of data, and using technology as a key enabler. As for its compatibility with other frameworks, not only is the **EIFISC** coherent with the findings of the most pertinent literature on the subject, but its construction ensured that it was consistent with the most relevant framework to the EU labour market and education – the ESCO framework. Furthermore, future research can explore its congruence with skills and competence frameworks that are applicable to the private sector and citizenry in general, such as the recently published updated version of DigComp, namely DigComp 2.1 (Carretero Gomez et al., 2017).

Although some elements of the **EIFISC** may be ubiquitous when considering interoperability skills and competences in different public sector areas, it is still possible to foresee that the need for interoperability skills may vary according to the sectoral area of application and occupation in the public sector. Therefore, studies aiming to apply this framework in different occupational and sectoral areas in the public sector are strongly encouraged. Some interoperability skills and competences may prove necessary for specific domains, and therefore the possibility of developing tailor-made human resources training programmes and academic curricula should be explored. In line with this, the development of curricula and training programmes on interoperability should examine the compatibilities between the **EIFISC** and the most recent Eurostat *Classification of Learning Activities* (Eurostat, 2016) and the *Taxonomy to assist in the identification of instructional methods* (ICAO, 2016), as well as ensure alignment with the 2011 International Standard Classification of Education by United Nations Educational, Scientific and Cultural Organization⁽²⁰⁾.

Furthermore, digital culture has been identified as a factor that shapes digital transformation, and it is also deemed necessary to buttress digital solutions in a sustainable and scalable way (Eggers and Bellman, 2015). Hence, the researchers recommend further research on how and which **EIFISC** elements can support the creation of such a digital culture. Moreover, a comparative research

⁽¹⁷⁾ https://ec.europa.eu/isa2/eif_en

⁽¹⁸⁾ European Union, Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC, OJ L 119 final, 4.5.2016, p. 1–88 (<https://eur-lex.europa.eu/eli/reg/2016/679/oj>).

⁽¹⁹⁾ <https://www.living-in.eu/declaration>


⁽²⁰⁾ [https://ec.europa.eu/eurostat/statistics-explained/index.php/International_Standard_Classification_of_Education_\(ISCED\)](https://ec.europa.eu/eurostat/statistics-explained/index.php/International_Standard_Classification_of_Education_(ISCED))

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approach to applications of the **EIFSC** in different contexts might reveal a deeper understanding of how national systems of public administration support the creation and development of certain interoperability skills outlined in the **EIFSC**.

6. Annexes

6.1. Annex 1 – First validation survey



Interoperability
Academy

Validation of the Interoperability Skills and Competencies Framework for the public sector

Fields marked with * are mandatory.

1 Introduction

This survey is conducted in the framework of the [Interoperability Academy action \(2019.01\)](#), funded by the [ISA² programme](#) of the European Commission.

The purpose of this survey is to validate the selection of attitudes and values, knowledge elements and skills that have been selected to construct the European Interoperability Skills and Competencies Framework for the public sector.

The **deadline** to complete this questionnaire is **October 15th 2020**.

This questionnaire is divided into four sections.

Section 1: This section includes the Introduction and it presents general information about this questionnaire.

Section 2: This section is the Scene Setting in which there are questions that would allow us to know our respondents better.

Section 3: This section presents the Scope and Background of the survey and explains the methodological steps that were taken into account when developing the current version of the framework.

Section 4: This section contains five questions related to the selected elements that construct the framework.

All of your answers to this questionnaire will be kept strictly confidential. Only aggregated results will be documented. For more details as to how your personal data will be treated, please refer to the privacy statement available at the end of this page.

The survey will not take more than 10 minutes to complete and will provide highly valuable information for us.

All of your answers to this questionnaire will be kept strictly confidential. Only aggregated results will be documented. For more details as to how your personal data will be treated, please refer to the privacy statement available at the end of the survey.

1

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Please do not hesitate to get in touch with the KU Leuven Team (Cesar Casiano <cesar.casiano@kuleuven.be>) or Interoperability Academy Team (IOP-ACADEMY@ec.europa.eu), if you have any questions regarding the content of the questionnaire.

This questionnaire was designed by the Public Governance Institute from KU Leuven and TRASYS International on behalf of Georges LOBO and Victoria KALOGIROU European Commission Program Managers of Interoperability Academy, Interoperability Unit / DG Informatics (DIGIT).

I agree with the private statement below.

Privacy Statement

[Annex_Privacy_Statement_.pdf](#)

2 Section Title

Which of the following categories best describe your professional status?

- EU Public Authority
- Non-EU Public Authority
- European Institution
- IT Industry
- Research/Academia
- Other

If you responded 'Other', please specify your role within your organisation.

This sections aims to collect more information about the person who is completing the questionnaire. None of the questions are mandatory.

First name

Last name

Organisation

Email address

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Reuse of your inputs and contact details:

Your survey inputs and results will not be shared with others. Aggregate analysis, across all submitted IOP Academy surveys, will only be made in a fully anonymized way. Your contact details will not be reused, except if you provide your consent herewith: "I agree that my contact details can be reused by the European Commission in the context of other ISA2 actions":

- Yes
 No

3 Scope and Background

Nowadays, many countries in Europe are offering digital services and interoperability could help to make digitalisation more efficient by removing barriers between services, IT systems and data; allowing those services to be not only digital but also interoperable. Interoperability has been defined as "the ability of organisations to interact towards mutually beneficial goals, involving the sharing of information and knowledge between these organisations, through the business process they support, by means of exchange of data between their ICT systems" (European Union, 2017:7)*. This ability requires specific skills and competences; the lack of them could be a barrier to implement interoperability policies.

Understanding the need for developing specific skills and competences for interoperability, we have created a customised framework of interoperability for the public sector in Europe. Based on the European Skills, Competences and Occupations (ESCO) classification**, the creation of this framework and its validation follows five consecutive methodological steps:

1. Literature review
2. Draft of the framework based on a structured literature review
3. Feedback from experts
4. Revised version of the framework
5. Survey with different target groups to try to identify core skills and knowledge elements

This survey is part of step 3. Table 1, which can be downloaded, shows the literature that we used for the identification and analysis of attitudes and values, skills and competences. The table includes frameworks from three specific categories:

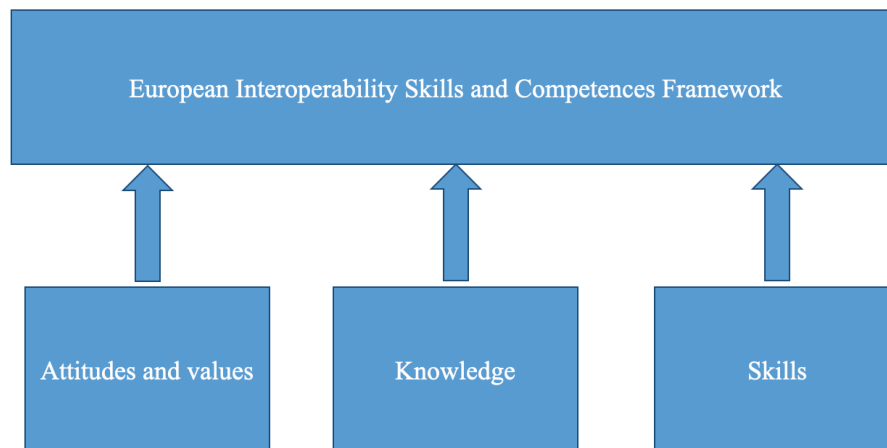
1. Frameworks from public sector organizations
2. Frameworks from intergovernmental organizations
3. Frameworks grounded in the academic literature

Download Table 1

[Table 1.pdf](#)

Based on our findings we have developed the European Interoperability Skills and Competencies Framework for public sector, which is composed by three pillars, 1) attitudes and values***, 2) knowledge and 3) skills. Figure 1 below shows the framework and its components.

Study on the development of a European framework for interoperability skills and competences in the public sector (EIFISC)



*see https://ec.europa.eu/isa2/sites/isa/files/eif_brochure_final.pdf.

** The ESCO framework provides two advantages. First, it is a comprehensive and systematic categorization for a wide array of skills and competences in the European labour market. Second, it is a standardised approach to categorize the results of the literature review that we conducted.

*** The classification of attitudes and values refers to the individual work styles and believes as well as preferences that support the behaviour, so knowledge and skills can be applied in an effective manner (European Commission, 2020), see <https://ec.europa.eu/esco/portal/home?resetLanguage=true&newLanguage=en>.

4 Questionnaire

This section is composed of 5 questions aiming at gathering your input regarding the identified attitudes, skills, values and competencies that employees working in interoperability at different public administrations across Europe should have.

Question 1

Within the pillar of attitudes and values, we identified the 21 attitudes described in the table below:

1. Flexible	8. Independent	15. Influencer
2. Precise	9. Innovative	16. Communicative
3. Self-development	10. Service oriented	17. Future oriented
4. Enthusiastic	11. Results oriented	18. Proactive
5. Responsible	12. Evidence base	19. Analytical and critical thinking
6. Persistent	13. Teamwork oriented	20. Courageous
7. Efficient	14. Leadership	21. Empathy

Study on the development of a European framework for interoperability skills and competences in the public sector (EIFISC)

*** Based on your expertise, are the identified attitudes relevant to the framework?**

If not, please state the reason.

500 character(s) maximum

*** Based on your expertise, do you think there is an important element missing and why?**

500 character(s) maximum

Question 2

Within the pillar of attitudes and values, we identified the 9 values outlined in the table below:

1. Demonstrate good manners	6. Accountability
2. Follow ethical code of conduct	7. Demonstrate Public Service Motivation
3. Demonstrate the added value of interoperability	8. Discipline
4. Contribute to public values	9. Consciousness
5. Responsibility	

*** Based on your expertise, are the identified values relevant to the framework?**

If not, please state the reason.

500 character(s) maximum

*** Based on your expertise, do you think there is an important value missing and why?**

500 character(s) maximum

Question 3

Within the pillar of knowledge we have identified the 7 general knowledge elements outlined in the table below:

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1. Information and communication technologies
2. Expertise in administrative workflows
3. European Interoperability Framework knowledge
4. National Interoperability knowledge
5. Knowledge of the regulations related to their field
6. Ethical awareness
7. Cultural awareness

*** Based on your expertise, are the identified knowledge elements relevant to the framework?
If not, please state the reason.**

500 character(s) maximum

*** Based on your expertise, do you think there is an important element missing and why?**

500 character(s) maximum

Question 4

We identified 17 general skills which are outlined in the table below:

1. Information skills	10. Communication skills
2. Research skills	11. Management skills
3. Reviewing skills	12. Leadership
4. IT skills	13. Networking
5. Analytical skills	14. Creativity
6. Collaboration skills	15. Adaptability
7. Financial skills	16. Business skills
8. Teamwork	17. Psychological and emotional stability
9. Decision making competencies	

*** Based on your expertise, are the identified general skills relevant to the framework?
If not, please state the reason.**

500 character(s) maximum

*** Based on your expertise, do you think there is an important element missing and why?**

500 character(s) maximum

Question 5

Any additional remarks?

500 character(s) maximum

5 This is the end of the survey!

* Your survey inputs and results will not be shared with others. Aggregated analysis, across all submitted IOP Academy surveys, will only be made in a fully anonymised way.

Your contact details will not be reused, except if you provide your consent herewith:

"I agree that my contact details can be reused by the European Commission in the context of other ISA2 actions"

- Yes
- No

Thank you very much for your time!

If you have any questions or require clarifications, please do not hesitate to get in touch with us via email: cesar.casiano@kuleuven.be or IOP-ACADEMY(at)ec.europa.eu.

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6.2. Annex 2 – Second validation survey



Validation of the Interoperability Skills and Competencies Framework for the public sector

Fields marked with * are mandatory.

1 Introduction

This questionnaire is conducted in the framework of the [Interoperability Academy action \(2019.01\)](#), funded by the [ISA² programme](#) of the European Commission.

The questionnaire will not take more than 10 minutes to complete and will provide highly valuable information for us.

The purpose of this questionnaire is to validate the list of elements that have been selected to construct the European Interoperability Skills and Competencies Framework (EISCF) for the public sector and to know the relevance that the selection of those elements has for different groups of interest.

The **deadline** to complete this questionnaire is **November 20th 2020**.

This questionnaire is divided into four sections.

Section 1: Introduction and general information about this questionnaire.

Section 2: Scene Setting with questions that would allow us to know our respondents better.

Section 3: Scope and Background of the questionnaire and methodological steps that were taken into account when developing the current version of the framework.

Section 4: Six questions related to the selected elements that construct the framework.

All of your answers to this questionnaire will be kept strictly confidential. Only aggregated results will be documented. For more details as to how your personal data will be treated, please refer to the privacy statement available at the end of this page.

Please do not hesitate to get in touch with the KU Leuven Team (Cesar Casiano <cesar.casiano@kuleuven.be>) or Interoperability Academy Team (IOP-ACADEMY@ec.europa.eu), if you have any questions regarding the content of the questionnaire.

This questionnaire was designed by the Public Governance Institute from KU Leuven and TRASYS

Study on the development of a European framework for interoperability skills and competences in the public sector (EIFISC)

International on behalf of Georges LOBO and Victoria KALOGIROU European Commission Program Managers of Interoperability Academy, Interoperability Unit / DG Informatics (DIGIT).

I agree with the private statement below.

Privacy Statement

[Annex - Privacy Statement .pdf](#)

2 Section Title

* Which of the following categories best describe your professional status?

- EU Public Authority
- Non-EU Public Authority
- European Institution
- IT Industry
- Research/Academia
- Other

Please specify

This sections aims to collect more information about the person who is completing the questionnaire. None of the questions are mandatory.

First name

Last name

Organisation

Email address

Reuse of your inputs and contact details:

Study on the development of a European framework for interoperability skills and competences in the public sector (EIFISC)

Your questionnaire inputs and results will not be shared with others. Aggregate analysis, across all submitted IOP Academy questionnaires, will only be made in a fully anonymized way. Your contact details will not be reused, except if you provide your consent herewith: "I agree that my contact details can be reused by the European Commission in the context of other ISA2 actions":

- Yes
 No

3 Scope and Background

Nowadays, many countries in Europe are offering digital services and interoperability could help to make digitalisation more efficient by removing barriers between services, IT systems and data; allowing those services to be not only digital but also interoperable. Interoperability has been defined as "the ability of organisations to interact towards mutually beneficial goals, involving the sharing of information and knowledge between these organisations, through the business process they support, by means of exchange of data between their ICT systems" (European Union, 2017:7)*. This ability requires specific skills and competences; the lack of them could be a barrier to implement interoperability policies.

Understanding the need for developing specific skills and competences for interoperability, we have developed a framework of interoperability for the public sector in Europe. Based on the European Skills, Competences and Occupations (ESCO) classification**, the creation of this framework and its validation follows five consecutive methodological steps:

1. Literature review
2. Draft of the framework based on a structured literature review
3. Feedback from experts
4. Revised version of the framework
5. Questionnaire with different target groups to try to identify core skills and knowledge elements

This questionnaire is part of step 5. Table 1, which can be downloaded, shows the literature that we used for the identification and analysis of attitudes and values, skills and competences. The table includes frameworks from three specific categories:

1. Frameworks from public sector organisations
2. Frameworks from intergovernmental organisations
3. Frameworks grounded in the academic literature

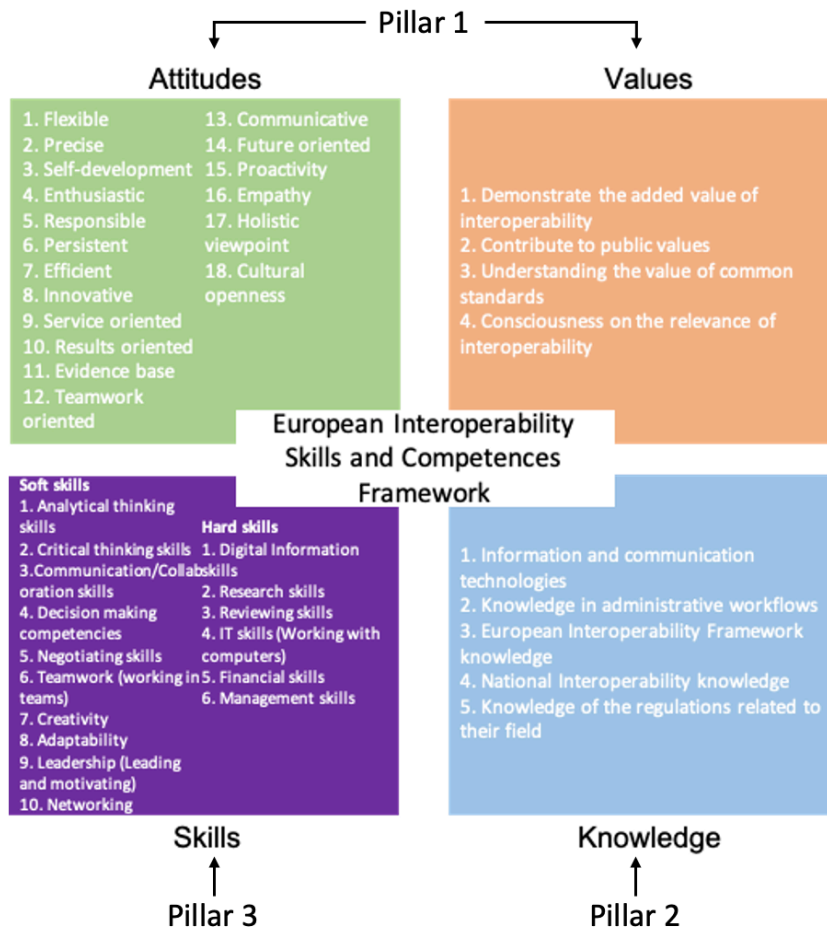
We contacted 8 experts with different backgrounds and we received feedback from 5. The experts were asked to validate the selected elements for the initial version of the framework. Based on their recommendations, the revised version of the EISCF for the second validation process includes 18 Attitudes and 4 Values, 10 Soft skills and 6 Hard skills and 5 Knowledge elements. The figure below presents the validated version of the EISCF.

Download Table 1

[Table_1.pdf](#)

Study on the development of a European framework for interoperability skills and competences in the public sector (EIFISC)

Based on our findings we have developed the EIFISC for public sector, which is composed by three pillars, 1) attitudes and values***, 2) knowledge and 3) skills. Figure 1 below shows the framework and its components.



*see https://ec.europa.eu/isa2/sites/isa/files/eif_brochure_final.pdf.

** The ESCO framework provides two advantages. First, it is a comprehensive and systematic categorization for a wide array of skills and competences in the European labour market. Second, it is a standardised approach to categorize the results of the literature review that we conducted.

*** The classification of attitudes and values refers to the individual work styles and believes as well as

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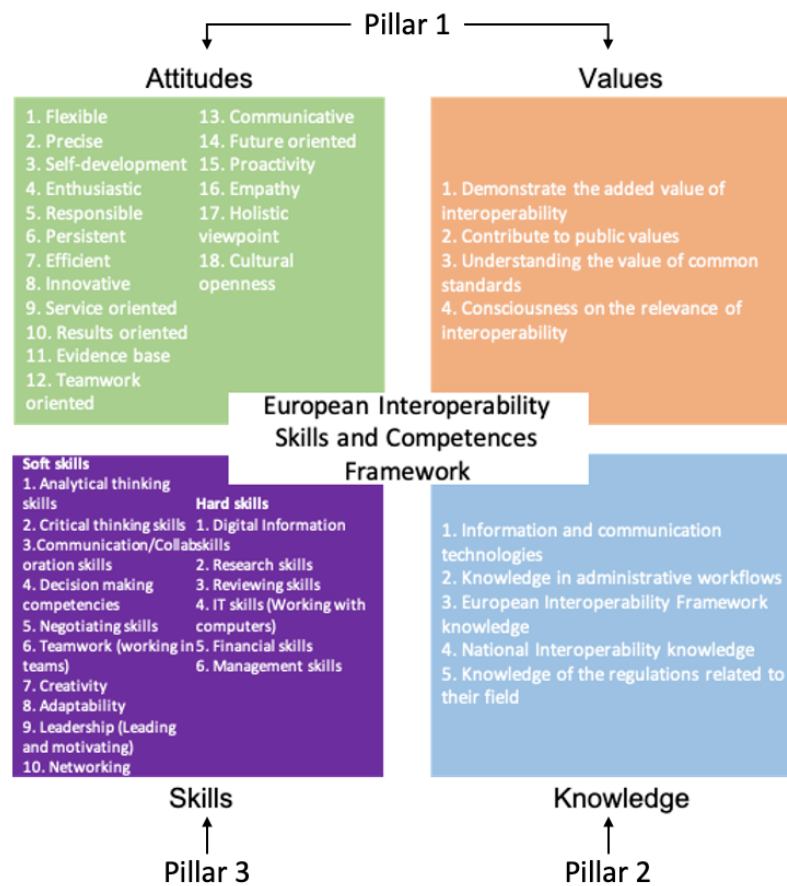
preferences that support the behaviour, so knowledge and skills can be applied in an effective manner (European Commission, 2020), see <https://ec.europa.eu/esco/portal/home?resetLanguage=true&newLanguage=en>.

4 Questionnaire

This section is composed of 6 questions aiming at gathering your input regarding the identified attitudes, skills, values and competencies that employees working in interoperability at different public administrations across Europe should have.

Question 1

Based on the framework below, is there any Attitude, Value, Skill, or Knowledge element that we are missing or that might not be needed?



Please write your answer in the text box.

500 character(s) maximum

Question 2

Considering the 18 attitudes we identified, can you select the 5 that you consider the most important?

1. Flexible
2. Precise
3. Self-development
4. Enthusiastic
5. Responsible
6. Persistent
7. Efficient
8. Innovative
9. Service oriented
10. Results oriented
11. Evidence base
12. Teamwork oriented
13. Communicative
14. Future oriented
15. Proactivity
16. Empathy
17. Holistic viewpoint
18. Cultural openness

*** Please write in the text box the 5 attitudes that you consider most important.**

500 character(s) maximum

Question 3

Considering the 10 soft skills we identified, can you rank them in descending order of importance? This means the one that is more important for you needs to be first and the least important at the end.

Soft skills

1. Analytical thinking skills
2. Critical thinking skills
3. Communication/Collaboration skills
4. Decision making competencies
5. Negotiating skills
6. Teamwork (working in teams)
7. Creativity
8. Adaptability
9. Leadership (Leading and motivating)
10. Networking

*** Please write in the text box, the soft skills in descending order of relevance.**

500 character(s) maximum

Question 4

Considering the 6 hard skills we identified, can you rank them in descending order of importance? This means the one that is more important for you needs to be at the beginning and the least important at the end.

Hard skills

1. Digital Information skills
2. Research skills
3. Reviewing skills
4. IT skills (Working with computers)
5. Financial skills
6. Management skills

* Please write in the text box, the 6 hard skills in descending order of relevance.

600 character(s) maximum

Question 5

Considering the 5 knowledge elements we identified, can you rank them in descending order of importance? This means the one that is more important for you needs to be at the beginning and the least important at the end.

1. Information and communication technologies
2. Knowledge in administrative workflows
3. European Interoperability Framework knowledge
4. National Interoperability knowledge
5. Knowledge of the regulations related to their field

*** Please write in the text box, the 5 knowledge elements in descending order of relevance.**

500 character(s) maximum

Question 6

Do you have any additional remarks?

500 character(s) maximum

5 This is the end of the questionnaire!

*** Your questionnaire inputs and results will not be shared with others. Aggregated analysis, across all submitted IOP Academy questionnaires, will only be made in a fully anonymised way. Your contact details will not be reused, except if you provide your consent herewith: "I agree that my contact details can be reused by the European Commission in the context of other ISA2 actions"**

Study on the development of a European framework for interoperability skills and competences in the public sector (EIFISC)

Yes

No

Thank you very much for your time!

If you have any questions or require clarifications, please do not hesitate to get in touch with us via email: cesar.casiano@kuleuven.be or IOP-ACADEMY(at)ec.europa.eu.

The Interoperability Academy Team.

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The screenshot shows the 'Digital Skills in the public sector' collection page on the Joinup platform. The page features a dark blue header with the collection title and a sub-header 'Last update 7 days ago' and '97 Members 3 Solutions'. Below the header, there is a navigation menu with 'Overview', 'Members', and 'About'. The main content area displays statistics: '19 News', '10 Events', and '4 Solutions'. There are four featured cards: 'EIF' (Interoperability Academy), 'Help us create a positive learning experience on the Interoperability Academy', 'Interoperability Academy', and 'DIGILABS20 CONFERENCE'. The page also includes a search bar and a user profile icon in the top right corner.

7. References

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