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TSI component "Romania: Developing a general digital competence framework for civil servants"

OUTPUT 1.

Report on the assessment of the digital competencies needed in the Romanian civil service

Taking into account relevant policies at the national and European Union levels



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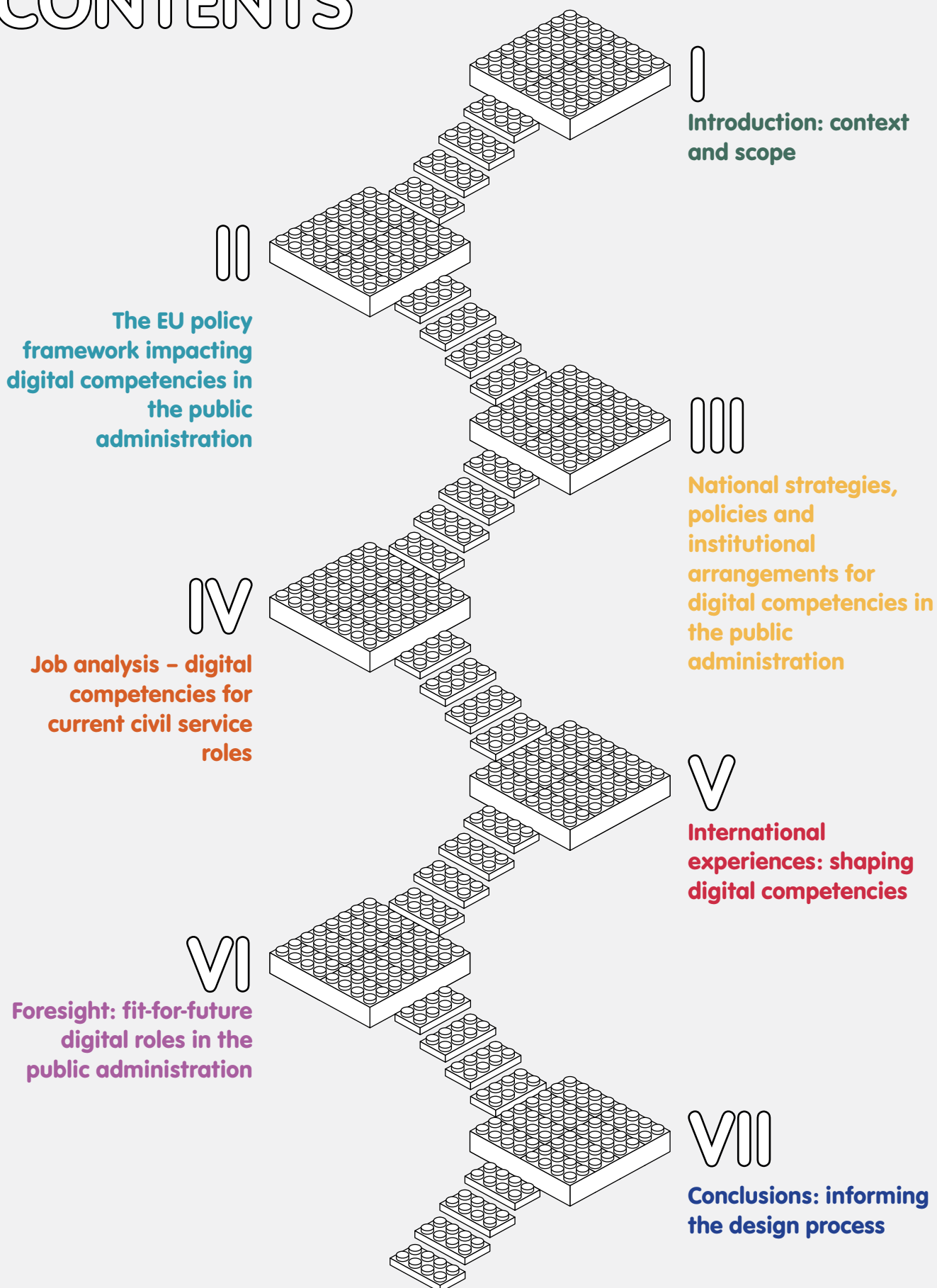
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Abbreviations

ADR	Authority for the Digitalization of Romania
AgID	Agency for Digital Italy
AI	Artificial Intelligence
ANAF	National Agency for Fiscal Administration
ANOVA	Analysis of Variance
ANPIS	National Agency for Payments and Social Inspection
APIA	Payments and Intervention Agency for Agriculture
AR	Augmented Reality
BAIT	Ikanos Digital Competence Certification System
B2B	Business to Business
BPR	Business Process Reengineering
CEI	Electronic ID Cards
CERB	Committee for e-governance and red tape reduction
CGSI	Core Government Systems Index
CRA act	Cyber Resilience Act
CNAS	National Health Insurance House
CSA act	The Cybersecurity Act
CTE	Technical Economic Committee
DAO	Decentralized Autonomous Organizations
DCEI	Digital Citizen Engagement Index
DESI	Digital Economy and Society Index
DGA	Data Governance Act
DGI	Digital Government Index
DID	Decentralized Digital Identity
DigComp	Digital Competence Framework for Citizens
DIGITAL	Digital Europe Programme
DMA	Digital Markets Act
DNSC	National Directorate for Cybersecurity
DPA	Department of Public Administration in Italy
DSA	Digital Services Act
DSI	Digital Skills Indicator
DTM	Digital Transition Managers
DTO	Digital Transition Office
EAR	School of Regional Administration of Castilla La Mancha in Spain
EC	European Commission
ECLAP	School of Public Administration of Castilla y León in Spain
ECDL	European Computer Driving License
ECM	Enterprise Content Management
ECSF	European Cybersecurity Skills Framework
e-CF	European e-Competence Framework

EDIC	European Digital Infrastructure Consortium
EHDS	European Health Data Space
EHR	National Electronic Health Record
eID	Digital Identity
eIDAS	European Digital Identity Framework
EIF	European Interoperability Framework
EMRG	Emerging Technology
ENISA	European Union Agency for Cybersecurity
ESCO	European Skills, Competences, Qualifications and Occupations (Framework)
EU	European Union
EQF	European Qualifications Framework
FEAS	Feasibility Assessment
FMIT	Financial Management Information Technology
GAI	Generative Artificial Intelligence
GDPR	General Data Protection Regulation
GEO	Government Emergency Ordinance
GIS	Geographic Information Systems
GSG	General Secretariat of the Government
GTEI	GovTech Enablers Index
GTMI	GovTech Maturity Index
HPC	High Performance Computing
HR	Human Resources
HRM	Human Resources Management
IAAP	Canary Islands Institute of Public Administration
ICT	Information and Communication Technology
IM	Labor Inspection
INA	National Institute for Administration
INAP	National Institute of Public Administration in Spain
INCIBE	National Institute of Cybersecurity in Spain
INS	The National Institute of Statistics
IoT	Internet of Things
IRMG	Information Resource Management
ISCO	International Standard Classification of Occupations
ISP	Institutional Strategic Plan
ITS	Intelligent Transport System
ITSP	Information Technology Strategic Planning
ITU	International Telecommunication Union
IVAP	Valencian Institute of Public Administration
JRC	Joint Research Centre
LO	Learning Outcomes
MADR	Ministry of Agriculture and Rural Development
MAI	Minister of Internal Affairs
ME	Former Ministry of Economy

MEDET	Ministry of Economy, Digitalization, Entrepreneurship and Tourism
MF	Ministry of Finance
MIPE	Ministry of Investments and European Projects
MJ	Minister of Justice
MLFYSS	Ministry of Labor, Family, Youth and Social Solidarity
MoRID	Ministry of Research, Innovation, and Digitalization
MRDPA	Ministry of Regional Development and Public Administration
NACS	National Agency of Civil Servants
NAPP	National Agency for Public Procurement
NGO	Non-governmental organization
NIS2	Network and information systems 2 (Directive)
NLP	Natural Language Processing
NRPP	National Recovery and Resilience Plan
OAS	Organization of American States
OECD	Organization for Economic Cooperation and Development
ONRC	National Trade Register Office
OOTs	Once Only Technical System
PA	Public Administration
PCA	Principal Component Analysis
PDP	Professional Digital Profiles
PDURo26	Single Digital Platform for Romania
PEDP	Personal Data Protection
POCIDIF	Smart Growth, Digitalization, and Financial Instruments Program
PNADD	National Digital Decade Action Plan
PNI	National Interoperability Platform
PROF	Portfolio, Program, and Project Support
PSDI	Public Service Delivery Index
RCC	Romanian Competition Council
RDA	Regional Development Agencies
RHDS	Romanian Health Data Space
ROeID	Romania's digital identity system
RRF	Recovery and Resilience Facility
SAT	Ikanos Self-Assessment Tests
SEAP	Electronic Public Procurement System
SDG	Single Digital Gateway
SME	Small and Medium Sized Enterprise
SNA	National School of Administration in Italy
SNI	National Interoperability System
SRI	Romanian Intelligence Service
STEM	Science, Technology, Engineering, and Mathematics
STS	Special Telecommunications Service
TSI	Technical Support Instrument
UNESCO	United Nations Educational, Scientific and Cultural Organization

Glossary

Concept	Definition
Artificial intelligence	Are defined as “systems which have the capacity to process data and information in a way that resembles intelligent behavior, and typically includes aspects of reasoning, learning, perception, prediction, planning or control”.¹ What makes AI distinct from other emerging or traditional information technologies is its capacity to learn from previous examples captured in digital data, leading to the creation of accurate predictions based on existing data rather than pre-programmed rules.
Attitudes	Attitudes describe the disposition and mind-sets to act or react to ideas, persons or situations. An attitude is a learned tendency or readiness to evaluate things or react to ideas, persons or situations in certain ways, either consciously or unconsciously. Attitudes are underpinned by values and beliefs and have an influence on behavior.²
Civil service (Romanian context)	Category of public administration personnel. The civil service in the Romanian administrative context is defined as involving the exercise of “public power prerogatives”³ through general and special activities carried out by public authorities and institutions. General activities include drafting normative acts, public policies, and strategies, conducting inspections and audits, managing human and financial resources, representing institutions, and implementing digital strategies. Special activities cover constitutional prerogatives of the Parliament and the President, legislative review, foreign policy, the protection of fundamental rights, enforcement of criminal sanctions, customs activities, and other areas of exclusive state competence. Civil service positions are set by law.
Competence/ competency	A competence is a “combination of knowledge, skills and attitudes, in other words, they are composed of concepts and facts (i.e. knowledge), descriptions of skills (e.g. the ability to carry out processes) and attitudes (e.g. a disposition, a mindset to act)”⁴ Key competences are developed throughout life. The terms “competence” and “competency” are used in this Report interchangeably. However, in academic literature and official documents they are sometimes used with different meaning. The EC uses “competence” as the standard term to refer to “the proven ability to use knowledge, skills and personal, social and/or methodological abilities, in work or study situations and in professional and personal development” (European Qualifications Framework - EQF). However, in Anglophone countries, “competency” is also used as the standard term to refer to the combination of knowledge, skills, and attitudes applied to a specific context. In some cases, “competence” is used only to define the overall ability to perform a role or task to a required standard, being more linked to the concept of performance. In the majority of EC documents the standard formulation is “competence framework”. However, there are cases when “competency framework” is also used (for example by EPSO: https://eu-careers.europa.eu/en/documents/epsos-competency-framework)
Digital competence	Digital competence “involves the confident, critical and responsible use of, and engagement with, digital technologies for learning, at work, and for participation in society. It includes information and data literacy, communication and collaboration, media literacy, digital content creation (including programming), safety (including digital well-being and competences related to cybersecurity), intellectual property related questions, problem solving and critical thinking.”⁵

1. UNESCO's Broadband Commission for Sustainable Development (2022), Artificial Intelligence and Digital Transformation Competencies for Civil Servants. Available at: <https://unesdoc.unesco.org/ark:/48223/pf0000383325>.
2. UNESCO's Broadband Commission for Sustainable Development (2022), Artificial Intelligence and Digital Transformation Competencies for Civil Servants. Available at: <https://unesdoc.unesco.org/ark:/48223/pf0000383325>.
3. EGO 57/2019 The Administrative Code, art. 370.
4. Vuorikari, R., Kluzer, S. and Punie, Y., DigComp 2.2: The Digital Competence Framework for Citizens, EUR 31006 EN, Publications Office of the European Union, Luxembourg, 2022
5. Council Recommendation on Key Competences for Lifelong Learning, 22 May 2018.

Concept	Definition
Digital Competence Framework for Citizens (DigComp)	The European Digital Competence Framework (DigComp) for Citizens was developed by the Joint Research Centre (JRC). The framework identifies the key components of digital competence in five areas and 21 competences. It also describes eight proficiency levels, examples of knowledge, skills and attitudes, and use cases in education and employment contexts. The DigComp is targeted to the general public. It is a broader framework that focuses on improving digital literacy for all citizens.⁶
Digital government and GovTech	Digital government and GovTech means leveraging digital technologies to create user-driven policies and services. Instead of digitizing⁷ existing processes, digital government redesigns services around citizen and business needs, making them digital by design. This shift includes a growing emphasis on “mobile first” strategies to enhance accessibility and responsiveness. “Digital government refers to the use of digital technologies, as an integrated part of governments’ modernization strategies, to create public value. It relies on a digital government ecosystem comprised of government actors, non-governmental organizations, businesses, citizens’ associations and individuals, which supports the production of and access to data, services and content through interactions with the government.” The OECD defines GovTech as the collaboration between the public sector and start-ups, innovators, government “intrapreneurs”, and academia on digital government solutions. It complements existing public sector capability to explore what is possible, experiment with new approaches, and develop scalable solutions. While there is still some confusion with other GovTech definitions and with CivicTech, this is the concept of GovTech on which consensus is building.⁸
Digital transformation	Digital transformation refers to a process of adoption of digital tools and methods by an organization, typically those that have either not been including the digital factor as part of their core activities or have not kept up with the pace of change in digital technologies.⁹ The concept needs to be differentiated from digitization and digitalization. Digitization deals with encoding information in computers by converting from analog to digital format. The process mainly deals with recording data that can eventually be used in digital technologies. Digitalization deals with information processing, or how digitized data can be used to improve workflows through automating existing processes.
The European Computer Driving Licence (ECDL/ICDL)	ECDL is a certification that attests a person’s digital skills and competences, which is recognized across Europe. It is used to validate the holder’s ability to use computers and common computer applications effectively. The certification is structured in various modules, each covering different aspects of digital literacy, from basic computer essentials to more advanced skills. In some contexts, ECDL is also referred to as ICDL (International Computer Driving License), which is the global equivalent of the certification.
Employment category (for public employees)	The employment category (for public employees) is either “civil servants” (“functionar public”) or “contractual employee” (“personal contractual”)
European e-Competence Framework (e-CF)	The European e-Competence Framework (e-CF) classifies 40 competences for the Information and Communication Technology (ICT) professionals. It establishes a common language for competences, skills and proficiency levels across Europe. Competences in the e-CF are organized according to five ICT business areas and related to the European Qualifications Framework (EQF).¹⁰

6. https://joint-research-centre.ec.europa.eu/scientific-activities-z/education-and-training/digital-transformation-education/digital-competence-framework-citizens-digcomp_en

7. According to Gartner Glossary, “Digitization is the process of changing from analog to digital form, also known as digital enablement. Said another way, digitization takes an analog process and changes it to a digital form without any different-in-kind changes to the process itself.” According to the same source, “Digitalization is the use of digital technologies to change a business model and provide new revenue and value-producing opportunities. It is the process of moving to a digital business.” Available at <https://www.gartner.com/en/information-technology/glossary?starts=D>.

8. OECD (2020), “Going Digital integrated policy framework”, OECD Digital Economy Papers, No. 292, OECD Publishing, Paris, <https://doi.org/10.1787/dc930adc-en>.
https://www.oecd.org/content/dam/oecd/en/publications/reports/2024/10/enabling-digital-innovation-in-government_ae259f62/a51eb9b2-en.pdf

World Bank, GovTech: The New Frontier in Digital Government Transformation. Available at: <https://thedocs.worldbank.org/en/doc/805211612215188198-0090022021/original/GovTechGuidanceNote1TheFrontier.pdf>

9. <https://oecd-opsi.org/guide/digital-transformation>.

10. <https://esco.ec.europa.eu/en/about-esco/escopedia/escopedia/european-e-competence-framework-e-cf>

Concept	Definition
European Cybersecurity Skills Framework (ECSF)	The European Cybersecurity Skills Framework (ECSF) is a practical tool to support the identification and articulation of tasks, competences, skills and knowledge associated with the roles of European cybersecurity professionals.¹¹ The ECSF is specifically targeted at all ICT professionals working in the cybersecurity domain. The ECSF is built on and complements the e-CF.
European interoperability framework	European interoperability framework is a commonly agreed approach to the delivery of European public services in an interoperable manner. It defines basic interoperability guidelines in the form of common principles, models and recommendations. ¹²
European public service	European public service comprises any public sector service exposed to a cross-border dimension and supplied by public administrations, either to one another or to businesses and citizens in the Union. ¹³
Function	Functions in the Romanian administrative context refer to all legally regulated job types within the public sector. They are distinct from individual jobs or positions and serve as a classification framework for public administration roles. All public sector jobs are categorized into occupational groups under the Public Sector Pay Law 153/2017. The function is reflected in the job title.
Interoperability	"Interoperability is the ability of organizations to interact towards mutually beneficial goals, involving the sharing of information and knowledge between these organizations, through the business processes they support, by means of the exchange of data between their ICT systems." ¹⁴
ICT Competence (e-CF) for ICT Professionals	For this report, ICT Competencies for ICT Professionals are those defined in e-CF and are used in ICT Role Profiles defined by e-CF and ECSF. ¹⁵
ICT Proficiency level (e-CF/ ECSF)	Proficiency levels in e-CF are from e-1 to e-5 and they coincide to European Qualifications Framework (EQF) level 4-8. Proficiency levels in ECSF are from e-3 to e-5 (The ECSF supposes more senior roles).
ICT Level of Responsibility	The level of responsibility is linked with the complexity of the ICT systems. At this stage and for this report four complexity levels are used namely: 1 is the junior level, 2 is the normal level, 3 is the medium level and 4 is for highest responsibilities. See also Annex 4 with proposed categories of ICT systems.
ICT Role Profile (e-CF/ ECSF)	ICT Role Profiles are defined in e-CF (30 ICT Professional Role Profiles) and ECSF (12 ICT Professional Role Profiles for cybersecurity). There are some overlaps between e-CF and ECSF which will be analyzed during the design phase of the competence framework. At this stage and for this report it can be estimated that there are around 40 Role Profiles for complex and large IT Departments. Most of the IT Departments/Units will use slightly simplified version of the e-CF role profiles. And IT Departments/Units specialized in cybersecurity will use more the role profiles defined in ECSF, but also some e-CF ones.
ICT Role	ICT Role is one of the most important terms for this project. The ICT Role includes ICT Role Profile and ICT Level of Responsibility. These will be better defined and detailed in the Design phase. At this stage and for this report we can estimate 70-100 ICT Roles, because some of ICT Role Profile will have more level of responsibilities.
Knowledge	Knowledge is composed of the facts and figures, concepts, ideas and theories which are already established and support the understanding of a certain area or subject. ¹⁶
Learning outcomes	Learning outcomes can be defined by statements of what a learner knows, understands and is able to do after completion of learning. ¹⁷

11. <https://www.enisa.europa.eu/topics/skills-and-competences/skills-development/european-cybersecurity-skills-framework-ecsf>

12. European Interoperability Framework https://ec.europa.eu/isa2/sites/default/files/eif_brochure_final.pdf

13. https://ec.europa.eu/isa2/sites/default/files/eif_brochure_final.pdf

14. https://ec.europa.eu/isa2/sites/default/files/eif_brochure_final.pdf

15. See e-CF and ECSF in this table.

16. Schwendinger, F., Topp, L., Kovacs, V. Competences for Policymaking — Competence Frameworks for Policymakers and Researchers working on Public Policy, Publications Office of the European Union, Luxembourg, 2022

17. Ibidem.

Concept	Definition
Position (job)	The Position (Ro "Post") is the general term regardless of function (related to salary) and employment category (employment type), namely "civil servants" ("functionar public") or "contractual employee" ("personal contractual"). Many IT Departments/Units have ICT positions from both categories.
Skills Framework for the Information Age (SFIA)	SFIA is a practical resource for people who manage or work in or with business and technology professionals who design, develop, implement, manage and protect the data and technology that power the digital world. SFIA brings together professional skills, behaviors / behavioral factors and knowledge.¹⁸ The SFIA is also target to ICT professionals. It is developed in UK and used mainly in Anglo-Saxon countries.
Skills	Skills are defined as the ability and capacity to carry out the processes and use the existing knowledge to achieve results. ¹⁹

18. <https://sfia-online.org/en/about-sfia/about-sfia>.

19. Schwendinger, F., Topp, L., Kovacs, V. Competences for Policymaking — Competence Frameworks for Policymakers and Researchers working on Public Policy, Publications Office of the European Union, Luxembourg, 2022

Executive summary

Romania's public administration faces structural challenges that limit the development of digital competencies and, more broadly, constrain progress in both the digital transformation and human resources management (HRM) reform agendas. These challenges include difficulties in attracting and retaining skilled personnel, rigid and inequitable salary and career structures, and limited professional development opportunities. Additionally, the absence of a strategic link between HRM modernization and digital transformation objectives, combined with institutional fragmentation, weakens the coherence of reform efforts. While Romania has taken steps to introduce a competency-based HRM system, underpinned by a general competency framework, the systematic definition and integration of digital competencies into HRM processes remain limited. Digital skills are inconsistently defined, often reduced to basic IT literacy, and not differentiated by job profiles or functional areas. As a result, HRM processes such as recruitment, workforce planning, and training are unable to adequately address digital skills needs, contributing to persistent capacity gaps. Furthermore, investments in digital skills remain limited and rather ad-hoc.

Digital competencies are a key enabler of Romania's public administration reform and digitalization goals, but are not a standalone solution. They represent a critical component of a broader set of systemic reforms needed to modernize the civil service and enhance the quality and efficiency of public service delivery. In other EU member states the plans for strengthening digital skills are usually embedded within a wider, coherent reform agenda that is inherently linked to digital transformation plans. Once designed and adopted, the digital competency framework for the Romanian civil service will also need to be accompanied by systemic capacity building measures and targeted investments.

In this context, the World Bank is supporting the Government of Romania (GoR) to develop a General Digital Competence Framework for Civil Servants through the Technical Support Instrument (TSI) "Romania: Developing a General Digital Competence Framework for Civil Servants". The TSI project's²⁰ broader goal is to enhance the digital skills of Romanian civil servants to improve public service delivery and achieve digitalization objectives. The beneficiary institutions are the National Agency for Civil Servants (NACS)²¹, the Authority for the Digitalization of Romania (ADR)²², and the National Institute for Administration (INA)²³.

The TSI project includes five activities: (i) an assessment of the digital competencies needed in the Romanian civil service (a competency mapping exercise), taking into account relevant policies at the national and European Union (EU) levels; (ii) development of the general digital competency framework; (iii) development of recommendations for the introduction and operationalization of the digital competency framework; (iv) capacity building support including through study visits and updating of the training needs assessment methodology for INA to reflect also digital skills; and (v) development of a final report on lessons learned for other Member States to develop a digital competency framework based on the Romanian model.

A comprehensive, multi-layer approach to the analysis of Romania's needed digital competencies

This report represents Output 1 for Activity 1 under the project. The report assesses the digital competencies needed in the Romanian civil service based on a comprehensive multi-layer analysis,

20. This project is carried out with funding by the European Union via the Technical Support Instrument (TSI) managed by the European Commission's Reform and Investments Task Force (SG REFORM) and implemented by the World Bank with the support and the partnership of SG REFORM.

21. NACS is the central public institution with the mandate to design and implement the ambitious HRM reforms of the Romanian public administration.

22. ADR's main role is to oversee and drive the digital transformation of the country.

23. INA is the primary institution responsible for civil service training.

which includes: (i) the top-down dimension (national and EU key strategies, initiatives, policy documents, and regulations), (ii) the bottom-up dimension (job analysis, based on analysis of job descriptions, but also through focus groups, targeted interviews, and working groups), (iii) international good practices on structuring and applying digital competencies in the public administration, and (iv) a foresight dimension to identify critical digital skills for the future.

In terms of scope, the report targets the central public administration, with a focus on the civil service.

The civil service was covered in alignment with its definition from the Romanian legislation, corresponding to functions as defined by the Administrative Code ²⁴. References to the public administration were framed in accordance with the coverage of the occupational group “public administration” as per the Public Sector Pay Law 153/2017. The review was particularly focused on the central public administration, building on the design process undertaken for the general competency framework.²⁵ However, the assessment was approached by also considering that digital public services are delivered usually at local level and that the digital competencies will also be applied at that level. Also, it can be expected that the future digital competencies will be rolled out to contract-based positions in the public administration. Moving forward, the consultations following the design phase of the digital competency framework will also involve representatives of the local public administration structures, to ensure that the framework is relevant across various administrative levels.

The report outlines digital competencies needed in the Romanian public administration by targeting general digital competencies, specific digital skills and specialized ICT roles. A conceptual distinction is made between “general competencies”, which are expected to be applied across the entire civil service and “specific competencies”, which could be expected to be either (i) specific to a functional domain (e.g.: human resources (HR), strategic planning, audit); (ii) role-specific (i.e.: ICT roles requiring specific digital skills) and (iii) institution-specific (i.e. for the use of specific tools and systems in a particular institution).

The report is meant to inform the design of the future digital competency framework, by identifying the key ingredients for that future framework and its operationalization. This report does not seek to present a draft digital competency framework model or define a list of recommended specialized ICT roles at this stage. These elements will be developed during the design phase and reflected in Output 2. However, the assessment phase is essential for gathering key insights, identifying competency needs, and analyzing the applicability of relevant frameworks such as DigComp, or UNESCO’s framework for AI and Digital Transformation. By mapping existing digital skills, legal frameworks, and institutional roles, this phase establishes the foundation for a structured and informed approach to developing a tailor-made digital competency framework. The findings will inform the definition of competencies, classification of roles, and integration into HR processes, ensuring that the final model aligns with both current and future digital skill needs in the civil service.

The methodological approach for the assessment phase implied a mix of methods to ensure relevance.

The choice of methods was meant to ensure that the future digital competency framework is well grounded on current and future needs of the Romanian public administration. For this, the methodology implied a mix of methods and tools, including:

- I. a structured desk research and expert review of relevant strategic and policy frameworks at EU and national levels;
- II. an informed analysis of international experience with digital competency frameworks, including based on two study visits organized in Spain and Italy;
- III. various data collection methods for analyzing competencies for the current civil service roles (bottom-up analysis), covering:

24. Adopted by Emergency Government Ordinance (EGO) no. 57/2019.

25. Developed in 2019-2020 by NACS, with World Bank technical assistance through the HRM RAS.

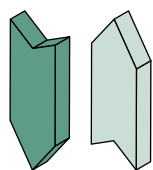
- collection of job descriptions. These were analyzed by HR experts and also by using AI tools to extract required digital skills and corresponding proficiency levels, by reference to a mature digital competency framework model (the Spanish model);
- organization of six focus groups and of 23 interviews with public administration representatives;
- operationalization of two working groups with HR and ICT experts from the public administration.

IV. a foresight exercise that involved: a horizon scanning of trends impacting digital society and digital public administration, expert consultations for developing and update baseline and aspirational scenarios and a validation workshop to confirm the scenarios and the digital roles for 2032.

This report focuses on identifying the digital competencies needed in Romania's public administration, at the intersection of digital transformation and HRM reform. The assessments reflected in this Report are not meant to underpin a future digital competency framework as a standalone solution; rather, they already show that digital competencies are a foundational tool to support more coherent workforce planning and capacity building. The assessments conducted clearly demonstrate that digital competencies should be embedded within a broader strategic vision for digital transformation to ensure their relevance, sustainability, and impact. By framing digital skills as essential for improving service delivery, building citizen trust, and strengthening the attractiveness of the public sector, the report sets the stage for a phased, integrated approach to reform, to be further developed in subsequent outputs of the TSI project.

The analysis lays the foundation for the future design process, by systematically mapping digital competency needs for the Romanian public administration. Beyond the introductory section, Chapters II to VI describe the methodological approach undertaken for each of the analysis layers mentioned previously and describe the results of the review process, underlining key findings and recommendations related to digital competencies needed for current and future civil service roles. The final section (Chapter VII) of the report captures the key conclusions drawn and next steps from the analysis that will inform the design process. The annexes include more details related to digital skills and transformation, including models and frameworks such as the Digital Maturity Conceptual Framework developed by ADR, which will also serve as a reference for the future design process, but also other key ingredients for that process, such as the proposed ICT system categories. Annexes also include international case studies, details on the foresight process and key research questions. Additionally, key takeaways from the two study visits organized in Spain and Italy were reflected in separate background reports.

Key findings by layer of analysis



The top-down analysis is reflected in Chapters II and III (national and EU key documents, initiatives, policy recommendations, and institutional arrangements)

The Bank team reviewed the EU strategic and regulatory framework. In addition, relevant initiatives of OECD, World Bank and UNESCO were analyzed to capture global trends and long-term modernization goals.

Additionally, the Bank team analyzed Romania's digital strategies and policies to identify digital competency needs in the public administration. A review of institutional roles and of the national legislation on competency-based HRM in the Romanian civil service was also included, to capture the baseline features of the system and to allow an informed formulation of future recommendations on the introduction and operationalization of the digital competency framework.

The EU is a key driver for digital transformation, with an ambitious regulatory framework setting rules and standards that require public administrations to develop relevant digital skills for effective adoption and implementation. Over the past years, the EU has adopted a considerable set of key digital regulations, such as the Digital Services Act (DSA, 2022), Digital Markets Act (DMA, 2022), AI Act (2024), and Cyber Resilience Act (2024), focusing on online safety, competition, AI governance, and cybersecurity. This evolving regulatory landscape implies that Romania's public administration employees need to be equipped with relevant general digital competencies and also with specialized skills in AI ethics, data governance, cybersecurity, and digital market regulations. Strengthening these competencies will ensure compliance and enable the public sector to proactively address emerging digital challenges.

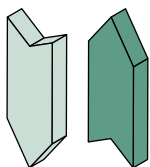
General digital competencies might need to be differentiated for policy makers, service delivery, managers and ICT roles. While foundational digital skills are essential for all, the variety and complexity of digital initiatives at EU and national level seem to require targeting general competencies to some categories of general roles in the public administration. Basic digital literacy, cybersecurity awareness, and information management are important for all civil servants. However, different roles require distinct skills and levels of proficiency. Policymakers need strategic and regulatory digital skills, while service delivery professionals need more advanced operational skills that would enable them to support and deliver digital public services in alignment with EU standards, IT specialists require advanced technical expertise, and digital leaders should focus on strategy and change management. The OECD Framework for Digital Talent and Skills in the Public Sector emphasizes differentiating between generalist, specialist, and leadership profiles. Also, UNESCO's Artificial Intelligence and Digital Transformation Competency Framework for Civil Servants identifies three key competency areas: digital planning and design, data use and governance, and digital management and execution.

Digital leaders and senior managers are indicated as the driving force for digital transformation. Their skills need to go beyond technical knowledge and should focus on developing a digital mindset that includes strategy development, change management, and collaboration. However, some digital leadership roles require specialization, such as leaders overseeing national cybersecurity efforts, who need to understand the requirements of the NIS2 Directive ²⁶ and ensure that risk management frameworks are in place to secure government IT infrastructure.

Nationally, Romania faces significant challenges in digital competency development due to gaps in foundational skills and inconsistent legal and HR frameworks. A 2023 ADR assessment highlights low digital proficiency among civil servants. Also, current legal and HR framework limitations create inconsistencies in recognizing and applying digital competencies. The reliance on private certification schemes without clear equivalencies limits flexibility.

Fragmented governance and overlapping roles are further complicated by weak interinstitutional coordination arrangements for strategic interventions. NACS is responsible for competency-based HRM, including identifying priority training areas, but does not formally lead digital skills planning. Moreover, NACS' digital skills training program for 30,000 civil servants under the National Recovery and Resilience Plan (NRRP) is a significant step forward but lacks a long-term sustainability strategy. ADR had a strategic intervention on defining a Digital Maturity Framework, but its recent Digital Transformation Strategy that builds around that model was not officially adopted. Furthermore, its role in the area of digital skills is not clear in the current HRM framework. INA has a structured approach to digital training but lacks sufficient resources to advance its role. Strengthening ties between INA, universities, other training providers and public administration could ensure more targeted digital skilling and upskilling and foster a culture of lifelong learning within the public sector. A national digital skills plan is essential for structured coordination and alignment with digital transformation priorities.

26. The NIS2 Directive (2022) establishes a unified legal framework to strengthen cybersecurity across 18 critical sectors in the EU and requires Member States to enhance their cybersecurity capabilities



The bottom-up analysis is reflected in Chapter IV (job analysis, stakeholder consultations - focus groups, targeted interviews, and working groups)

The bottom-up analysis targeted the central public administration and was based on the methodologies previously employed to develop the general competency framework. The data collection process, led by NACS and supported by the Bank team, covered 20 institutions within the central public administration. The Bank team used a systematic methodological approach, including expert analysis of the documents collected, natural language processing (NLP) techniques, clustering algorithms, and statistical tests, to analyze the digital competencies in the job descriptions. Beyond analyzing explicitly defined digital competencies, implicit digital skills were also identified based on the formulation of job-related tasks and responsibilities. In addition, relevant skills were distilled based on the analysis of the data by reference to a mature digital competency framework specific to the public administration, namely the Spanish digital competency framework for public employees ²⁷ (which is described in Chapter V). Despite challenges such as inconsistent document formatting and vague competency descriptions, the analysis provided substantial insights into the digital competency requirements.

The analysis of the job descriptions revealed significant inconsistencies in the classification and coverage of the digital competencies. While basic digital literacy is almost universally required, more advanced digital skills are poorly defined and inconsistently applied across roles. The presence of explicit digital competencies in job descriptions was found to be uneven, with a strong emphasis on basic office productivity skills, particularly Microsoft Office proficiency, which appeared in 74% of job descriptions. General IT literacy, email communication, and internet usage were also commonly referenced but often vaguely formulated. More advanced and/or critical digital competencies such as cybersecurity, database management, cloud computing, and data analytics appeared sporadically, and 15% of job descriptions did not a mention of digital skills at all. This suggests that digital proficiency is often assumed rather than explicitly defined, highlighting the need for clearer and more consistent competency expectations.

The absence of well-defined ICT roles, combined with duplicated and vague job descriptions, leads to inefficiencies and skills mismatches. Also, the current inadequate and rigid salary structures, as well as the limited career growth opportunities make it difficult to attract and retain skilled ICT personnel. These challenges contribute to high turnover, further exacerbating workforce shortages and reducing the effectiveness of ICT functions. The skills gap and lack of structured professional development further weaken the ICT workforce. Many institutions rely on outdated IT systems, requiring continuous upskilling, yet training programs remain limited. Financial constraints limit consistent investment in new technologies, training, and hiring, despite EU funding programs providing temporary relief. The long-term sustainability of digital transformation efforts is uncertain, especially as NRRP-funded projects transition to operational phases requiring specialized ICT expertise. Without strategic workforce planning, clearer role definitions, and improved talent attraction, development and retention mechanisms, public institutions risk falling behind in digital modernization, facing inefficiencies, cybersecurity risks, and challenges in maintaining critical digital infrastructure. Addressing these issues requires a comprehensive approach, including clearly structured ICT roles, structured outsourcing mechanisms, and expanded training initiatives to build a resilient ICT workforce.

The absence of clear certification requirements and the vague articulation of digital skill expectations also contribute to inefficiencies in workforce planning, hiring, and training. The lack of clarity on how competencies align with relevant standards or certifications weaken the use of digital skills across HR processes. The current legal framework will need to be updated to facilitate the application of digital competencies.

27. The official title is: "Digital Competencies of Public Employees: Reference Framework"

A preliminary list of general digital competency areas has been identified, which will be further refined during the design phase and analyzed at the intersection with DigComp and other relevant digital competency frameworks (e.g., UNESCO and the ADR Framework for Digital Maturity). Preliminary areas reflect key capability domains relevant across public administration, without yet representing an exhaustive or final set. Initial categories include: digital literacy and information management (e.g., verifying data sources and using open data), digital communication and collaboration (e.g., secure messaging and inter-agency interoperability), and cybersecurity and data protection (e.g., managing digital identities and applying GDPR standards). Additional areas cover digital service delivery and automation (e.g., mobile-first design and accessibility), data analysis and decision support (e.g., using analytics tools for policy planning), digital transformation and governance (e.g., ethical AI use and change management), and emerging technologies and innovation (e.g., cloud computing, IoT). These areas illustrate the diverse and evolving skills needed to support digitalization across the public sector.



International good practices are analyzed in Chapter V

The review of relevant international experience with digital competencies in the public administration was based on a comprehensive desk research and study visits in two selected EU countries (Spain and Italy). The desk review was structured using an analytical matrix²⁸ focused on 11 selected cases from EU member states and relevant international organizations that have systematically developed and updated digital competency frameworks²⁹. Furthermore, the Bank team looked at how digital competences were applied to advance digital transformation of the public administration.

The review highlights a growing trend of adaptation of DigComp 2.2, as a common foundation for digital competencies across EU countries, which allows for national customizations. Countries like Spain, Italy, and Portugal have tailored DigComp to their specific needs, using it as a baseline for their public sectors. This trend shows the value of a common European reference point while emphasizing the importance of local adaptations. Additionally, EU support, particularly through NRRPs, is driving the development and updating of digital skills initiatives in public administration, recognizing the critical role of digital competencies in modernizing public services and enhancing governmental efficiency.

Most European countries analyzed are still in the early stages of defining and formalizing digital competencies in structured frameworks. Despite the increasing demand for digital skills in the public administration, only five European countries have developed digital skills frameworks specifically tailored to the public administration (Spain, Italy, Denmark, Finland and UK). Countries like Italy and Spain have implemented structured digital competency frameworks, covering “traditional” types of foundational digital skills, but also emerging technologies, such as AI. Such frameworks are regularly updated to remain relevant. The UK, on the other hand, focuses only on a framework for specialized IT job profiles, describing the technical skills necessary for digital transformation. Finland and Denmark offer broader strategic approaches, prioritizing organizational transformation and leadership development.

The digital competency models primarily target general digital competencies, with specific initiatives focusing on specialized ICT skills for public administration. Countries like Italy, Spain (and the Basque Country), and Finland emphasize defining digital skills and competencies needed for policy development roles (ICT-enhanced tasks) in the public administration. Additionally, frameworks from UNESCO and Finland address competencies required for service delivery roles (ICT-dependent tasks), highlighting the need for

28. The analytical matrix structured the evaluation of digital competence frameworks across national and international initiatives, by following four key dimensions: (i) General overview of frameworks, (ii) Areas of competence framework, (iii), Training and implementation, and (iv) Development process. More details about the methodological approach can be found in Chapter V - International experiences: shaping digital competencies.

29. The analysis reflects data and materials accessible by October 2024.

both foundational and specialized skills to support a modern, technology-driven public sector. Beyond individual competencies, Denmark's model highlights the need for broader capacity of organizations to navigate and lead digital transformation efforts. This model reinforces the knowledge, skills, and attitudes necessary to manage change and lead digital transformation in the public administration. Frameworks like SFIA and the UK's Government Digital and Data Profession Capability Framework provide structured guidance on advanced-level digital skills for IT professionals, defining the competencies required for ICT-intensive tasks in public administration.

Training programs for digital skills have been the primary focus of HR initiatives in most countries when integrating digital competencies. Digital training programs are a key focus across most of the countries analyzed, though many lack an underlying structured competency framework. These programs vary widely in content, delivery methods, and target audiences, with some designed for all public employees and others targeting senior or specialized roles. This variation highlights the importance of tailoring digital skills development to different employee needs to ensure effective and strategic implementation. Italy and Spain stand out for their structured digital competence frameworks, which are supported by comprehensive training programs that are regularly updated to incorporate emerging technologies. For instance, Spain's 2023 update introduced new skills related to AI, data management, and cybersecurity. Aligning training programs with structured competence frameworks, as seen in Italy and Spain, enhances consistency and effectiveness, preventing inconsistent skill development and ensuring efficient resource allocation. Italy's "Nuove competenze per le Pubbliche Amministrazioni" program, based on the EU's DigComp framework, and Spain's framework both emphasize the importance of continuous updates to remain relevant in the evolving digital landscape.

Training needs assessment platforms and digital skills certification are essential as part of the upskilling agenda. Spain's AgeDigital project and the Basque Country's BAIT certification model provide valuable lessons in assessing and attesting digital skills. These models highlight the importance of a clear certification system to validate digital competencies and support career development. They offer insights into developing self-assessment tools that enable civil servants to evaluate their digital competencies and receive official certification upon completing structured training programs.



The foresight process allowed the identification of digital roles needed in 2032 and is presented in Chapter VI

The Bank team conducted, in collaboration with Prospectiva Institute, a foresight exercise. Using horizon scanning and scenario-building, the process aimed to define specific future digital roles and general competencies needed by 2032. The iterative methodology involved consultations with a specialized foresight team and was refined through three working sessions and a final consolidation and validation workshop with public administration and private sector representatives. The detailed foresight process is described in Chapter VI and Annex 9.

The foresight exercise revealed that high-level strategic oversight and hands-on digital technical expertise are essential in a digital-native ecosystem. Roles such as Digital Transformation Officers, Chief Data Officers, and Data Integration Specialists will be important. The integration of virtual assistants in public services will require roles like AI Engineers, NLP Specialists, User Experience Experts, Cybersecurity professionals, and AI Ethics Officers to ensure smooth automation, personalized interactions, and regulatory compliance. Predictive governance focuses on AI-driven analytics, digital twins, and IoT-based decision-making, requiring specialists in geospatial data, GIS, cloud computing, and smart infrastructure management, along with strategic roles like Smart City Managers.

The foresight exercise confirmed the relevance of the three digital role categories defined in the methodology: ICT-intensive, ICT-enhanced, and ICT-dependent roles. ICT-intensive roles, such as ICT

professionals specialized in interoperability, data and cybersecurity, focus on building and maintaining the technical infrastructure of digital governance. ICT-dependent roles integrate digital tools into specific policy and service areas. ICT-enhanced leadership roles, including digital transformation officers, drive strategic planning, regulatory compliance, and institutional digital adoption. This classification reinforces that digital transformation requires a coordinated approach across technical, operational, and strategic functions.

The foresight scenarios also highlight the need for a coherent and strategic approach to digital transformation in Romania, including the integration of digital skills development within a broader strategy. Given the complexity and cost of adopting advanced technologies, prioritization will be essential, along with clear institutional responsibilities and sequencing of capacity-building efforts. The planning process can build on the existing draft Strategy on Digital Transformation developed by ADR. Output 3 of this TSI project will also support a phased implementation of the digital competency framework and specialized ICT roles to ensure alignment with the national objectives that are currently reflected in different strategies.

Key recommendations informing the design process

- **A structured approach to defining and integrating digital competencies will be pursued during the design phase.** The analysis strongly revealed the need for a standardized digital competency framework, building among others on DigiComp RO, to clearly define required digital skills across different job categories. For the design process, four competency frameworks will be used as a reference, given their relevance confirmed by the assessments:
 - *DigComp 2.2 / DigComp RO*³⁰
 - *The Spanish digital competency framework for public employees*
 - *ADR's digital maturity framework*
 - *UNESCO's framework for AI and Digital Transformation for Civil Servants*
- **To successfully implement EU and national digital initiatives, the public administration workforce needs general digital competencies that go beyond the “traditional” set of digital skills emphasized in the current job descriptions.** General digital competencies at foundational level include basic data literacy, digital content handling, cybersecurity awareness, and digital transformation skills. Moving forward, the digital transformation journey in Romania will necessitate that public employees develop expertise in AI ethics, cybersecurity, data governance, interoperability, and digital service delivery. The increasing regulatory demands of EU legislation, such as the AI Act, Digital Services Act, and NIS2 Directive, highlight the urgency of equipping civil servants with specialized skills to ensure compliance and efficient implementation of digital policies. Additionally, fostering attitudes such as adaptability, openness to experimentation and innovation, and a user-centric mindset is very important.
- **Given the complexity of the digital transformation workstreams in the public administration, it could be useful to tailor proficiency levels across the general digital competencies to certain categories of civil service roles.** For example, policymakers need more advanced levels of competencies in data-driven decision-making, AI-assisted governance, and public data ethics, while service delivery roles require more advanced skills in digital workflow management and user-centered e-service platforms. This will also ensure adequate targeting of training programs without investing in a type of “one-size-fits-all” type of upskilling plan, which might be too ambitious and less effective.
- **Specific ICT roles will need to be defined considering the challenges faced by the ICT departments, proposing approaches for medium- and long-term adaptations.** IT specialists in the public administration need specialized technical skills to manage digital infrastructure, protect

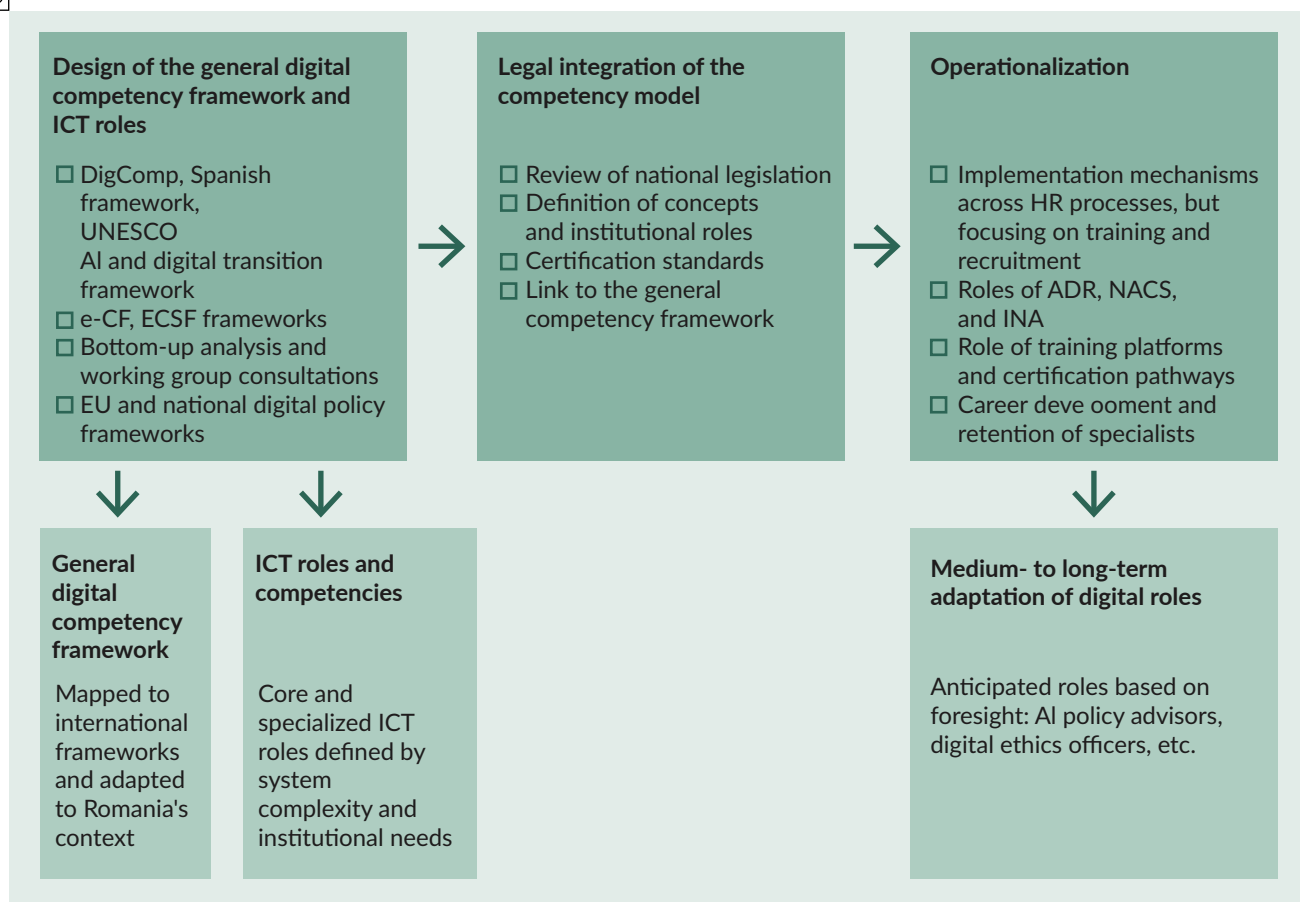
30. Adopted through Government Emergency Ordinance 27/2025.

sensitive data, and implement EU regulatory standards. A digitally competent workforce should have expertise in AI governance, security, data privacy, interoperability standards, and digital service management.

- **A new role of digital transformation leader should be introduced, to drive digital transformation within the public administration.** The role will require competencies in strategic digital governance, change management, and alignment with modernization goals. The role would be at the intersection between general civil service roles and ICT specialists, ensuring proper integration and leadership. For additional traction, the foresight exercise also showed the need of a digital transformation officer, ensuring correlation between policy development, strategic institutional planning and digital initiatives. The content and actual mapping of such roles to current jobs in the central public administration will be explored during the design phase.
- **A robust governance structure is essential to maintain the long-term relevance and effectiveness of Romania's digital competence framework.** Collaboration between key stakeholders, such as NACS, INA, and ADR, should be strengthened, with systematic updates and regular consultations with civil servants and external experts. Drawing from international good practices, such as the UK's DDaT Capability Framework Design Council, will ensure the framework aligns with evolving digital government needs.
- **For the future digital competency framework, institutional roles should be clarified and enhanced.** NACS is responsible for managing and overseeing the competency-based HRM system and integrating digital skills. ADR could lead the digital competency planning for specialized roles, working closely with NACS and INA. Establishing a national digital skills plan for the public administration will be essential, with proper investments in digital training programs, for which INA, NACS and ADR will need to work closely together.
- **A national digital training platform, similar to the one associated to Italy's Syllabus, should be established to provide continuous learning opportunities for civil servants.** This platform could offer online courses tailored to individual training needs, with embedded self-assessment tools to identify digital skills gaps and enroll in targeted courses. This system would enable structured, on-demand learning, ensuring public servants can develop competencies relevant to digital transformation.
- **A structured yet flexible system for certifying digital skills should be closely linked to accessible, modular training programs aligned with professional needs.** Romania could draw on international examples, such as Italy's Syllabus platform, Spain's AgeDigital, and the Basque Country's BAIT model, to develop a national training and certification approach. Certification/validation of digital skills should recognize skills acquired through various learning pathways, include self-assessment tools, and be guided by clear criteria, informing recruitment and staff development purposes without adding formal obligations to performance appraisals.
- **Given the wide range of digital skills and digital roles that have emerged across different assessment layers, the design will need to strike a balance when defining the breadth of general digital competencies and the depth of specialization required for ICT professionals.** In the next phases of the TSI project, activities 2 and 3 will focus on refining the design of the digital competency framework, supporting its legal integration and implementation. Output 2 will include the proposed general digital competency framework and the detailed ICT roles. The design process will be also informed by the testing of the draft digital competency framework model in a central public organization. Output 2 will therefore present the model as updated based on the testing phase. Examples of specific digital competencies will also be provided, linked to selected functional domains and institutions, to facilitate differentiation between general and specific digital skills. Output 3 will include recommendations on how to consistently reflect the digital competencies in the legal framework, as well as a proposed methodology for the operationalization of the digital competency framework in HR processes. Recommendations for phased implementation will also be included.



FIGURE 1: Next phases in the TSI project, building on the assessments in the current report



I. Introduction: context and scope

- Romania's public administration faces structural challenges that constrain the development of digital competencies across the civil service.** These challenges hinder the country's digital transformation and the human resources management (HRM) reform agendas. Digital skills deficits are symptomatic of deeper systemic issues, including difficulties in attracting and retaining qualified staff, rigid salary and career structures, and limited professional development opportunities. These challenges are compounded by the absence of a comprehensive strategy linking public administration HRM modernization with digital transformation objectives, as well as by institutional fragmentation.³¹
- Romania has already taken steps to introduce competency-based HRM in the public administration, but digital competencies are not systematically defined nor applied in HR processes.** A general competency framework is in place and serves as the foundation for the national recruitment competition system for civil servants³². This framework is gradually being extended to other HR processes and to other categories of personnel beyond the core civil service, aligning with the reform objectives outlined in Romania's National Recovery and Resilience Plan (NRRP). The National Agency for Civil Servants (NACS) plays a central role in advancing the HRM reform efforts, ensuring alignment with the broader public administration modernization initiatives. However, digital competencies in the public administration are not systematically defined or integrated into HR processes. While digital skills are tested during recruitment, they are not formally mapped within the general competency framework, nor are they clearly outlined in policy documents. Institutional definitions of digital skills vary significantly, often focusing narrowly on Microsoft Office proficiency, and the overall assessment of IT skills is constrained by the absence of a structured competency framework. This lack of clarity limits the effectiveness of HRM processes and results in fragmented capacity-building efforts with limited impact. Recent data reveals that almost 60 percent of civil servants self-assess their digital proficiency as low, proving the need for a more structured and coherent approach³³. Furthermore, the current framework does not clearly differentiate between general digital competencies and digital skills *specific* to certain job profiles or functional areas, limiting the capacity of the civil service to plan, recruit, and develop a digitally capable workforce.
- Digital competencies are a critical enabler for advancing Romania's digitalization and HRM reform objectives, but are not a standalone solution.** Strengthening digital skills in the civil service is essential to improving government efficiency, public service delivery, and citizen trust. Moreover, digital competencies play an important role in fostering transparency, data-driven decision-making, innovation, and the security of government systems. However, meaningful progress in this area requires embedding digital skills within the broader HRM reforms, in the workforce development strategies as well as in the wider digital transformation plan for the public administration. Digital competencies are not an end in themselves but a necessary tool to modernize the public administration, ensure effective service delivery, and align Romania's public sector with the EU Digital Decade targets. Figure 2 illustrates how the digital competency framework is placed at the intersection between the HRM reform

31. Systemic HRM challenges were analyzed by the Bank in detail in Deliverable 1.1 developed under the HRM RAS: *Baseline review of the national framework for HRM and its institutionalization* (2019). Key challenges related to institutional fragmentation are still valid, as reflected in that document. Document available at: <https://sgg.gov.ro/1/wp-content/uploads/2010/01/Livrabilul-1.1-Baseline-review-of-the-national-framework-for-HRM-and-its-institutionalization.pdf>.

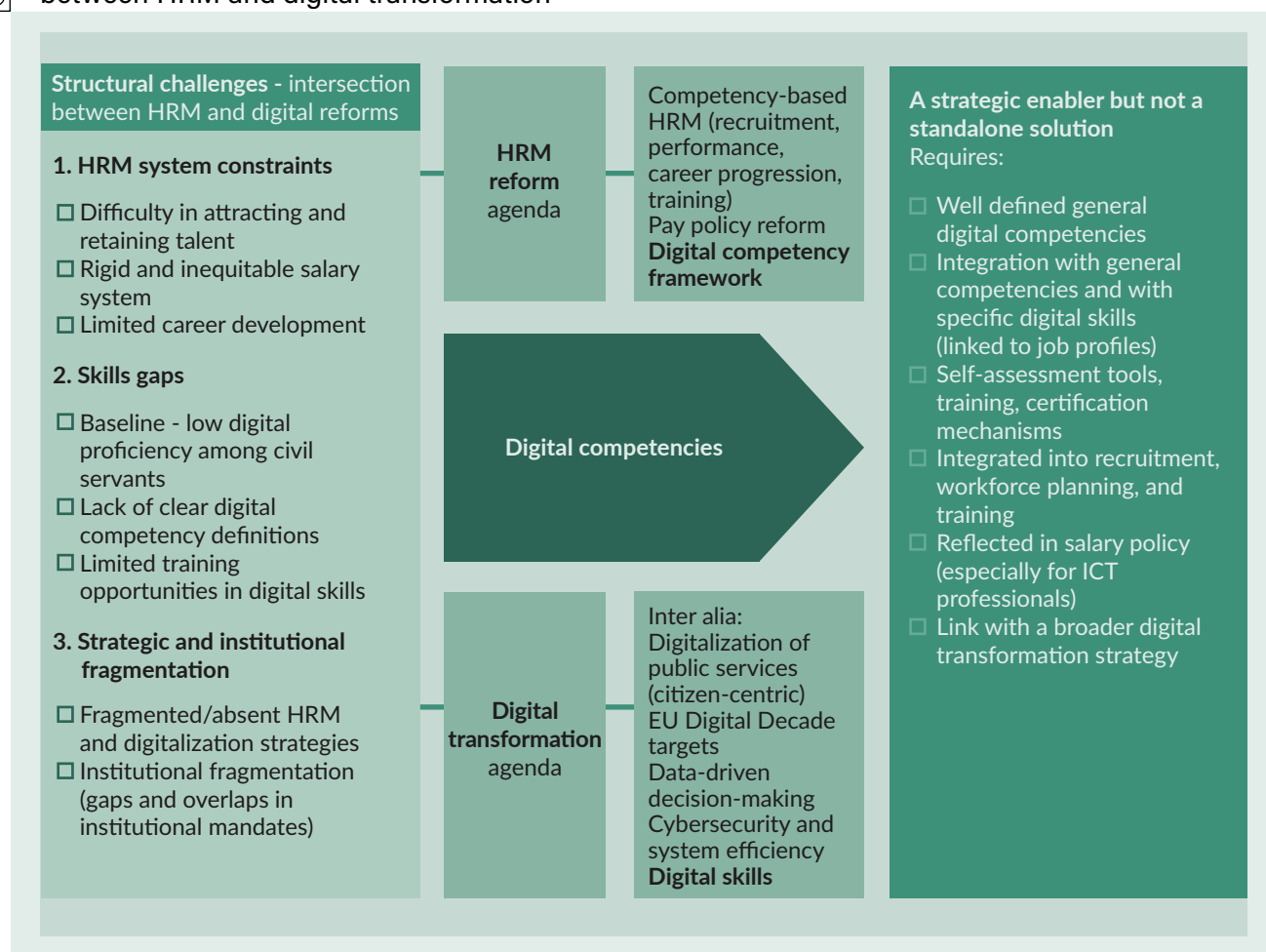
32. As adopted through the Administrative Code (GEO 57/2019).

33. NACS, *Analysis regarding the need for training human resources in the Romanian public administration in the field of digital skills*. 2022. Available at: <https://www.anfp.gov.ro/R/Doc/2023/PNRR/Anexa%20nr.%201%20-%20Analiza%20competente%20digitale.pdf>.

agenda and the digital transformation agenda; a structured digital competency framework represents a strategic enabler that necessitates complementary reform measures and targeted investments.

4. **To address these gaps, the World Bank, in close collaboration with the European Commission, is supporting the Government of Romania (GoR) in developing a general digital competency framework for civil servants.** The project is financed through the Technical Support Instrument (TSI) and is implemented in partnership with three beneficiary institutions: the National Agency for Civil Servants (NACS), the Authority for the Digitalization of Romania (ADR), and the National Institute for Administration (INA). The project's objective is to support the development of a digital competency framework that supports workforce development and aligns with Romania's digital transformation priorities. The underlying theory of change is that, (i) by identifying the digital competency needs that are relevant in the national and broader EU context, (ii) by defining the general digital competencies in a structured format, with clear descriptors and proficiency levels, and (iii) by supporting the integration of digital competencies into key HRM processes (such as recruitment and training), Romania can develop a critical component of the broader digital public administration ecosystem: the public administration workforce. The framework will provide the foundation for capacity-building initiatives, inform recruitment and career development policies, and contribute to broader HRM reforms such as strategic workforce planning and targeted public sector wage system reforms, allowing to attract and retain talent.

 **FIGURE 2:** Context for developing the general digital competency framework: intersection between HRM and digital transformation



5. **The project was designed to complement and build on ongoing HRM system reforms that are supported by the Bank's technical assistance.** First, important synergies exist between the TSI project on the *Development of the general digital competency framework for civil servants* and the

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Reimbursable Advisory Services (RAS) on *Support to the NACS on Human Resources Management Reforms*, which aims to strengthen HRM processes across the Romanian public administration. Digital competencies are a critical element of these processes, particularly for the effective operationalization of strategic workforce planning. Under the RAS the Bank will also support the operationalization of the “functional domains”³⁴, which will imply the identification of selected *specific* skills, including specific digital skills. Second, the TSI project is also linked to previous RAS support provided by the Bank to the Ministry of Labor, Family, Youth, and Social Solidarity (MLFYSS) on *Reforming the Public Sector Pay System*. Competitive and equitable salaries in the public administration are essential to attract and retain staff. For ICT professionals this requires not only targeted salary policies but also a clear definition of roles and competencies. In addition, the development of the digital competency framework will also build upon the technical assistance provided by the Bank to the Ministry of Economy, Digitalization, Entrepreneurship and Tourism (MEDET), under the *Digital Skills Training for all Romanians RAS*, which focuses on enhancing digital skills among Romanian citizens. In this context, the Bank has already supported the adaptation of the European Digital Competence Framework for Citizens (DigComp 2.2)³⁵ into a model tailored to the Romanian context — **DigComp RO** — which was adopted through GEO 27/2025. Both DigComp 2.2 and DigComp RO serve as key reference points for defining the general digital competencies relevant to the Romanian public administration workforce.

6. The TSI component “Developing a General Digital Competency Framework for Civil Servants in Romania” consists of five key activities:

- I. Activity 1 encompasses an assessment of digital competencies needed**, combining a review of EU and national policies with job analysis and foresight, to identify digital competencies needed in the public administration over the short to long-term. It includes mapping digital competencies to existing and future civil service jobs through focus groups, interviews, and data analysis.
- II. Activity 2 focuses on designing the digital competency framework**, defining competency areas, and for each area the relevant knowledge, skills, and attitudes, as well as the applicable proficiency levels. This phase also includes a pilot exercise to test and update the framework and an ample consultation process with stakeholders to validate the framework.
- III. Activity 3 covers the development of recommendations for integrating the framework into the legal framework and into HRM processes**, including a methodology for the application of digital competencies in key HR processes.
- IV. Activity 4 covers capacity building support** through study visits, the updating of training needs assessment methodologies, as well as the development of curriculum elements, and facilitating knowledge-sharing events.
- V. Activity 5 is aimed to facilitating knowledge sharing**, by developing a final report on lessons learned for other Member States to develop a digital competency framework based on the Romanian model. A final learning and dissemination event with relevant national stakeholders and experts from other EU countries will explore the relevance of Romania's digital competency framework in the EU context.

7. This report constitutes *Output 1* under the TSI component, corresponding to Activity 1. The report includes the findings of the assessment of the digital competencies needed in the Romanian civil service. Figure 3 below illustrates Activity 1 in the broader intervention logic of the TSI project. The current report identifies key digital competency needs through a combination of top-down policy

34. Functional domains correspond to sectoral policy areas (such as defense, diplomacy, health, education, tax administration, regional development, environment etc.), as well as to cross-cutting functions identified across institutions (such as HRM, public policy, strategic planning, financial management, etc.). The Bank proposed a classification of the functional domains in 2020, under the HRM RAS. The report is available at > https://sgg.gov.ro/1/wp-content/uploads/2010/01/Livrabilul-8.3_RO_Model-cadru-de-competente-generale-si-specifice.pdf.

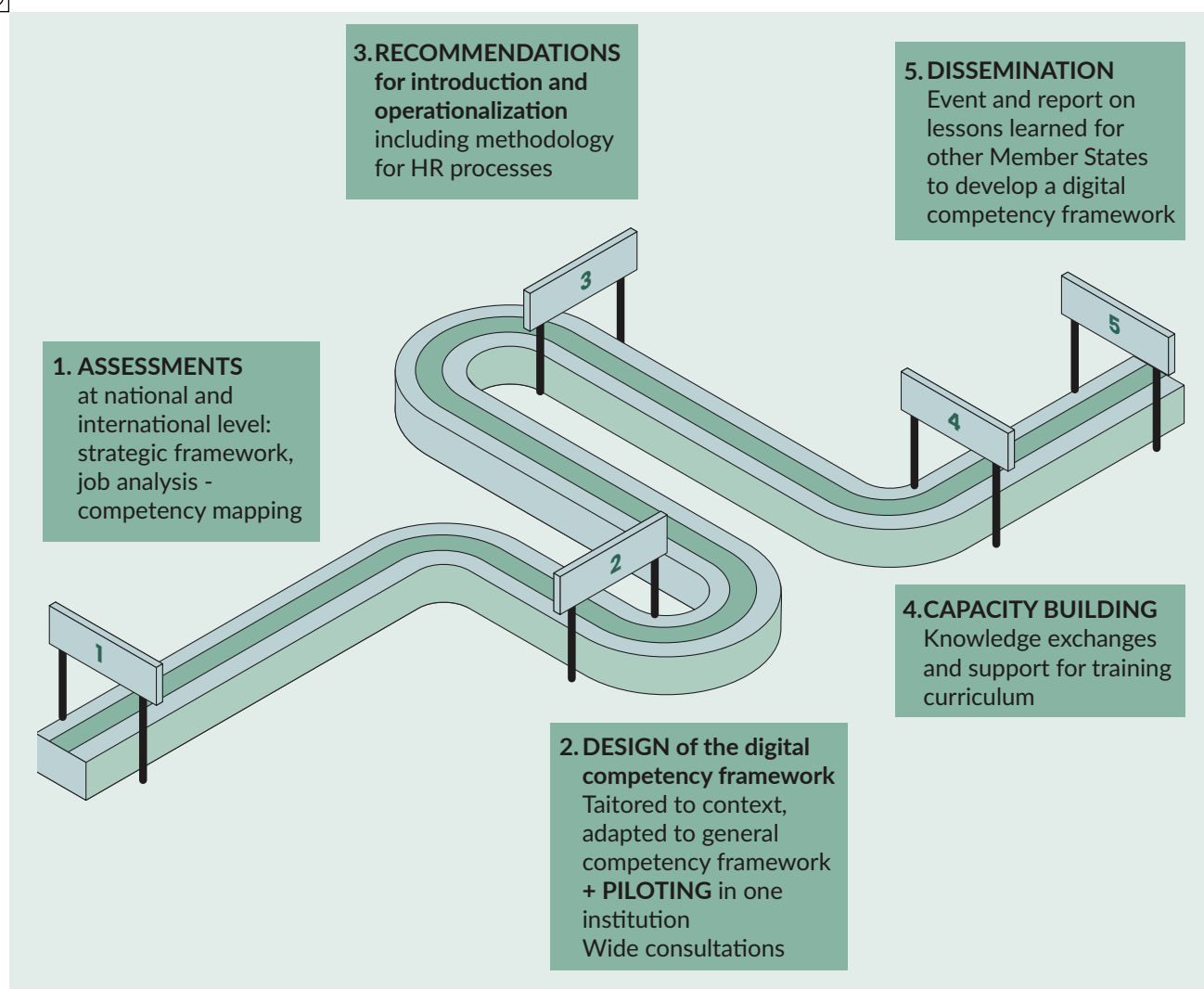
35. The DigComp 2.2. model is presented in detail in chapter 2.2.

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analysis and bottom-up job analysis. The activity included a review of European and national strategies on digitalization and digital skills, an analysis of international examples on digital competency frameworks from other EU member states and international organizations. Additionally, the assessment involved a job analysis exercise to determine digital skills already present and digital skills needed in the civil service. Finally, a foresight exercise was also conducted to distill potential future digital roles and digital skills needed in the public administration.



FIGURE 3: TSI project intervention logic: Report corresponds to Activity 1



8. **The findings of this report establish the foundation for the next phases of the project: the design and formulation of recommendations for introducing and operationalizing a digital competency framework in the Romanian civil service.** The results of this assessment will inform the development of a structured framework of general digital competencies, as well as targeted digital roles needed in the public administration. Furthermore, the findings in this report are also meant to inform future formulation of recommendations on how digital competencies should be (i) integrated in the legal framework; (ii) consistently introduced across HR processes, and (iii) effectively managed and updated by ensuring adequate institutional arrangements and resource allocation for future implementation of the digital competency framework model.
9. **The scope of the report broadly covers the central public administration, while being targeted at the core civil service, in line with the objectives of the TSI project.** The design of the future digital competency framework model is meant to be tailored to the civil service. However, the assessment approached the digital competency needs of current and future digital roles for the public administration

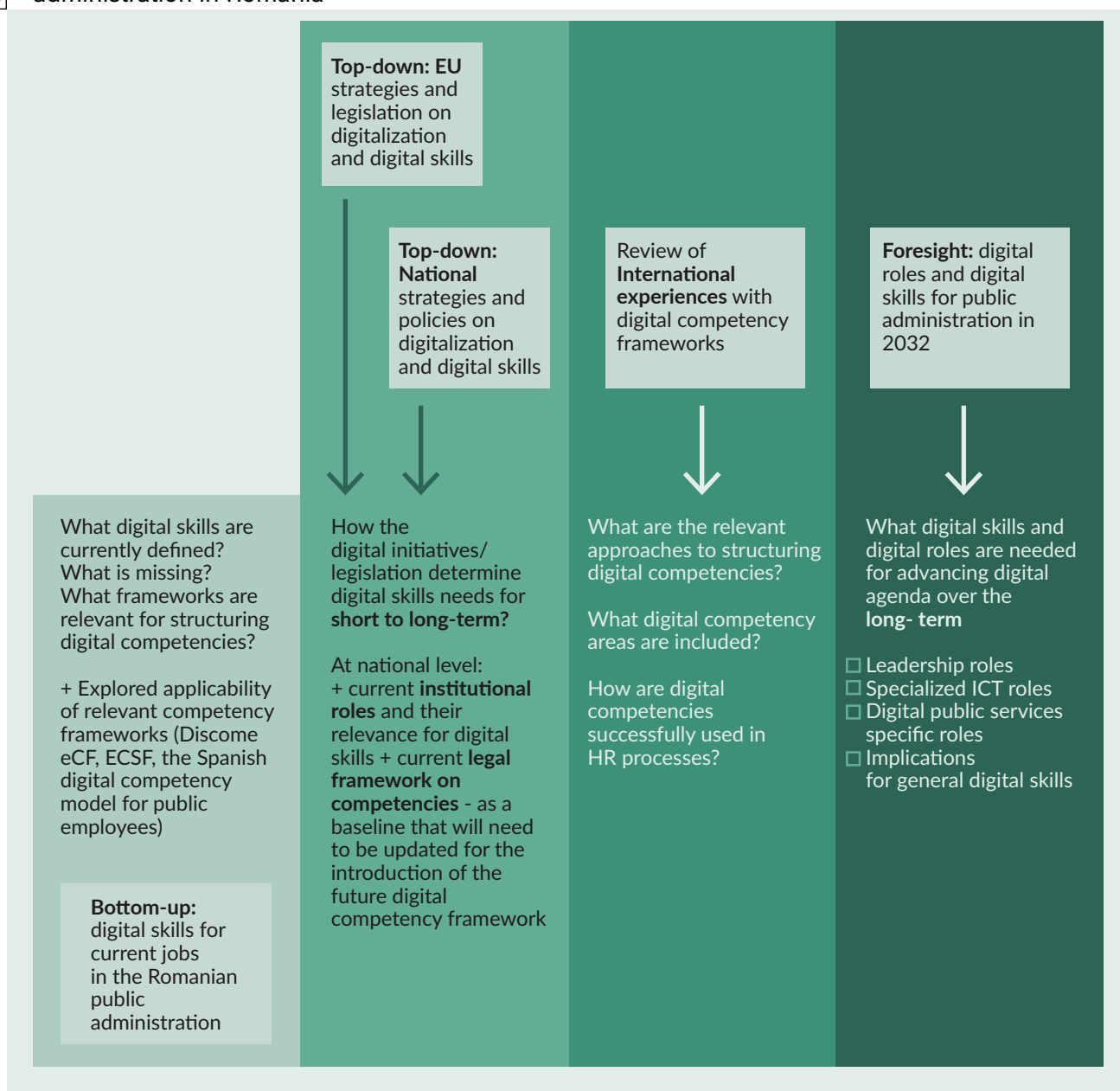
at large, as defined in the current legal framework³⁶. Some of the specialized IT roles to be defined during the design phase could be classified as contract-based positions.

10. **While the scope of the project (and of this report) does not include the formal identification of *specific* digital skills for functional domains or institutions, the future design process of the general digital competency framework will provide an opportunity to also illustrate how such skills can be identified based on institutional needs.** The TSI project focuses on the definition of general digital competencies. However, the formulation of examples of *specific* digital skills during the design phase is meant to facilitate the differentiation between general and *specific* digital competencies, to reflect actual functional requirements, and to avoid unnecessary duplication. The formulation of such examples will also draw on international experience and be informed by the future piloting of the framework. The selection of the piloting institution is expected to influence the choice of the functional domains and the types of specific digital skills that will be showcased.
11. **The current report does not aim to present a draft digital competency framework model, nor to already define the list of recommended specialized ICT roles.** These elements will be developed during the design phase. However, this assessment phase plays a crucial role in collecting key insights, identifying competency gaps, and analyzing the applicability of relevant frameworks such as the European Digital Competence Framework for Citizens (DigComp), the European e-Competence Framework for ICT professionals (eCF), and the European Cybersecurity Skills Framework (ECSF). By mapping existing digital skills, legal frameworks, and institutional roles, this phase lays the groundwork for an informed and structured approach to designing a comprehensive digital competency framework. The findings will support the development of competency definitions, role classifications, and integration into HR processes, ensuring that the final model reflects both current and future digital skill needs within the civil service.
12. **Methodologically, the assessment covers four main pillars:**
 - a top-down review of relevant EU and national strategies and policies on digitalization that impact digital skills in the public administration;
 - a bottom-up assessment of digital skills in the public administration (job mapping exercise);
 - a review of international experience with digital competency frameworks across EU countries, and
 - a foresight exercise.

Across all these pillars the assessment distills digital skills/digital roles that surfaced as important and relevant for the public administration digital reform agenda in Romania (Figure 4).
13. **The detailed methodological approach is not presented in this chapter, as each pillar-specific methodology is outlined within its respective chapter.** This structure ensures that the methodology is contextualized, providing a clear, targeted explanation of the approach used for each component of the assessment.

36. Public administration jobs and civil service jobs as defined and classified through EGO 57/2019 on the Administrative Code and the Public Sector Pay Law 153/2017.

FIGURE 4: Methodological approach to the assessment digital competencies needed the public administration in Romania



14. **Conceptually, when analyzing digital competency needs across different job types in the public administration, the OECD's generic classification of digital competencies provided the foundational framework for the analysis.** From a conceptual point of view, in this Report the terms "competency" and "competence" are used interchangeably. In different contexts the two concepts are used with slightly different meanings, but EC official documents include both "competency framework" and "competence framework" as equivalents. The distinction is explained in the *Glossary* section of this Report. In terms of job categories covered, the review process adopted the OECD's generic classification of digital competencies, which encompasses³⁷ digital user skills, digital professional skills, digital complementary skills and digital management and leadership skills. These types were linked with more generic categories of ICT-enhanced jobs, ICT-intensive jobs and ICT-dependent jobs³⁸ as is illustrated in Figure 5. The job categories include:

37. OECD, The OECD Framework for Digital Talent and Skills in the public sector, 2020. Available at: https://www.oecd.org/content/dam/oecd/en/publications/reports/2021/04/the-oecd-framework-for-digital-talent-and-skills-in-the-public-sector_f6fb7838/4e7c3f58-en.pdf.

38. <https://digital-skills-jobs.europa.eu/en/latest/briefs/digital-jobs-deep-dive>

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- ➔ **Digital user skills are foundational for the majority of public sector roles. They are prerequisites for completing ICT-enhanced tasks.** Basic competencies-such as word processing, Internet navigation, email communication, and spreadsheets usage are essential for most public sector jobs. The EU Framework **DigComp** provides proficiency levels and relevant examples to standardize these skills. For policy-development jobs, the so-called **ICT-enhanced tasks** require general digital competencies that enable the formulation of policies in compliance with digital initiatives and regulations.
- ➔ **Digital professional skills underpin successful ICT management and development within the public sector. They are mapped as ICT-intensive tasks.** Public administration organizations may want to attract different types of candidates depending on whether software development is conducted in-house or outsourced via public tender. In the first scenario, roles such as software engineers, developers, network specialists, enterprise and system architects, data scientists, designers, user researchers, product managers, and business analysts are essential. In the second scenario, personnel are needed for tasks ranging from drafting technical specifications for tenders to project management, overseeing user testing and deployment (as seen, for example, in Denmark).
- ➔ **Digital complementary skills are becoming increasingly important for effective digital governance across a range of public sector functions.** As digital technologies become increasingly integrated into public sector operations, tasks such as tax collection, project management, auditing, regulation, procurement and communication now demand upgraded skill sets that implies certain digital competencies, mainly focused on delivering digital services. Even non-ICT specific roles require these new competencies to function optimally in a digitized context. In this overview, these skill sets are needed to complete **ICT dependent tasks**. They are thus considered essential for public employees tasked with driving digital transformation.
- ➔ **Digital management and leadership skills are crucial for steering strategic, technology-focused transformations in the public sector.** Senior officials increasingly need foundational digital management and leadership capabilities, including an understanding of digital transformation's potential impact and a clear vision for future action. While they do not need to be experts in emerging technologies such as cloud computing, artificial intelligence, or data analytics, these leaders need to be equipped to make informed strategic decisions regarding their applications or investments. This shift calls for moving beyond traditional leadership, focused on legal compliance and bureaucratic processes, towards a mindset that embraces innovation and cultivates a digital culture. Promoting a digital culture and recognizing the broader implications of digital government are essential for achieving greater maturity in public administration, as outlined in the *OECD Recommendation on Public Service Leadership and Capacity*³⁹. In this review, these skills were considered needed for the digital transformation process, an idea which draws inspiration from the *EC competence framework for innovative policymaking*⁴⁰ (e.g. 10. Managing transformations, 17 Anticipatory mindset, 7. Systems thinking).

15. **The structure of this report is organized around the key assessment pillars, with each area of focus being reflected in a dedicated chapter.** This first chapter introduces the assessment in the context of the TSI project and the rest of the report is structured as follows:

- ➔ **Chapter II** maps the supra-national strategic and policy framework impacting digital competencies in the public sector, focusing especially on the EU relevant policy and legislative acts. In addition, other relevant initiatives from the OECD, the World Bank, and UNESCO are also briefly highlighted, underlining how they influence or set international benchmarks for digital skills.
- ➔ **Chapter III** shifts the focus to national strategies, policies, and institutional arrangements, mapping key institutional roles, legal frameworks, and ongoing digital initiatives to identify how digital

39. <https://legalinstruments.oecd.org/en/instruments/OECD-LEGAL-0445>.

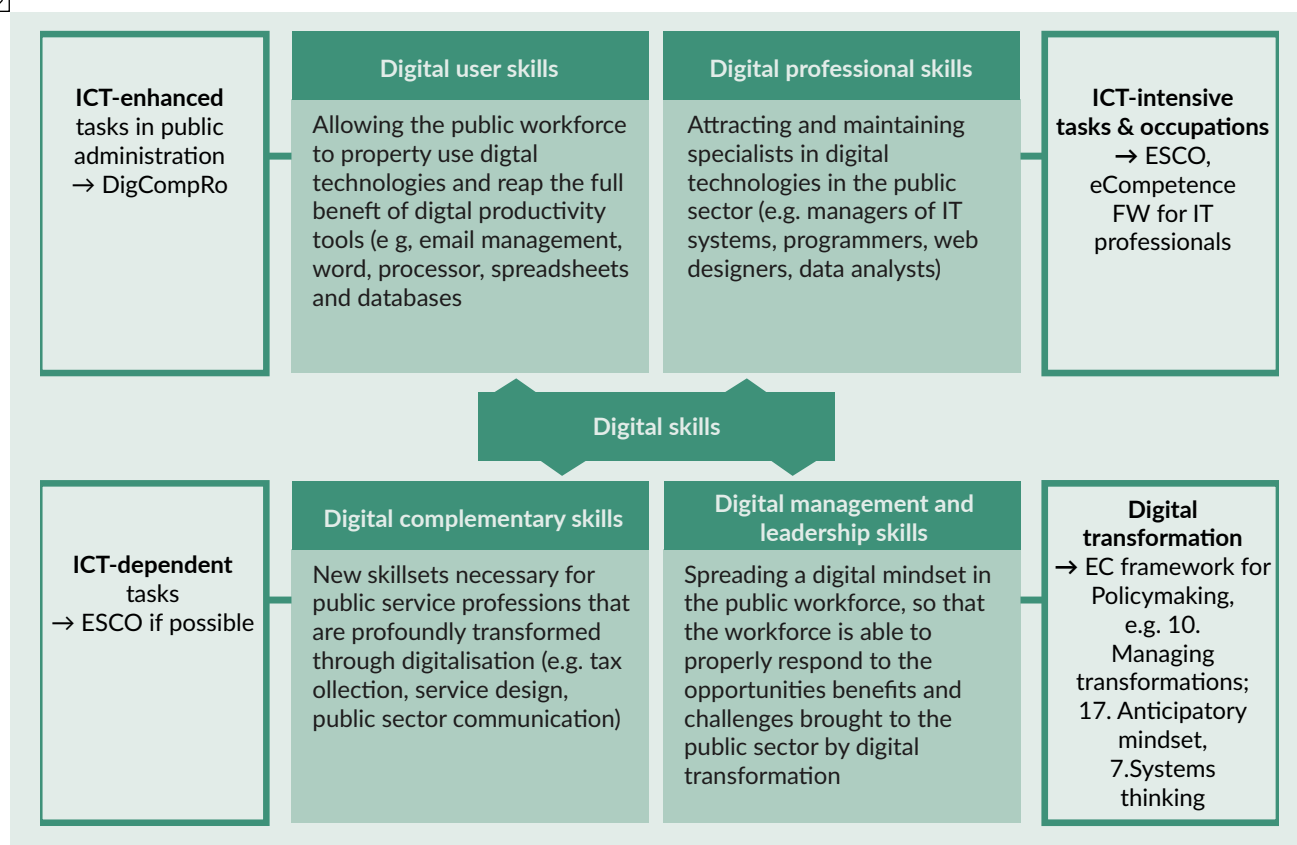
40. Schwendinger, F., Topp, L. and Kovacs, V., *Competences for Policymaking*, Publications Office of the European Union, Luxembourg, 2022.

competencies are currently addressed and what digital skills would be needed to drive forward the digitalization agenda.

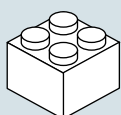
- **Chapter IV** presents the results of the job analysis, identifying typical digital competency requirements for general civil service jobs, with an emphasis on service delivery, digital transformation, and specialized ICT positions, based on job description reviews and stakeholder consultations.
- **Chapter V** explores relevant international experiences on structuring and institutionalizing digital competency frameworks in the public sector. Two specific case studies – Italy and Spain – are discussed, building on relevant insights extracted from two study visits that were organized under Activity 4 of the TSI project. Other relevant examples from Finland, Denmark, France, Slovenia, Portugal, UK are included in Annex 7, together with the presentation of the SFIA framework for digital skills.
- **Chapter VI** presents the findings of the foresight exercise, envisioning the future of digital roles in the public administration by developing baseline and aspirational scenarios for digital governance in 2032.
- **Chapter VII** synthesizes key findings, drawing conclusions that will inform the next phase: the design of the digital competency framework and its institutionalization within Romania's public administration.



FIGURE 5: Categories of digital skills in the civil service, OECD classification



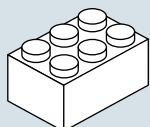
II. The EU policy framework impacting digital competencies in the public administration



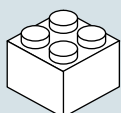
34 Scope of the review and methodological approach



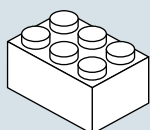
35 In focus: EU strategic framework on digitalization



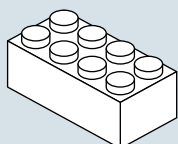
48 Complementary: OECD policy frameworks and initiatives on digital skills



52 Selected World Bank initiatives



53 UNESCO – AI and digital transformation skills for civil servants



55 Key takeaways: how EU-level policies and other international initiatives impact digital skills in the public administration

2.1

Scope of the review and methodological approach

16. **The strategic and policy frameworks on digitalization at the EU and international level shape and impact the current and future digital competency needs in Romania's public administration.** By reviewing the EU, OECD and other frameworks, the Bank team aimed to capture broad policy directions, priorities, and best practices in digital transformation at the international level. This provides a general reference for Romania's civil service competency needs, deriving from the digital transformation of its public administration, as prompted by "external" factors. It complements the analysis of Romania's digital strategies and policies carried out to identify key digital competency needs specific to its public administration, whose approach and findings are described in Chapter III.
17. **The methodological approach for reviewing the international level strategic and policy frameworks is based on a structured analysis of key documents, initiatives, and policy recommendations.** The review focuses on major EU strategies, such as the Digital Decade and related policy frameworks, as well as OECD guidelines on digital government, public sector innovation, and competency development. A special emphasis is placed on analyzing European strategies and policy framework for digital transformation, given Romania's EU membership. Additionally, relevant initiatives from international organizations such as UNESCO and the World Bank are briefly referenced to complement the analysis, offering a broader perspective on global trends and approaches to digital capacity building in the public sector.

2.2

In focus: EU strategic framework on digitalization

18. **The review of the EU digital framework highlights the key strategic initiatives and regulatory instruments that impact the digital skills needed in public administration.** Foundational strategies, such as the *Digital Decade Policy Programme 2030* and *Shaping Europe's Digital Future*, set long-term goals for digital infrastructure, skills, and innovation. Guiding frameworks, including the *European Interoperability Framework* (EIF) and the *EU Cybersecurity Strategy*, provide recommendations to enhance cross-border cooperation, public sector modernization, and resilience against cyber threats.
19. **The EU legal framework plays a crucial role for its member states in ensuring effective governance and adaptation to the rapid advancement of digital technologies.** It addresses key areas such as digital tools, data availability and exchange, cybersecurity, interoperability, and the ethical use of AI and emerging technologies. The EU's digital regulatory framework consists of key legislative measures, including the *Data Act*⁴¹, the *Open Data Directive*⁴² and related *Implementing Regulation on high-value datasets*⁴³, the *Data Governance Act*⁴⁴, the *Artificial Intelligence Act*⁴⁵ (AI Act), the *Cybersecurity Act* (CSA Act)⁴⁶, the *Cyber Resilience Act*⁴⁷ (CRA Act), the *Network and Information systems 2* (NIS2) Directive⁴⁸, the *Interoperable Europe Act*⁴⁹, *Web Accessibility Directive*⁵⁰, the *Digital Markets Act*⁵¹ (DMA

41. Regulation (EU) 2023/2854 of the European Parliament and of the Council of 13 December 2023 on harmonized rules on fair access to and use of data and amending Regulation (EU) 2017/2394 and Directive (EU) 2020/1828 (Data Act).
42. Directive (EU) 2019/1024 of the European Parliament and of the Council of 20 June 2019 on open data and the re-use of public sector information.
43. Commission Implementing Regulation (EU) 2023/138 of 21 December 2022 laying down a list of specific high-value datasets and the arrangements for their publication and re-use.
44. Regulation (EU) 2022/868 of the European Parliament and of the Council of 30 May 2022 on European data governance and amending Regulation (EU) 2018/1724 (Data Governance Act).
45. Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence and amending Regulations (EC) No 300/2008, (EU) No 167/2013, (EU) No 168/2013, (EU) 2018/858, (EU) 2018/1139 and (EU) 2019/2144 and Directives 2014/90/EU, (EU) 2016/797 and (EU) 2020/1828 (Artificial Intelligence Act).
46. Regulation (EU) 2019/881 on the European Union Agency for Cybersecurity and on information and communications technology cybersecurity certification (Cybersecurity Act).
47. Regulation (EU) 2024/2847 of the European Parliament and of the Council of 23 October 2024 on horizontal cybersecurity requirements for products with digital elements and amending Regulations (EU) No 168/2013 and (EU) 2019/1020 and Directive (EU) 2020/1828 (Cyber Resilience Act)
48. Directive (EU) 2022/2555 of the European Parliament and of the Council of 14 December 2022 on measures for a high common level of cybersecurity across the Union, amending Regulation (EU) No 910/2014 and Directive (EU) 2018/1972, and repealing Directive (EU) 2016/1148 (NIS 2 Directive)
49. Regulation (EU) 2024/903 of the European Parliament and of the Council of 13 March 2024 laying down measures for a high level of public sector interoperability across the Union (Interoperable Europe Act).
50. Directive (EU) 2016/2102 of the European Parliament and of the Council of 26 October 2016 on the accessibility of the websites and mobile applications of public sector bodies.
51. Regulation (EU) 2022/1925 of the European Parliament and of the Council of 14 September 2022 on contestable and fair markets in the digital sector and amending Directives (EU) 2019/1937 and (EU) 2020/1828 (Digital Markets Act).

Act), and the *Digital Services Act*⁵² (DSA Act). These regulations and directives⁵³ set clear guidelines for data sharing, AI, security, interoperability, accessibility, accountability and transparency.

20. **The review of key strategies, programs and regulations is essential for contextualizing the digital competency needs of the Romanian public administration within the broader EU-driven digital transformation agenda.** To provide a complete picture, this review is complemented by an assessment of national strategic initiatives in the area of digitalization and skills, presented in section 3 of this report.
21. **The current chapter is structured along six key dimensions of EU-driven digital transformation.** For each area, the review examines strategic frameworks and regulatory instruments and highlights some of the critical digital competencies required within public administration to support implementation and compliance. The six areas are as follows:
 - I. the broader foundational layer of EU digital strategy & governance,
 - II. interoperability & digital public infrastructure,
 - III. cybersecurity & resilience,
 - IV. data governance & digital platforms,
 - V. artificial intelligence & emerging technologies, and
 - VI. digital skills & workforce development.

Foundations: key strategies and programs

22. **The EU has adopted a wide range of strategies, policies and tools aimed at enhancing digital competencies, upgrading infrastructure, and fostering inclusive digital growth.** These initiatives reflect the EU's commitment to fostering a cohesive digital ecosystem that aligns the efforts of member states toward a competitive, inclusive, and citizen-centric digital Europe.
23. **The European Commission's 2020 communication, "Shaping Europe's Digital Future", sets out the EU's strategy for digital transformation** based on three pillars: technology that works for people, a fair and competitive economy, and an open, democratic, and sustainable society⁵⁴. It promotes the development of human-centered technologies and seeks to create a competitive digital economy, supporting businesses while safeguarding consumer rights. Additionally, it emphasizes a trustworthy digital environment, reinforcing democratic principles, data protection, and sustainability. This strategy positions the EU as a global leader in responsible digitalization, ensuring that digital progress benefits society while maintaining high ethical and regulatory standards.
24. **The *Digital Decade Policy Programme 2030*⁵⁵ is the main policy framework for digital transformation, setting the EU's strategic objectives** around four areas⁵⁶: **digital skills**, secure and sustainable digital infrastructure, digital transformation of business, and digitalization of public services. Among its specific targets are ensuring that 80 percent of the population aged 16 to 74 possess at least basic

52. Regulation (EU) 2022/2065 of the European Parliament and of the Council of 19 October 2022 on a Single Market for Digital Services and amending Directive 2000/31/EC (Digital Services Act).

53. Regulations are directly applicable and enforceable across the EU, while directives require Member States to adapt their national laws to meet the specified objectives.

54. https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age/shaping-europes-digital-future_en.

55. Decision (EU) 2022/2481 of the European Parliament and of the Council of 14 December 2022 establishing the Digital Decade Policy Programme 2030.

56. https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age/europes-digital-decade-digital-targets-2030_en.

digital skills and increasing the number of ICT specialists to 20 million by 2030, with a strong focus on promoting gender equity in the digital workforce. Progress on these targets is tracked through the *Digital Economy and Society Index (DESI)*⁵⁷, which ensures alignment with the broader goals of the Digital Decade. Member states are required to develop *National Digital Decade Strategic Roadmaps*⁵⁸ to guide their efforts and yearly *Country Reports*⁵⁹ to report progress. Specific tools were also set up to support member states progress under the Digital Decade Policy Programme 2030, such as the *European Digital Infrastructure Consortium (EDIC)*⁶⁰, which supports multi-country infrastructure projects in emerging technologies, including 5G, quantum computing, and blockchain, to achieve these goals.

25. **The European Declaration on Digital Rights and Principles for the Digital Decade**⁶¹ affirms the **right to safe, secure, and privacy-protective digital technologies**. It emphasizes that all individuals in the EU should have access to a trusted digital identity for online and offline services, safeguarded against cybersecurity risks, data breaches, and identity theft. The declaration also reinforces the right to personal data protection, ensuring individuals have control over how their data is used and shared.
26. **Adopted in 2020, the European Skills Agenda**⁶² outlines a **comprehensive strategy to enhance digital and green skillsets across the European workforce**, addressing evolving labor market demands driven by technological advancements and sustainability goals. Emphasizing the twin transitions to a green and digital economy, the agenda calls for substantial investments in digital competencies – from basic to advanced levels –, in STEM education, and in high-demand sectors such as AI, robotics, and climate-neutral technologies. To address immediate ICT skill shortages, initiatives like *ICT Jump-Start* and *Digital Crash Courses* provide targeted, rapid upskilling programs for SMEs workforce, strengthening their digital capabilities. Additionally, the *Digital Education Action Plan*⁶³ highlights the importance of high-quality digital education at all educational levels.
27. **A flagship action under the European Skills Agenda, the Pact for Skills**⁶⁴ fosters **public-private collaboration to drive sector-specific upskilling and reskilling initiatives, preparing Europe for sustainable, technology-driven growth**. The Pact promotes upskilling and reskilling across sectors. While not exclusively focused on public administration, it fosters cross-sector collaboration, encouraging governments to partner with industry, academia, and civil society to develop digital competencies. The Pact supports digital and green transitions, lifelong learning, and workforce adaptation to new technologies, aligning with broader EU priorities.
28. **The Enhancing the European Administrative Space – ComPact**⁶⁵ initiative builds on the European Skills Agenda and the Digital Decade targets to support resilient, future-ready digital public

57. SWD (2024) COMMISSION STAFF WORKING DOCUMENT of 2 July 2024, DESI 2024 methodological note, <https://digital-decade-desi.digital-strategy.ec.europa.eu/s/g0BkErMjP1zOd/>
58. European Commission: National Digital Decade strategic roadmaps, <https://digital-strategy.ec.europa.eu/en/policies/national-strategic-roadmaps>.
59. European Commission: 2024 Digital Decade Country Reports, <https://digital-strategy.ec.europa.eu/en/library/digital-decade-2024-country-reports>.
60. European Commission: European Digital Infrastructure Consortium, <https://digital-strategy.ec.europa.eu/en/policies/edic>.
61. Joint Declaration of the European Parliament, the Council and the European Commission, European Declaration on Digital Rights and Principles for the Digital Decade 2023/C 23/01. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AAOJ.C_.2023.023.01.0001.01.ENG&toc=OJ%3AC%3A2023%3A023%3ATOC.
62. https://employment-social-affairs.ec.europa.eu/policies-and-activities/skills-and-qualifications/european-skills-agenda_en.
63. SWD (2020), COMMISSION STAFF WORKING DOCUMENT of 30 September 2020 Accompanying the Document Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions Digital Education Action Plan 2021-2027 Resetting Education and Training for the Digital Age.
64. European Commission: Pact for Skills, https://pact-for-skills.ec.europa.eu/index_en.
65. COM(2023) COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS of 20 October 2023 Enhancing the European Administrative Space (ComPact)<https://commission.europa.eu/document/download/>.

administrations across the EU. A core component of this initiative is digital upskilling of the public administrations in EU member states, focusing on AI integration, cybersecurity, and the modernization of public procurement processes. The Public Administration Skills Agenda (Pillar 1 under ComPAct) supports these efforts, developing high performing, transparent, and attractive public administrations by providing a range of upskilling and reskilling tools. Under Pillar 2 of ComPAct (*Capacity for Europe's Digital Decade*), the European Commission supports measures to accelerate the digital transformation of public administrations, ensuring alignment with Digital Decade targets. Key actions include assisting governments in implementing digital and data-related legislation, integrating AI technologies safely and ethically, strengthening cybersecurity, and modernizing public procurement practices. The Commission also promotes the adoption of emerging technologies, such as distributed ledger technologies (e.g., blockchain), and encourages member states to leverage technical support and communities of practice to enhance digital readiness. Efforts to improve interoperability focus on harmonizing legal, organizational, semantic, and technical standards for cross-border data exchange, in line with the European Interoperability Framework.

29. **In terms of financing mechanisms, the Digital Europe Programme (DIGITAL)⁶⁶ is the EU's main financial tool for driving digital transformation, addressing infrastructure gaps, skills shortages, and innovation⁶⁷.** With a budget of over €8.1 billion (2021-2027), it funds key areas such as cybersecurity, artificial intelligence (AI), and digital innovation hubs to boost Europe's global competitiveness. DIGITAL enhances public administration by advancing e-government technologies, fostering interoperability, and connecting public and private sectors. It supports digital transformation through a network of *European Digital Innovation Hubs* (EDIHs), linking administrations with start-ups and SMEs offering market-ready solutions. The program also prioritizes workforce digital skills, including supercomputing, big data, cybersecurity, blockchain, quantum technologies, robotics, and AI, while promoting gender balance. By modernizing public administrations and strengthening digital capacities, DIGITAL plays a crucial role in implementing the Digital Single Market.
30. **The Recovery and Resilience Facility (RRF)⁶⁸ is crucial for advancing digital skills across the EU Member states; however its 2026 time limit requires a forward-looking planning effort across EU member states to ensure continuity of current reform efforts.** As the EU's largest financial instrument for post-pandemic recovery, the RRF allocates significant funding to support digital transformation, with at least 20% of each national recovery plan dedicated to digital priorities⁶⁹, including digital skills development. Investments focus on upskilling and reskilling the workforce, enhancing digital education, and improving public administration capabilities. By supporting national reforms and targeted training programs, the RRF helps bridge digital skill gaps and fosters workforce adaptability to emerging technologies such as AI and cybersecurity. The RRF accelerates progress toward Digital decade targets for digital skills by ensuring coordinated funding and policy implementation at both national and EU levels.

Interoperability and digital public infrastructure

31. **Interoperability is essential for the EU's internal market, and the European Interoperability Framework (EIF, 2017)⁷⁰ provides the foundation for seamless digital interactions between businesses, citizens, and public administrations.** Without interoperability, fragmented digital services create barriers that increase administrative burdens and reduce efficiency. To address this, the

66. <https://digital-strategy.ec.europa.eu/en/activities/digital-programme>.

67. Regulation (EU) 2021/694 of the European Parliament and of the Council of 29 April 2021 establishing the Digital Europe Programme. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32021R0694>.

68. Regulation (EU) 2021/241 of the European Parliament and of the Council of 12 February 2021 establishing the Recovery and Resilience Facility. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:02021R0241-20230301>.

69. https://commission.europa.eu/business-economy-euro/economic-recovery/recovery-and-resilience-facility_en.

70. The European Interoperability Framework (EIF) is part of the Communication (COM(2017)134) from the European Commission, adopted on 23 March 2017. Available at: https://ec.europa.eu/isa2/eif_en/.

EIF includes 47 recommendations⁷¹ that offer a structured approach for aligning national and sectoral digital services, ensuring cross-border connectivity. It defines legal, organizational, semantic, and technical interoperability as key to enabling administration-to-administration (A2A), administration-to-business (A2B), and administration-to-citizen (A2C) interactions. The EIF also provides governance recommendations to enhance interoperability management, cross-organizational cooperation, and end-to-end digital service delivery, ensuring that legislation facilitates rather than hinders these efforts. Implementing the EIF requires legal and policy expertise to align national frameworks, data governance and semantic interoperability skills to enable smooth information exchange, and technical proficiency in interoperability protocols and standards.



*The EIF, SDG and OOTS Regulations imply that public administrations need to be equipped with technical expertise in **semantic and technical interoperability**, ensuring that digital services can exchange and process data seamlessly.*

***Data governance skills** are essential for managing cross-border data flows while ensuring compliance with General Data Protection Regulation (GDPR) and cybersecurity regulations.*

***Policy and legal expertise that incorporates specific digital skills** is required to align national frameworks with EU-wide interoperability rules.*

*Public administrations must also develop **general digital skills to manage and execute interoperable services effectively**.*

***Inclusion skills in the digital environment** are also needed, Civil servants need to understand and handle the inclusion agenda in public digital services. They need to be able to **facilitate end-user testing, support, networking with stakeholders' groups**.*

***Digital transformation management capabilities** are critical, to ensure that systems are modernized and integrated.*

32. **The Interoperable Europe Act⁷², effective from April 2024, establishes a framework to enhance cross-border interoperability of digital public services across the European Union.** This act enhances the EIF framework, but while EIF provides a framework and recommendations this act defines mandatory actions for the member states. The regulation mandates public sector bodies to conduct interoperability assessments, ensuring that their digital services can seamlessly interact across member states. Implementing this act necessitates that public administrations develop competencies in interoperability solutions, cross-border data exchange, and compliance with the European Interoperability Framework. Additionally, there is a significant emphasis on capacity building, requiring investment in training programs to equip public sector employees with the necessary digital skills to manage and execute interoperable services effectively. This initiative aims to reduce administrative burdens, facilitate smoother cross-border interactions, and foster a more integrated Digital Single Market.
33. **The Single Digital Gateway⁷³ (SDG) Regulation establishes the legal framework for a European data space, enabling public administrations to exchange information securely and reliably.** It enables access to information, administrative procedures, and assistance services required in another EU country. Following the adoption of this regulation in 2018, national administrations have been developing a network of national portals that explain how EU rules are applied in each country and provide guidance on completing administrative processes digitally. By reducing fragmentation and increasing accessibility, the SDG fosters trust, transparency, and efficiency in public administration.

71. A detailed overview is available here: https://ec.europa.eu/isa2/sites/default/files/eif_brochure_final.pdf.

72. Regulation (EU) 2024/903 of the European Parliament and of the Council of 13 March 2024 laying down measures for a high level of public sector interoperability across the Union (Interoperable Europe Act). Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=OJ:L_202400903.

73. Regulation (EU) 2018/1724 of the European Parliament and of the Council of 2 October 2018 establishing a single digital gateway to provide access to information, to procedures and to assistance and problem-solving services and amending Regulation (EU) No 1024/2012.

34. **The *Once-Only Technical System*⁷⁴ (OOTS) is a key component of the SDG Regulation and facilitates seamless data exchange between national authorities.** It is set up through a specific implementing Regulation ((EU) 2022/1463) which sets the technical and operational specifications of the system. The OOTS aims to ensure that individuals and companies only need to provide information once when interacting with public administrations across EU member states. Projects under this framework focus on developing open standards and cross-border services that leverage advanced technologies such as blockchain, which are critical for modernizing public administrations.
35. **The European Digital Identity Framework⁷⁵ (eIDAS 2.0) requires member states to provide EU Digital Identity (eID) Wallets within 24 months of the adoption of the Implementing Acts⁷⁶.** The five implementing acts were adopted in November 2024. These set out the core functionalities, security standards, and certification requirements for the eID Wallets. The framework strengthens cross-border digital identification, enabling citizens to access public and private services while ensuring high standards of data protection and cybersecurity.
36. **The EU Digital Identity Wallet⁷⁷ (eID Wallet), introduced under the European Digital Identity Framework, addresses the growing need for secure and reliable digital identification.** As more public and private services move online, it ensures EU citizens have a privacy-enhancing way to verify their identity. This tool enables users to securely verify their identities, access online services, store and share digital documents, and create legally binding digital signatures. EU member states are required to offer their own (certified) Digital Identity Wallet application, designed according to common EU-wide standards, ensuring interoperability and security. This will enhance digital governance, making it easier for citizens and businesses to engage with online public services across the EU.



The implementation of eIDAS 2.0 and the EU Digital Identity (eID) Wallets means that public administrations need to develop advanced digital competencies to ensure secure, interoperable, and efficient identity management.

Expertise is needed in **digital identity verification, authentication protocols, and secure access** control mechanisms.

Public administration employees need to enhance their capabilities in **cyber risk management, encryption techniques, and secure data storage** to prevent identity fraud and unauthorized access.

Digital user support skills are crucial for ensuring widespread adoption and usability of eID Wallets. Public sector employees must be trained to assist citizens and businesses in navigating digital identity service.

Cybersecurity and resilience

37. **Cybersecurity is a critical pillar of Europe's digital future. The EU Cybersecurity Strategy⁷⁸ for the Digital Decade, adopted in December 2020, aims to safeguard security and fundamental rights.** It deploys regulatory, investment, and policy initiatives across three areas: resilience and technological leadership, operational capacity for cyber threat response, and international cooperation for a secure

74. Commission Implementing Regulation (EU) 2022/1463 of 5 August 2022 setting out technical and operational specifications of the technical system for the cross-border automated exchange of evidence and application of the 'once-only' principle in accordance with Regulation (EU) 2018/1724 of the European Parliament and of the Council.

75. Regulation (EU) 2024/1183 of the European Parliament and of the Council of 11 April 2024 amending Regulation (EU) No 910/2014 as regards establishing the European Digital Identity Framework. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32024R1183>.

76. The new Regulation establishing a framework for a European Digital Identity builds on the 2014 Regulation on electronic identification and trust services for electronic transactions in the internal market (eIDAS Regulation).

77. Regulation (EU) 2024/1183 of the European Parliament and of the Council of 11 April 2024 amending Regulation (EU) No 910/2014 as regards establishing the European Digital Identity Framework. "revised eIDAS regulation" and "eIDAS regulation" respectively

78. The EU's Cybersecurity Strategy for the Digital Decade, Joint Communication of the European Parliament and the Council, 2020. Available at: <https://digital-strategy.ec.europa.eu/en/library/eus-cybersecurity-strategy-digital-decade-0>.

cyberspace. Supported by an unprecedented investment in Europe's digital transition, it is a key element of *Shaping Europe's Digital Future*, the *Recovery Plan*, and the *Security Union Strategy* (2020-2025), ensuring a more resilient and secure digital economy.



Ensuring compliance with NIS2 in the public sector necessitates both general and specific digital competencies in cybersecurity risk assessment, incident reporting, data protection, and supply chain security. Public administrators must develop proficiency in threat detection, secure information management, and adherence to cybersecurity protocols to safeguard digital infrastructures and maintain cross-border cooperation.

Cybersecurity skills: recognize and handle external threats such as phishing and ransomware mails, malware, MTlx attacks, zero-day attacks, botnets, APT, DDoS, IoT vulnerabilities, etc.

Information security skills: recognize and handle data classification, data breach, credentials loss, etc.

Risk and vulnerability analysis skills: The risk-based approach is inherent in many EU regulations, e.g. AI act, CSA act and GDPR.

38. **The EU Cybersecurity Act (2019/881) sets common standards across EU member states for cyber risk management, certification, and crisis response.** It reinforces the role of European Union Agency for Cybersecurity (ENISA), providing Member States with guidance on cybersecurity capacity-building and good practices. As public administrations expand digital services and manage sensitive data, secure infrastructure and skilled personnel are essential. The Act promotes certification for digital systems⁷⁹ and emphasizes the need for continuous cybersecurity training, ensuring civil servants can prevent, detect, and respond to threats. By promoting certification frameworks and national cybersecurity strategies, the Act indirectly encourages member states to enhance cybersecurity awareness and skills among government employees, ensuring they can effectively identify risks, follow security protocols, and respond to cyber threats.
39. **The NIS2 Directive⁸⁰ (2022) establishes a unified legal framework to strengthen cybersecurity across 18 critical sectors in the EU and requires member states to enhance their cybersecurity capabilities.** The directive became effective in October 2024 and mandates member states to adopt national cybersecurity strategies, enhance risk management, and enforce reporting obligations. The directive expands the scope of cybersecurity rules beyond NIS1, incorporating new sectors such as public administration, digital services, and manufacturing of critical products, while also reinforcing cooperation, supervision, and enforcement mechanisms.
40. **The CRA Act (2024) strengthens the NIS2 Directive, reinforcing the EU's cybersecurity framework.** It sets common cybersecurity requirements for digital products and connected devices. It introduces mandatory security measures throughout the lifecycle of hardware and software products, requiring manufacturers to address vulnerabilities, ensure secure design, and provide timely updates. The Act entered into force on 10 December 2024 and the main obligations will apply from December 2027⁸¹. Public administrations must integrate these standards into procurement and IT governance, requiring competencies in cybersecurity policy, risk assessment, and regulatory compliance. Civil servants are expected to oversee security measures, enforce adherence to EU regulations, and coordinate incident response. Effective supply chain security management is essential to mitigate risks from third-party providers. Strengthening these capabilities within the public administration is key to ensuring resilience and compliance with the CRA.

79. <https://digital-strategy.ec.europa.eu/en/policies/cybersecurity-certification-framework>.

80. Directive (EU) 2022/2555 of the European Parliament and of the Council of 14 December 2022 on measures for a high common level of cybersecurity across the Union, amending Regulation (EU) No 910/2014 and Directive (EU) 2018/1972, and repealing Directive (EU) 2016/1148 (NIS 2 Directive) (Text with EEA relevance). Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32022L2555>.

81. <https://digital-strategy.ec.europa.eu/en/library/cyber-resilience-act>.

Data governance

41. **The General Data Protection Regulation (GDPR)⁸² establishes a uniform legal framework for personal data protection and the free movement of data across the EU.** It strengthens fundamental rights in the digital age while ensuring regulatory clarity for public administrations operating within the digital single market. The Regulation applies since 2018 and ensures harmonization of data protection rules, reducing fragmentation and administrative burdens, requiring public sector institutions to implement transparent, secure, and accountable data processing practices. Ensuring that public sector employees receive training on data protection, cybersecurity, and GDPR compliance is critical.



Ensuring GDPR compliance also requires **specialized digital skills in privacy risk assessment, secure data handling, and rights-based data management**, making it a key regulatory framework for the digital competency development of public sector employees.

42. **The Data Governance Act (DGA) (2022)⁸³ provides a legal framework to promote trusted data sharing across the EU while ensuring compliance with data protection and privacy laws.** It establishes mechanisms to facilitate the reuse of public sector data, promote business-to-business (B2B) data sharing, and encourage data altruism, enabling individuals and organizations to voluntarily share data for the public good. The regulation defines data intermediation services, neutral entities that facilitate secure and transparent data transactions under strict governance and security requirements.
43. **The Data Act (2023)⁸⁴, which will apply from September 2025, complements the DGA by defining who can access and use data and under what conditions.** The Data Act establishes a harmonized framework for fair access to and use of data across the EU. It is a key pillar of the European data strategy. The legal act aims to unlock the value of data by ensuring businesses, consumers, and public administrations can access and share data generated by connected devices while maintaining confidentiality and security. It introduces rules for fair contractual terms, safeguards against abuses of market power, and ensures public sector bodies can access private-sector data for public interest purposes, such as responding to emergencies.



Implementing EU data governance acts, DGA and DMA requires public administrations to develop data governance and compliance skills to manage secure data-sharing frameworks.

Interoperability and **data management expertise** remains essential for handling structured, machine-readable data.

Risk management competencies are needed to protect sensitive data from misuse and breaches.

Regulatory enforcement and market oversight skills are critical for monitoring online platforms, marketplaces, and gatekeepers under the DSA and DMA.

Additionally, **digital literacy and public engagement skills** help build trust in digital services and ensure regulatory compliance.

82. Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 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 (General Data Protection Regulation - GDPR). Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02016R0679-20160504&qid=1532348683434>.
83. Regulation (EU) 2022/868 of the European Parliament and of the Council of 30 May 2022 on European data governance and amending Regulation (EU) 2018/1724 (Data Governance Act). Available at <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32022R0868>.
84. Regulation (EU) 2023/2854 of the European Parliament and of the Council of 13 December 2023 on harmonized rules on fair access to and use of data and amending Regulation (EU) 2017/2394 and Directive (EU) 2020/1828 (Data Act). Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32023R2854&qid=1704709568425>.

44. **Common rules for a “European market for government-held data”⁸⁵ are set by the Open Data Directive (2019)⁸⁶, which covers the reuse of public sector information across the EU.** The directive aims to strengthen, at the level of member states, transparency in public-private agreements and mandates the free provision of high-value datasets in machine-readable formats, covering geospatial, environmental, meteorological, statistical, corporate, and mobility data. In 2023, the Commission adopted an implementing act defining these datasets, supporting AI development, innovation, and the data economy.
45. **The Digital Services Act (DSA)⁸⁷ and Digital Markets Act (DMA)⁸⁸ establish a harmonized legal framework for digital services and online platforms across the EU.** The DSA focuses on creating a safer digital space, setting rules for online intermediaries and platforms such as marketplaces, social networks, and content-sharing services. It introduces stricter obligations for very large platforms with over 45 million monthly users, ensuring transparency, accountability, and protection of fundamental rights. The DMA regulates gatekeeper platforms—large digital companies that control market access—to prevent unfair practices and ensure fair competition in the European Single Market. Together, these laws protect users, promote innovation, and enhance competition while ensuring digital services remain open, fair, and secure across the EU.

Artificial intelligence and emerging technologies

46. **The AI Act⁸⁹ (2024) is the world’s first comprehensive legal framework on artificial intelligence, establishing harmonized, risk-based rules for AI development and deployment across the EU.** The regulation categorizes AI systems into four risk levels—unacceptable, high-risk, limited-risk, and minimal/no risk—with strict obligations for high-risk AI systems used in critical areas such as hiring, healthcare, and public services. It also includes prohibitions on harmful AI practices and requires accountability and transparency for AI-generated decisions. The Act entered into force on 1 August 2024, with full applicability by 2 August 2026, except for some provisions on governance, AI literacy, and high-risk AI systems, which have earlier or extended transition periods.



AI literacy implies:

Technological AI skills, such as understanding AI development, machine learning, and data sources used for training models.

Practical AI skills, which involve the ability to operate AI systems correctly, including knowledge of usage scope, limitations, and precautions.

Ethical AI skills, which focus on recognizing bias, transparency, and societal impacts, ensuring responsible AI use.

47. **Additionally, member states are required to establish AI offices and advisory forums to ensure regulatory compliance.** The EC will conduct annual reviews of the AI Act’s implementation, working with national administrations to ensure consistent oversight and seamless integration into national legal frameworks.

85. <https://digital-strategy.ec.europa.eu/en/policies/legislation-open-data>.

86. Directive (EU) 2019/1024 of the European Parliament and of the Council of 20 June 2019 on open data and the re-use of public sector information (recast).

87. Regulation (EU) 2022/2065 of the European Parliament and of the Council of 19 October 2022 on a Single Market for Digital Services and amending Directive 2000/31/EC (Digital Services Act - DSA).

88. Regulation (EU) 2022/1925 of the European Parliament and of the Council of 14 September 2022 on contestable and fair markets in the digital sector (Digital Markets Act – DMA).

89. Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonized rules on artificial intelligence and amending Regulations (EC) No 300/2008, (EU) No 167/2013, (EU) No 168/2013, (EU) 2018/858, (EU) 2018/1139 and (EU) 2019/2144 and Directives 2014/90/EU, (EU) 2016/797 and (EU) 2020/1828 (Artificial Intelligence Act). Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32024R1689>.

48. **To support public administrations in AI adoption, the EU has launched capacity-building initiatives, ensuring that AI integration aligns with ethical guidelines and regulatory standards.** The *EU AI Alliance*⁹⁰ plays a key role in fostering public dialogue on AI ethics, providing guidance on the responsible development and deployment of AI technologies. Key initiatives include the establishment of a European AI Office to oversee implementation, enforcement, and stakeholder collaboration for trustworthy AI, the AI Innovation Package, meant to support AI startups and SMEs with regulatory guidance and resources, and AI Regulatory Sandboxes, providing controlled environments for testing AI solutions before large-scale deployment⁹¹.

Digital skills initiatives

49. **The Digital Competence Framework for Citizens (DigComp) is a comprehensive tool developed by the European Commission's Joint Research Centre to define the key components of digital competence for individuals**⁹². It outlines 21 competences across five areas: Information and Data Literacy, Communication and Collaboration, Digital Content Creation, Safety, and Problem Solving. These competences are further detailed across eight proficiency levels, providing a structured approach to assessing and enhancing digital skills.
50. **Since its inception in 2010, DigComp has been instrumental in shaping digital skills policies, curriculum development, and the assessment of digital competences** in the education sector and the wider labor market contexts. The framework supports the EU's Digital Education Action Plan 2021-2027, contributing to the broader goal of creating 'A Europe fit for the Digital Age' and aligning with initiatives like Next Generation EU. Its versatility allows for applications ranging from designing competence assessment tools to identifying professional digital profiles.
51. **The latest iteration, DigComp 2.2, released in 2022, includes over 250 updated examples of knowledge, skills, and attitudes that equip citizens to interact with digital technologies.** This version also consolidates existing reference materials and includes annexes focusing on interactions with AI systems and the dynamics of remote or hybrid work environments. These updates ensure that DigComp remains a relevant and practical resource for citizens navigating the complexities of the digital landscape.
52. **DigComp 2.2. includes 5 dimensions.** The conceptual reference model consists of 21 competences organized across key areas (Dimension 1) with titles and descriptors (Dimension 2). Additional dimensions define proficiency levels (Dimension 3), knowledge, skills, and attitudes (Dimension 4), and use cases (Dimension 5), from foundational to highly-specialized skills.

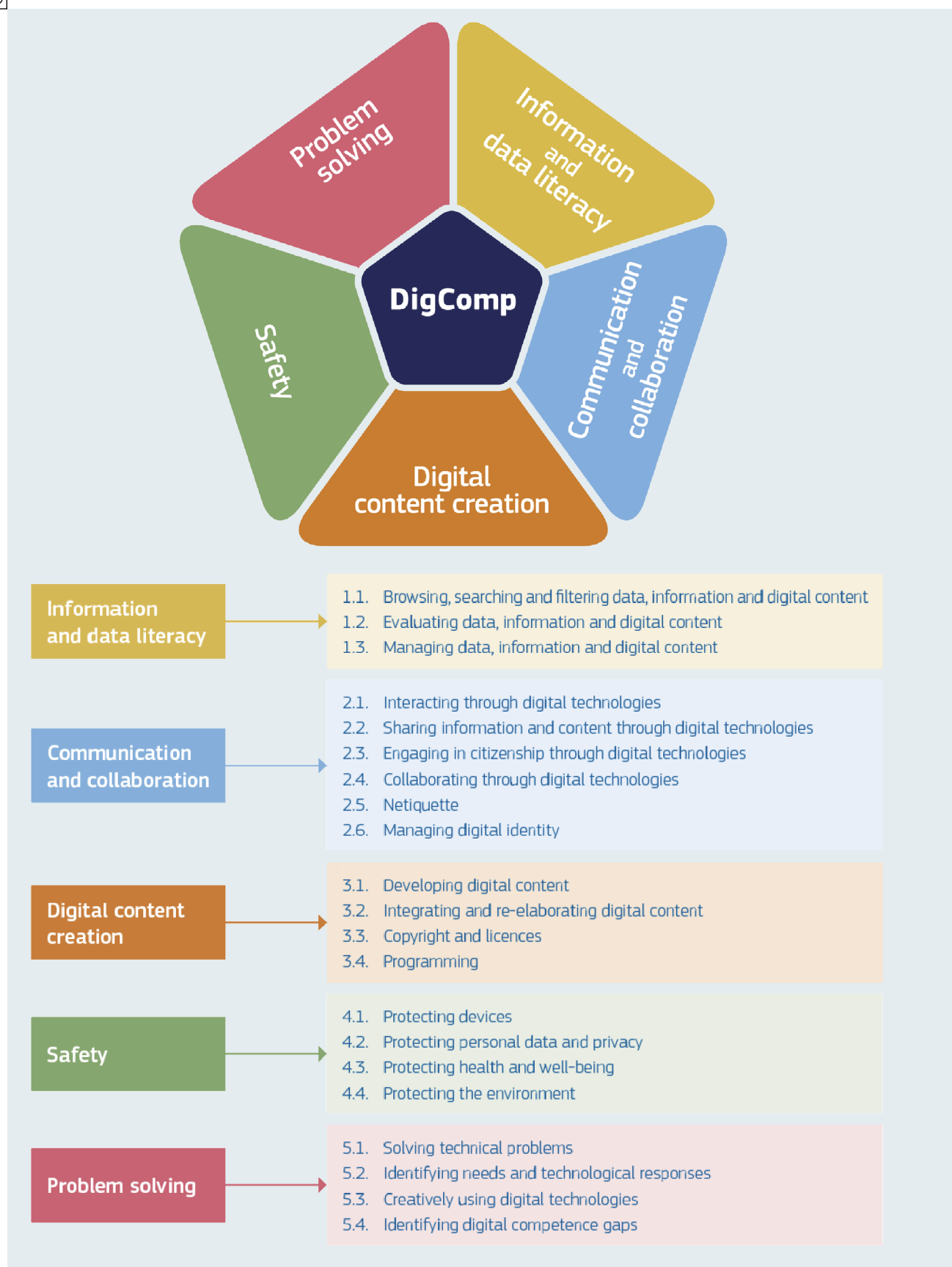
90. <https://digital-strategy.ec.europa.eu/en/policies/european-ai-alliance>

91. <https://digital-strategy.ec.europa.eu/en/policies/regulatory-framework-ai>

92. https://joint-research-centre.ec.europa.eu/scientific-activities-z/education-and-training/digital-transformation-education/digital-competence-framework-citizens-digcomp_en.



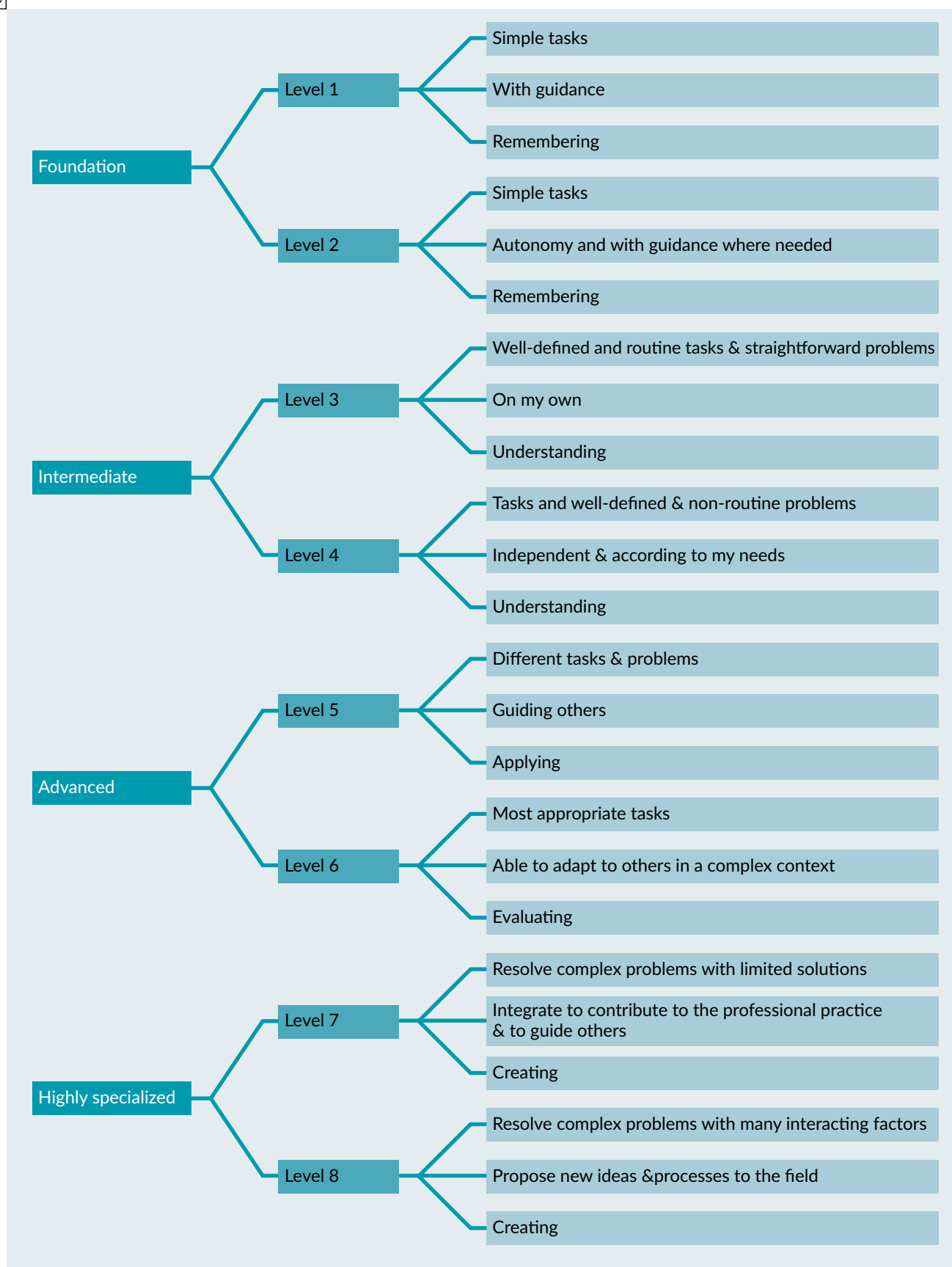
FIGURE 6: DigComp 2.2. framework⁹³



93. Vuorikari, R., Kluzer, S. and Punie, Y., *DigComp 2.2: The Digital Competence Framework for Citizens - With new examples of knowledge, skills and attitudes*, EUR 31006 EN, Publications Office of the European Union, Luxembourg, 2022.



FIGURE 7: Proficiency levels for DigComp 2.2. competences⁹⁴



94. <https://joint-research-centre.ec.europa.eu/system/files/2017-05/digcomp-framework-poster-af-ok.pdf>.

53. **DigComp 2.2 serves as a key reference for EU member states in designing digital skills strategies and training programs, ensuring alignment with evolving technological demands.** The framework is reflected in the policy framework across various member states, supporting individuals in acquiring essential digital skills for work, education, and daily life. In targeted sectors, such as education and public administration, DigComp informs curriculum development, teacher training, and the integration of digital competences into professional development programs. The European Commission monitors the use of DigComp through several assessment tools⁹⁵. *DigCompSat* evaluates individuals' digital skills across five competence areas, piloted in multiple EU countries. The Digital Skills Indicator (DSI) 2.0, aligned with DigComp, tracks digital competence levels across the EU and contributes to the Digital Economy and Society Index (DESI), supporting the EU's 2030 goal, that 80% of adults possess at least basic digital skills. Additionally, the *Digital Skills self-assessment tool*, available via Europass and the Digital Skills and Jobs Platforms, allows individuals to measure and improve their digital competences, promoting lifelong learning and workforce adaptability. Some countries have adapted DigComp to the public administration specificities (as it is for example the case in Spain). **Chapter V** of this report covers the review of relevant international experience and highlights digital competency framework models that are aligned with DigComp 2.2.



DigComp 2.2. serves as a basis for strategies and digital upskilling initiatives for public administration employees.

DigComp 2.2 is the reference framework for defining digital competences needed for the Romanian public administration.

54. **Another policy initiative targeting a specific area of digital skills is the Cybersecurity Skills Academy, launched by the European Commission in 2023⁹⁶.** The initiative addresses the shortage of cybersecurity professionals in the EU by coordinating training initiatives, expanding access to funding, and promoting diversity in the sector. It collaborates with organizations like ISACA⁹⁷ and Fortinet,⁹⁸ offering free resources to students and pledging large-scale training programs. The Academy also promotes common frameworks for defining cybersecurity roles, such as the **European Cybersecurity Skills Framework (ECSF)**⁹⁹, ensuring a standardized approach to cybersecurity competence development. These efforts aim to strengthen the EU's cyber workforce and enhance resilience against evolving threats.

95. https://joint-research-centre.ec.europa.eu/scientific-activities-z/education-and-training/digital-transformation-education/digital-competence-framework-citizens-digcomp/digcomp-based-assessment-and-monitoring-tools_en.

96. <https://digital-skills-jobs.europa.eu/en/cyber-skills-academy-knowledge-and-training>.

97. ISACA is a global professional association and learning organization with 185,000 members who work in digital trust fields such as information security, governance, assurance, risk, privacy and quality. See <https://www.isaca.org/>.

98. Fortinet, Inc. is an American cybersecurity company with headquarters in Sunnyvale, California. The company develops and sells security solutions like firewalls, endpoint security and intrusion detection systems. See: <https://www.fortinet.com/>

99. <https://www.enisa.europa.eu/publications/european-cybersecurity-skills-framework-ecsf>.

2.3

Complementary: OECD policy frameworks and initiatives on digital skills

55. **OECD frameworks on digital transformation and digital skills are relevant for Romania, given the country's accession status.** Over the past five years, the organization has issued a growing number of frameworks, recommendations, and reports, addressing key challenges such as digital upskilling, the future of work, and capacity-building in the public sector. These initiatives provide evidence-based policy guidance to help countries bridge digital skills gaps and prepare individuals for an increasingly digital economy.



*In its assessment of Romania as part of the OECD accession procedure, the OECD conducted a **Digital Government Review**, evaluating the country's efforts to transition towards digital governance. The review provided policy recommendations to support Romania in its digital transformation, focusing on governance structures, public sector capabilities, data-driven approaches, and service design in the digital age. The assessment underscores Romania's commitment to enhancing its digital infrastructure and services in line with OECD standards."*

56. **At strategic level, the OECD Skills Strategy (2019)¹⁰⁰ refers to digital skills as “foundational skills”** The strategy includes a Skills Strategy Dashboard, which provides key policy insights, good practice examples, and strategic recommendations to support the development of relevant skills, effective skills utilization, and the strengthening of skills system governance.
57. **The OECD Framework for Digital Talent and Skills in the Public Sector (2021)¹⁰¹ provides a structured approach to strengthening digital competencies among public sector employees.** Recognizing the increasing reliance on digital tools and services in government, the framework outlines key areas of skill development, including data literacy, cybersecurity awareness, digital service design, and emerging technologies such as artificial intelligence. The document provides targeted recommendations along three pillars:
- I. **Building the right environment for digital transformation**, which requires strong leadership and organizational commitment. Leaders should understand the digital skills needed to keep pace with evolving technologies and clearly communicate the role and benefits of digital government. They should actively participate in digital initiatives, reducing hierarchical barriers and empowering teams to make decisions. A focus on user-centered digital professions and a learning culture that encourages experimentation are crucial. Additionally, organizations should provide the necessary policies, tools, and technologies to support new ways of working, ensuring a sustainable digital transformation in the public sector.

100. OECD (2019), OECD Skills Strategy 2019: Skills to Shape a Better Future, OECD Publishing, Paris, <https://doi.org/10.1787/9789264313835-en>.

101. OECD (2021), OECD Working Paper no. 45, *The OECD Framework for digital talent and skills in the public sector*. Available at: https://www.oecd.org/en/publications/the-oecd-framework-for-digital-talent-and-skills-in-the-public-sector_4e7c3f58-en.html.

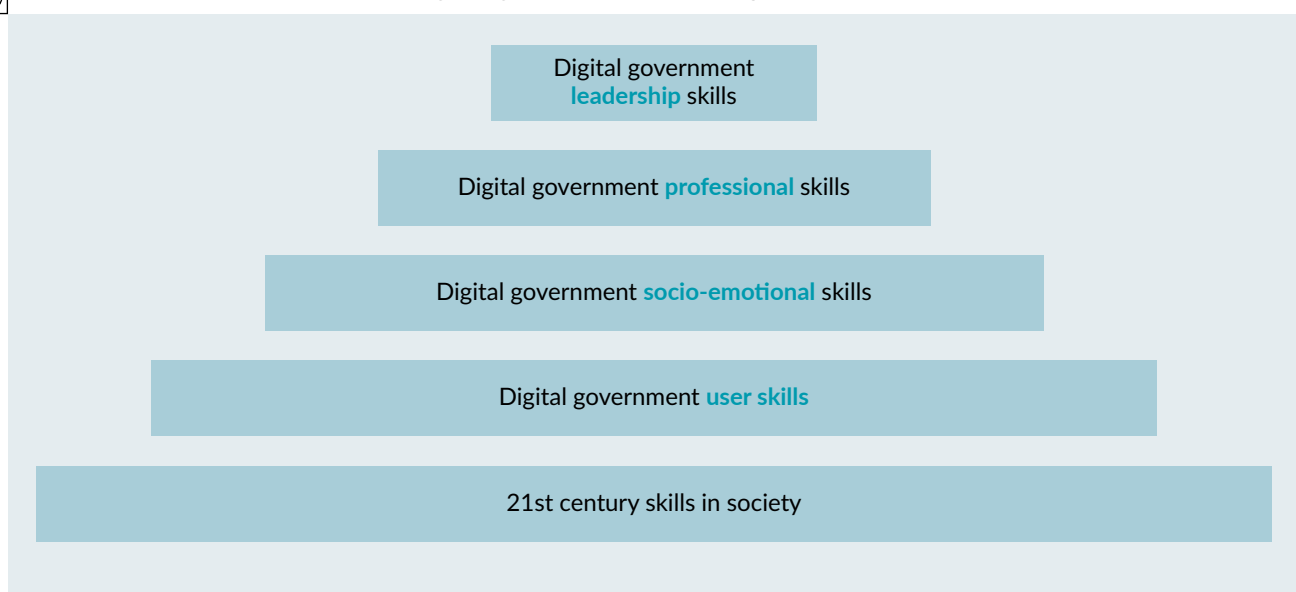
II. Establishing the skills for a digitally enabled state means adopting broader digital skills strategy. Five layers of digital skills are described, as presented in Under Pillar 2 OECD defines five layers of skills necessary for digitally mature government, ensuring that digital transformation is not confined to ICT roles, but is embedded across the entire public sector workforce. The foundation is 21st-century skills in society, which serve as a baseline for digital competence needed across government. Building on this, all public servants—regardless of their role or government level—should possess digital government user skills to understand and apply digital government principles. Beyond basic user skills, socio-emotional skills are essential for fostering collaboration, adaptability, and citizen engagement in a digital environment. At a more specialized level, digital government professional skills are required for those working directly with digital tools and services, ensuring effective implementation and innovation. At the highest level, digital government leadership skills enable decision-makers to champion digital transformation, align strategies, and drive a culture of digital innovation across public administrations..

III. Creating a digital-ready public administration workforce requires proactive recruitment strategies that position the public sector as an attractive employer. Clear career pathways, fair reward systems, and professional development opportunities through multidisciplinary teams are essential. Investing in digital talent means offering mentoring programs, training opportunities, and regular feedback loops.

58. **Under Pillar 2 OECD defines five layers of skills necessary for digitally mature government, ensuring that digital transformation is not confined to ICT roles, but is embedded across the entire public sector workforce.** The foundation is *21st-century skills in society*, which serve as a baseline for digital competence needed across government. Building on this, all public servants—regardless of their role or government level—should possess *digital government user skills* to understand and apply digital government principles. Beyond basic user skills, *socio-emotional skills* are essential for fostering collaboration, adaptability, and citizen engagement in a digital environment. At a more specialized level, *digital government professional skills* are required for those working directly with digital tools and services, ensuring effective implementation and innovation. At the highest level, *digital government leadership skills* enable decision-makers to champion digital transformation, align strategies, and drive a culture of digital innovation across public administrations.



FIGURE 8: Skills to support digital government maturity, OECD¹⁰²



102. OECD (2021), OECD Working Paper no. 45, The OECD Framework for digital talent and skills in the public sector. Available at: https://www.oecd.org/en/publications/the-oecd-framework-for-digital-talent-and-skills-in-the-public-sector_4e7c3f58-en.html

I Introduction	II The EU policy framework	III National strategies, policies and institutional arrangements	IV Job analysis	V International experiences	VI Foresight	VII Conclusions
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With respect to digital government user skills, five key skills areas are highlighted by OECD, as shown in Box 1.¹⁰³



BOX 1: Skills highlighted by OECD for digital government employees¹⁰³

- **Skills needed to understand and leverage the potential of digital for transformation**, which means that public employees should be able to identify and analyze digital transformation examples and opportunities, assess existing processes for improvement, and have access to a network of digital government practitioners for insights and collaboration. They should ensure that new digital initiatives align with broader strategic goals and, if they oversee digital activities, they should ask informed and relevant questions beyond superficial reporting.
- **Skills needed to understanding users and their needs**, which means that public employees should be involved in user research exercises, be able to map end-to-end user journeys, and address digital inclusion challenges by supporting accessibility, connectivity, and 21st-century skills development.
- **Skills for open collaboration for iterative delivery**, which entails skills needed for open collaboration, participatory approaches with users, and work within multi-disciplinary teams. Public employees are expected to understand the iterative delivery process, emphasizing continuous research, prototyping, testing, and learning.
- **Skills related to the trustworthy use of data and technology**, which implies that public servants should have a clear understanding of information security and legal requirements to protect citizen privacy. They should be confident in digital security practices and know the ethical implications of using digital technologies and data.
- **Skills for data-driven government**, which means that public employees should be familiar with data governance frameworks, interoperability, the Once Only Principle, and recognize the value of Open Government Data.

59. **Other key OECD initiatives include the OECD's Going Digital Integrated Policy Framework¹⁰⁴ (2020) and OECD's 2023 Digital Government Index (DGI)¹⁰⁵.** The former highlights digital skills as essential for individuals and societies to benefit from digital transformation. It stresses the need for digital literacy, workforce upskilling, and inclusive access to digital opportunities to drive innovation, employment, and social participation. The DGI framework is meant to support the assessment of governments' digital maturity across six key dimensions. Digital skills are referenced under several dimensions: for example, when assessing the dimension "digital by design", some assessment questions refer to: the *availability of a public sector digital talent/skills strategy* at central/federal level, *core skills covered by training programs on digital government* and *conduction of a need assessment for digital skills* in the public sector.
60. **Lessons learned from international good practices in developing digital skills in government are analyzed by OECD in the recent report *Developing Skills for Digital Government*¹⁰⁶ (2024).** The report presents different approaches within public administrations to build capacities necessary for digital government. A key area analyzed is the use of digital competence frameworks and a key finding is that such frameworks are essential for a strategic approach to digital skills development in government, as they provide a common reference for public administrations. These frameworks support recruitment, skills assessment, training, and workforce planning. Their scope varies — some focus on general digital skills (e.g., DigComp), others on those applicable to digital professionals (e.g., SFIA), and some on organizational needs (e.g., the Danish Model of Digital Skills – see Annex 7). The report acknowledges the importance of expanding the use of self-assessment tools and performance-based tests, to strengthen skills diagnostics, workforce planning and targeted upskilling programs. It is underlined that most public administrations offer short courses, workshops, and on-the-job training, while some provide longer-term programs with formal certifications. Informal learning methods, such as mentoring, coaching, and communities of practice, complement structured training.

103. OECD (2021), OECD Working Paper no. 45, The OECD Framework for digital talent and skills in the public sector. Available at: https://www.oecd.org/en/publications/the-oecd-framework-for-digital-talent-and-skills-in-the-public-sector_4e7c3f58-en.html, pp. 34-42.

104. OECD (2020), "Going Digital integrated policy framework", OECD Digital Economy Papers, No. 292, OECD Publishing, Paris, <https://doi.org/10.1787/dc930adc-en>.

105. OECD (2024), "2023 OECD Digital Government Index: Results and key findings", OECD Public Governance Policy Papers, No. 44, OECD Publishing, Paris, <https://doi.org/10.1787/1a89ed5e-en>.

106. OECD, (2024), *Developing skills for digital government: A review of good practices across OECD governments*, Available at: https://www.oecd.org/en/publications/developing-skills-for-digital-government_f4dab2e9-en.html.

I	Introduction	II	The EU policy framework	III	National strategies, policies and institutional arrangements	IV	Job analysis	V	International experiences	VI	Foresight	VII	Conclusions
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*The review of international experiences conducted by OECD in **Developing Skills for Digital Government** highlights the added value of digital competence frameworks and their role in the systematization of digital skills assessment and development. **DigComp 2.2** is referenced and countries like Italy, Spain, Slovenia are mentioned as successfully applying the framework in the public administration.*

2.4

Selected World Bank initiatives

61. **The *Digital Progress and Trends Report 2023*¹⁰⁷ highlights the transformative potential of digital public infrastructure in enhancing the efficiency, transparency, and accessibility of public services.** Governments worldwide are increasingly adopting digital platforms to streamline service delivery, reduce bureaucratic barriers, and improve citizen engagement. The report highlights the critical role of digital skills for civil servants. These skills cover not only foundational digital literacy skills, but also the ability to leverage digital tools for data-driven decision-making, cybersecurity awareness, and effective communication in a digital environment. The report discusses various training programs and initiatives aimed at enhancing the digital literacy of public sector employees, ensuring they are equipped to navigate and manage the complexities of digital government.



*The World Bank GovTech Maturity Index (GTMI) data for 2022 revealed that there is a **growing interest in improving digital skills and innovation in the public sector, especially in Group A and B economies**, compared to the 2020 version. About 130 economies (65 percent) have digital skills and innovation strategy documents and/or programs, as well as dedicated government entities focused on public sector innovation. However, only about 20 percent of these institutions are publishing public information about the results achieved in these programs.*

62. **The GovTech Maturity Index¹⁰⁸ (GTMI) 2022 Report provides a comprehensive overview of the progress and trends in digital transformation within the public sector across 198 economies.** The GTMI is a comprehensive composite index comprising 48 key indicators, including 40 updated or expanded GovTech indicators and 8 highly relevant external indicators. It measures four components: the Core Government Systems Index (CGSI), the Public Service Delivery Index (PSDI), the Digital Citizen Engagement Index (DCEI), and the GovTech Enablers Index (GTEI). These components collectively provide a detailed snapshot of the state of public sector digital transformation. In 2022¹⁰⁹, fifty-two economies improved to the next level of maturity, while ten economies regressed. Overall, 136 economies (69 percent) remained in their GovTech Maturity Index (GTMI) group compared to 2020. This indicates a significant level of stability in the digital transformation efforts of most economies, with a notable number making advancements. Economies are grouped into four categories based on their GovTech maturity. Group A is for very high GovTech maturity and comprises the GovTech leaders demonstrating substantial progress and good practices in all focus areas. Group B is for high GovTech maturity countries that prove significant GovTech investments and good practices in most focus areas. Group C is for medium GovTech maturity, in countries that have ongoing activities to improve some of the GovTech focus areas. Group D is for low GovTech maturity and includes economies with minimal focus on such initiatives. **In the 2022 report, Romania was placed in group B, together with Bulgaria, the Slovak Republic, while the majority of European countries were in Group A.**

107. World Bank. 2024. Digital Progress and Trends Report 2023. © Washington, DC: World Bank.

108. World Bank, GovTech Maturity Index 2022 Update: Trends in Public Sector Digital Transformation; Washington, DC. World Bank, 2022.

109. Ibidem.

2.5

UNESCO – AI and digital transformation skills for civil servants

63. **The State of Broadband 2024 report¹¹⁰, published by UNESCO and the International Telecommunication Union (ITU), emphasizes the critical role of connectivity in driving socio-economic development.** The report positions broadband connectivity not just as a technological necessity but as a fundamental right essential for accessing education, healthcare, financial services, and participating fully in modern society. The report notes a significant surge in demand for digital government services, driven by citizens' expectations for accessible, efficient, and transparent interactions with government agencies. In response, governments are shifting from traditional, reactive service delivery models to proactive, citizen-centric approaches. This involves anticipating citizen needs and providing personalized services through digital platforms. The implementation of foundational digital products — such as universal digital identities — enables seamless access to a range of government services. For instance, with a secure digital identity, a citizen can file taxes online, apply for permits, or access social welfare programs without the need for in-person visits or cumbersome paperwork. Moreover, the report emphasizes the importance of inclusivity in digital government initiatives. This requires investing in accessible design and multilingual platforms to overcome barriers to adoption.
64. **The citizen-centric digital government described in the above-mentioned report requires public administration staff to have digital competencies which, although not explicitly stated, are essential:** digital service design skills to create accessible, user-friendly platforms, along with expertise in digital identity management to enable seamless service access. Cybersecurity and data privacy competencies are crucial to protecting citizen data, while interoperability skills ensure efficient integration of digital services. Understanding AI and automation helps optimize public service delivery, while digital leadership and change management drive institutional transformation. Additionally, citizen engagement and digital communication skills are essential for ensuring transparent, inclusive, and responsive governance. These competencies enable governments to leverage broadband connectivity for efficient, secure, and inclusive digital public services.
65. **UNESCO's 2022 Report on Artificial Intelligence and Digital Transformation Competencies for Civil Servants proposes three competency domains, with three proficiency levels.** The report identifies several challenges hindering digital transformation in the public sector, such as cultural and organizational barriers, inadequate data infrastructure, and significant gaps in human resource capacities. Addressing these challenges is essential for creating an enabling environment that fosters inclusive and equitable digital transformation. The report underlines a set of digital competencies which were identified as common across various digital competency frameworks: digital leadership, literacy, data-driven approaches, AI, open data, and people-centric service design. In addition, emerging skills such as systems thinking and strategic foresight were also seen as crucial. These competencies were distilled into three competency domains: (i) Digital planning and design, which focuses on problem identification and agile strategy for inclusive digital transformation; (ii) Data use and governance, which emphasizes data-driven policymaking, digital literacy, and privacy protection; and (iii) Digital

110. ITU and UNESCO. 2024. The State of Broadband 2024: Leveraging AI for Universal Connectivity.

management and execution, which highlights agile methods and iterative improvements in digital service delivery. Attitudes are also integrated (Digital attitudes highlighted by UNESCO's Broadband Commission).



BOX 2: Digital attitudes highlighted by UNESCO's Broadband Commission

UNESCO's Broadband Commission proposes five attitudes as integral part of the AI and Digital Transformation Competency Framework:

1. *Trust.* Civil servants must be able to share information, collaborate effectively, and build long-term relationships based on trust. Trust also plays a crucial role in data governance, ensuring that AI and digital solutions are used transparently to maintain public trust in government institutions.
2. *Creativity.* Creativity enables civil servants to generate innovative ideas, overcome obstacles, and improve digital services.
3. *Adaptability.* Adaptability is essential in fast-changing digital environments, where civil servants must respond to unexpected challenges, test new solutions, and refine policies. Adaptable civil servants can challenge outdated processes, adjust strategies quickly, and integrate new technologies effectively.
4. *Curiosity.* Civil servants with a curious mindset seek innovative practices from other sectors and countries, engage with external stakeholders, and leverage global knowledge.
5. *Experimentation.* A culture of experimentation reduces fear of failure, promotes innovation, and accelerates the adoption of effective digital solutions.

66. **UNESCO's AI and Digital Transformation Competency Framework model includes attitudes as a critical component.** These are essential, as attitudes shape how civil servants engage with technology, adapt to change, and drive digital transformation. Beyond technical skills, a proactive mindset is essential for navigating complex digital environments, fostering innovation, and ensuring user-centered service delivery. Civil servants need to be open to change, willing to experiment, and committed to continuous learning to effectively implement digital initiatives.
67. **Evidence shows that civil servants should not be expected to become technology experts, but be able to understand and use technologies to develop policies and deliver public services.** The abovementioned report underlines that civil servants should have a basic understanding of key technologies, stay informed about emerging trends, leverage digital tools in their work, and provide strategic direction for digital governance initiatives¹¹¹ (Figure 9).¹¹²



FIGURE 9: Digital competencies for civil servants - the general focus¹¹²

Civil servants need to understand the impact of technologies - not to become specialists

Code & Code Law	How does software code work? How does code create defaults and rules that constrain or enable users ? How do patents apply to code?
Machine Learning	How can a machine learn? What problems is machine learning good or bad for? What impact will machine learning have on employment?
Open Source	What does being open-source mean? How do co-creation communities work? Should governments use open-source software? What are the benefits or drawbacks?
Social Media	Has social media decentralized power? Can it enable the public to connect, or hold public institutions accountable? Can governments regulate or leverage social media?
Platforms	How can governments foster better platform governance? Do they regulate them? What is the impact of private platforms on human rights, regulatory regimes, competition, and the economy?

Source: Adapted from Harvard <https://medium.com/digitalhks/teaching-digital-at-the-kennedy-school-of-government-a-road-map-part-4-3504cf4534bc>

111. UNESCO's Broadband Commission for Sustainable Development (2022), *Artificial Intelligence and Digital Transformation Competencies for Civil Servants*. Available at: <https://unesdoc.unesco.org/ark:/48223/pf0000383325>, p. 15.
112. UNESCO's Broadband Commission for Sustainable Development (2022), *Artificial Intelligence and Digital Transformation Competencies for Civil Servants*. Available at: <https://unesdoc.unesco.org/ark:/48223/pf0000383325>.

2.6

Key takeaways: how EU-level policies and other international initiatives impact digital skills in the public administration

68. **The EU and other international organizations such as the EU, OECD, World Bank, and UNESCO recognize in adopted strategic frameworks that digital proficiency in public administration is a prerequisite for modern governance.** Strategies such as the *EU's Digital Decade 2030* and the *OECD's Going Digital Framework* explicitly emphasize the need for equipping civil servants with digital competencies. Romania's public administration is not only navigating its digital transformation guided by these strategic frameworks, but they also offer valuable insights into the competencies that its civil service will require in the future.
69. **At the same time, EU legislation — such as the GDPR, AI Act, NIS2 Directive, and Interoperable Europe Act — impose specific compliance requirements** that demand targeted digital competencies across all levels of government. As Romania aligns with EU digital policies and legal frameworks, strengthening the digital competencies of public sector employees is essential for ensuring regulatory compliance, operational efficiency, and adaptability to emerging technologies.
70. **The EU has adopted over the past three years several significant digital acts, which have implications for the digital skills of public administrations across EU countries.** This recent legislation - such as the Digital Services Act (DSA) and the Digital Markets Act (DMA) in 2022, the Artificial Intelligence Act (AI Act) in 2024, and the Cyber Resilience Act in 2024 - aim to enhance online safety, ensure fair competition, establish comprehensive AI governance, and improve cybersecurity standards across member states. For Romania's public administration, this rapidly evolving legislative landscape necessitates the development and implementation of a robust general digital competency framework. In addition, specialized skills in areas such as AI ethics, data governance, cybersecurity protocols, and digital market regulations are needed, to effectively implement the EU legislation. This approach ensures compliance with EU standards and will also equip the Romanian public sector to proactively address emerging digital challenges.
71. **While acknowledging the importance of a set of foundational digital skills, relevant EU and international policies and initiatives reveal the need to further differentiate digital competencies based on public administration roles, rather than applying a uniform approach across the civil service.** While foundational skills — such as basic digital literacy, cybersecurity awareness, and information management — are essential for all civil servants, specific roles, on the other hand, require additional distinct competencies. The rapid pace of digital transformation requires public administrations to build a workforce that can adapt, respond, and innovate in various ways according to their roles. Competency frameworks should be designed to ensure that digital skills are relevant, practical, and aligned with the needs of the different roles. Policymakers need strategic and regulatory digital skills, service delivery professionals require operational digital skills aligned with the needs of citizen-focused digital service delivery, IT specialists should develop advanced technical expertise, and digital leaders should focus on strategic foresight and change management. The *OECD Framework for*

Digital Talent and Skills in the Public Sector emphasizes the importance of differentiating between generalist, specialist, and leadership profiles. Similarly, UNESCO's *Artificial Intelligence and Digital Transformation Competency Framework for Civil Servants* identifies three key competency areas: digital planning and design, data use and governance, and digital management and execution.

72. **For example, service delivery necessitates digital competencies to ensure secure and efficient interactions between government, businesses, and citizens.** User-centered service design, data protection awareness, and cyber risk management are essential. For instance, the Single Digital Gateway Regulation requires civil servants to implement digital procedures that allow citizens and businesses to access administrative services across EU borders seamlessly. Understanding basic principles of interoperability requirements and foundational skills related to ensuring digital accessibility are necessary for example to comply with the Web Accessibility Directive¹¹³ and ensure that digital public services are inclusive. Additionally, data governance competencies are vital for implementing the Once-Only Principle, which enables citizens and businesses to submit data only once to public administrations, reducing administrative burdens.
73. **Digital leaders and senior managers play a pivotal role in driving the digital transformation forward.** Their competencies extend beyond technical knowledge to include digital strategy development, project and change management, and cross-sector collaboration. Some digital leadership roles need to be specialized (such as leaders overseeing national cybersecurity efforts, who need to understand the requirements of the NIS2 Directive and ensure that risk management frameworks are in place for securing government IT infrastructure).
74. **IT specialists in the public administration need advanced technical competencies to plan, develop and manage digital infrastructures, protect sensitive data, and implement EU regulatory standards.** This includes expertise in cybersecurity, AI development, cloud computing, and big data analytics. For example, under the Cyber Resilience Act, public sector IT professionals have to implement security-by-design principles in software and digital systems to mitigate cyber threats. Similarly, under the Interoperable Europe Act, IT teams should develop and maintain semantic interoperability standards to facilitate seamless cross-border data exchange between EU institutions.
75. **In practical terms, to keep pace with the EU digital initiatives, Romania's public administration needs a digitally competent workforce with a broader range of foundational general digital skills.** Beyond classical digital literacy core competency areas, public employees need to be able to work ethically with AI tools, ensure security, data privacy and compliance with interoperability standards, and effectively contribute to digital service management. Focus areas include: (i) a general understanding of the key pillars of the EU digital strategic and legal framework, enabling civil servants to interpret legislation and translate it into actionable national policies; (ii) skills in national strategy and policy development in the digital area, encompassing the design, implementation, monitoring, and evaluation of digital governance and sectoral strategies; (iii) AI literacy and the ethical use of technology, ensuring civil servants can work with AI-driven tools while safeguarding transparency and accountability; (iv) security awareness, particularly the capacity to identify and mitigate cybersecurity threats within digital public services; (v) knowledge of data protection and GDPR compliance, critical for managing personal data responsibly and upholding citizens' privacy rights; (vi) familiarity with interoperability principles and user-centric service design, including practices like the Once-Only Principle and service journey mapping to reduce administrative burden; (vii) the ability to understand and work with digital public infrastructure, such as digital identity systems; and (viii) expertise in specialized and emerging technology areas, relevant for roles in institutions leading digital transformation efforts.

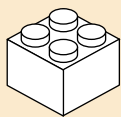
113. Directive (EU) 2016/2102 on the accessibility of the websites and mobile applications of public sector bodies. Available at: <https://digital-strategy.ec.europa.eu/en/policies/web-accessibility-directive-standards-and-harmonisation>.

BOX 3: Key competency areas derived from the review of the EU strategic framework

- *General understanding of key pillars of the EU digital strategic and legal framework:* civil servants should possess skills to process EU legislation, and be able to distill implications for national agendas and strategies.
- *National strategy and policy development skills in the digital area:* civil servants need expertise in designing, implementing, monitoring and evaluating digital governance strategies and sectoral strategies that include digital components, ensuring a coherent and integrated approach to public digital infrastructure.
- *AI literacy and ethical use of technology:* preparing civil servants to implement AI-driven solutions while upholding transparency and accountability.
- *Security awareness:* equipping employees with knowledge to identify and mitigate risks associated with cyber and information security threats in digital public services.
- *Data protection and GDPR compliance:* civil servants should be equipped with knowledge of secure data handling and compliance with citizen privacy rights.
- *Interoperability and user-centricity:* civil servants should possess knowledge regarding interoperability principles and layers, fostering, among other, openness, transparency, security and privacy, inclusion, and reducing the administrative burden on citizens and businesses e.g. through the Once-Only Principle or service journey mapping.
- *Understand and be able to work with digital public infrastructure:* for example, civil servants supporting Digital Identity Management and digital signature systems such as Romania's digital identity system (ROeID), SDGR/OOTS and the EU Digital Identity Wallet to enhance national and cross-border digital service integration.
- *Specialized roles should be defined in key institutions managing the digital transformation process, with skills in advanced and emerging cross-cutting topics and technologies,* such as blockchain, digital twins, advanced biometrics.

76. **The EU and other international policy frameworks analyzed also prove that attitudes are just as critical as technical skills in enabling digital transformation.** Digital competencies should also include **adaptability, openness to innovation, and a user-centric mindset**. Public servants should be open and willing to engage in continuous learning, as digital policies and technologies evolve rapidly. Policymakers should cultivate a future-proof regulatory mindset, by anticipating emerging risks in AI and data governance. Service delivery professionals should embrace citizen-centered design thinking, ensuring digital platforms meet user needs. Digital leaders should drive institutional innovation, fostering an environment that encourages experimentation with new technologies, such as blockchain-based services.
77. **Competency frameworks such as DigComp and UNESCO's Artificial Intelligence and Digital Transformation Competency Framework for Civil Servants emphasize the importance of digital mindset and soft skills.** DigComp 2.2, for example, emphasizes that attitudes are as crucial as knowledge and skills in fostering digital competence. UNESCO's framework emphasizes five attitudes, underlining that civil servants should build trust by ensuring transparency and accountability in digital systems, foster creativity to develop innovative solutions, demonstrate adaptability to evolving technologies, cultivate curiosity to stay informed about emerging digital trends, and embrace experimentation to test new approaches and learn from both successes and failures. These attitudes complement technical knowledge and skills, enabling individuals to navigate the digital landscape effectively and responsibly.
78. **The alignment with established digital competency models - such as DigComp for general digital literacy, e-CF and ECSF for ICT specialists, and UNESCO's AI and digital transformation competency framework — will provide a solid foundation for the design process of the general digital competency framework.**

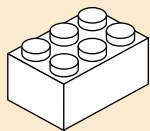
III. National strategies, policies and institutional arrangements for digital competencies in the public administration



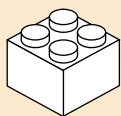
59 Scope of the review and methodological approach



62 Key institutional roles



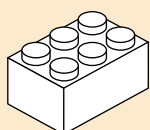
69 Vision and initiatives impacting digital competencies in the public administration



78 Digital skills initiatives in the public administration



82 Baseline legal framework on digital competencies in the civil service



90 Key takeaways informing the design of a digital competency framework and its institutionalization mechanisms

3.1

Scope of the review and methodological approach

79. **The review of Romania's national digital strategic and policy framework aims to identify digital competency areas¹¹⁴ for the public administration to support the country's digital advancement.** The objective was to discern digital skills that are critical for civil servants to support the broader national and EU priorities. The review was approached based on a mapping of key digital initiatives, strategies, and policy measures. The findings are meant to inform the development of a future digital competency framework¹¹⁵ that is both practical and adaptable to Romania's evolving public administration landscape.
80. **Methodologically, the review of the national strategic and policy framework was based on an expert analysis of key strategies, institutional strategic plans¹¹⁶ and relevant legislation.** Relevant national strategies and legislation were analyzed to map the key institutional roles and responsibilities related to digital skills development and governance. Relevant initiatives for mapping and developing digital skills in the public administration were also included in the analysis, to provide a baseline for the design phase of the future digital competency framework model.
81. **This review is not intended to be a stand-alone comprehensive stock-taking of Romania's digitalization efforts, but a targeted analysis of the main strategic initiatives.** As such, the scope of this review focuses on the primary strategies relevant to the digital domain, including sectoral strategies that have specific objectives in the area of digitalization. The mapping exercise did not aim to exhaustively cover all strategic documents at national and sectoral level, including action plans and policy measures, but its purpose was to identify key areas and reform pillars that rely or have an impact on the digital competencies of public administration employees.
82. **As shown in the review of the strategic framework at the EU level, major reforms efforts at national level in digitalization are driven by the EU.** Therefore, where possible, these initiatives were analyzed not only in the national context but also in relation to the broader EU framework, recognizing that digital transformation efforts are heavily influenced and supported by EU strategies, regulations, and funding mechanisms, particularly through the National Recovery and Resilience Plan (NRRP).
83. **In addition, the review focuses on identifying key institutional roles in digital government and competency-based management in the public administration.** The general overview of institutional roles shows how different government bodies contribute to digital governance and digital skills development. By examining their mandates and interactions, the review highlights potential gaps, overlaps, and opportunities for better coordination. This approach ensures that future responsibilities

114. Following the DigComp approach.

115. Which is expected to be proposed in Output 2 under the TSI component *Developing a general digital competency framework for civil servants in Romania*.

116. In the Romanian context, institutional strategic plans are strategic management instruments used to ensure policy and budget planning alignment at the institutional level. They are used as implementing, monitoring and evaluating instruments for sectoral, multi-sectoral or cross-sectoral strategies.

for digital skills development will be more clearly distributed across government, fostering a more structured and consistent implementation of digital competency initiatives.

84. **Also, the review includes a dedicated section on current strategic initiatives for developing digital skills within the civil service.** This mapping briefly describes the key frameworks and programs that can inform the design of a digital competency framework, by identifying key areas of focus, funding mechanisms, and institutional efforts aimed at strengthening digital competencies among public employees. Documenting good practices and lessons learned at national level ensures that Romania's efforts to enhance digital skills for the public administration builds on existing efforts.
85. **The main strategies and plans covered by the review set the national vision for digital transformation, a vision that is anchored in EU-level strategies to enhance public service delivery, cybersecurity, and digital inclusion.** The government's efforts focus on modernizing administrative processes, ensuring interoperability, and leveraging technologies like artificial intelligence to improve efficiency and transparency. A key driver of the strategic planning process remains the EU programmatic funding mechanisms, with the NRRP constituting an umbrella program with a sizeable part of its measures focused on digital. In addition to national strategies, Institutional Strategic Plans of line ministries were analyzed to distill sector-specific digital initiatives, which are expected to be derived upstream from the NRRP. These plans provide valuable insights into how institutions translate national and EU-level digital priorities into actionable programs and investments at the sectoral level. The key strategies, policy documents, and institutional plans analyzed include:
- *The NRRP*,¹¹⁷ which plays a central role in Romania's digital strategy, allocating funds to e-governance development, cybersecurity, and the integration of digital technologies in public administration. Component C7 of the plan emphasizes interoperability and creating an integrated digital public services architecture.
 - *Government Cloud Infrastructure Legal framework and Strategy*,¹¹⁸ which establishes the legal and operational framework for the centralized Government Cloud, a critical infrastructure component that will standardize and secure digital services across all public institutions.
 - *National Digital Decade Action Plan (PNADD)*¹¹⁹. This programmatic document aligns Romania with the EU Digital Decade 2030 goals, ensuring a structured roadmap for full digitalization, digital skills development, and infrastructure investments. This document sets objectives for a fully digitized government by 2030; for nationwide broadband expansion and 5G deployment; and for bridging the digital skills gap in public administration.
 - *The National Strategy on Artificial Intelligence (2024-2027)*, which supports AI integration in government operations, focusing on standardization, regulation, and responsible AI use. This strategy aims to enhance administrative efficiency and improve digital service delivery while aligning with European AI governance principles.

117. Available at <https://mfe.gov.ro/pnrr/>.

118. The Strategy was approved by GD 112/ 2023 on the approval of the Government Cloud Platform Governance Guidelines – issued to provide the necessary implementation guidance for the provisions of the GEO 89/ 2022 on the establishment, management and development of cloud computing infrastructures and services used by public authorities and institutions.

119. Strategic framework established by EU member states as part of the broader Digital Decade Policy Programme. Each member state is required to submit a national roadmap to the EC that outlines the specific measures, policies, and actions that the country intends to implement to contribute to the overarching European digital objectives and targets. The EC monitors the progress of these national plans and submits annual reports to the European Parliament and Council regarding the state of the digital decade.

- *The Public Policy in eGovernment (2021-2030)*¹²⁰ focuses on improving digital public services by increasing their sophistication and accessibility. The policy sets ambitious targets to enhance digital interactions between citizens and government, aiming to reach full online service capabilities by 2030.
- *The National Cybersecurity Strategy (2022-2027)*,¹²¹ which focuses on strengthening Romania's digital infrastructure security against cyber threats.
- *The National Strategic Framework for Digital Innovation Centers (2024-2027)*,¹²² which supports both the public and private sectors, providing SMEs and institutions with access to digital tools, training, and funding opportunities.
- *Law No. 242/2022 on Interoperability*¹²³ which will ensure real-time data exchange between government institutions, reducing bureaucracy and improving service delivery.
- *Smart Growth, Digitalization, and Financial Instruments Program (POCIDIF)*,¹²⁴ POCIDIF complements NRRPNRRP by supporting digital innovation in both public and private sectors.
- *Institutional Strategic Plans 2025-2028* for the central public authorities.¹²⁵

86. **The review also includes an analysis of the current national legislation on digital skills¹²⁶ to inform the future recommendations on introducing and institutionalizing digital competencies.** The purpose was to map how key concepts related to general and specific digital skills are already defined, how they are used in selected HR processes, how certification requirements are formulated in the present framework. These findings provide the basis for the future recommendations that will be formulated under Output 3 of the TSI project, to facilitate the operationalization of the future digital competency framework.

120. Available here: <https://sgg.gov.ro/1/wp-content/uploads/2016/04/Propunere-de-politica-publica-in-domeniul-e-guvernarii-adoptata-3-iun-2021.pdf>.

121. GD 1321/ 2021 on the approval of the Cybersecurity Strategy of Romania for the period 2022-2027 and the Action Plan for the implementation of the Cybersecurity Strategy of Romania for the period 2022-2027. Available here: <https://legislatie.just.ro/Public/DetaliuDocumentAfis/250128>.

122. GD 1166/ 2024 on the approval of the National Strategy for the development and support of digitization through digital innovation centers in Romania 2024-2027. Available here: <https://legislatie.just.ro/public/DetaliuDocument/288969>

123. Law 242/2022 on data exchange between information systems and the creation of the National Interoperability Platform. Available here: <https://legislatie.just.ro/Public/DetaliuDocumentAfis/257856>.

124. Available here: <https://mfe.gov.ro/pocidif/despre-programul-pocidif/>.

125. Available here: <https://sgg.gov.ro/1/planuri-strategice-institutionale/>.

126. Including the general competences framework, as reflected in the Administrative Code. Available here: <https://legislatie.just.ro/Public/DetaliuDocument/215925>.

3.2

Key institutional roles

87. **This section focuses on a set of key institutional actors, specifically targeting those expected to play a significant role in the oversight and implementation of the digital competency framework.** The mapping aims to establish a baseline understanding of key institutions and their constraints. This will serve as a reference for future recommendations on the implementation and operationalization of the digital competency framework (Output 3 under the TSI project). Mapping these stakeholders provides critical insights into the contextual factors — such as institutional capacities, collaboration dynamics, and operational challenges — that influence current digital transformation efforts and could impact future implementation of the digital competency framework and of the specialized ICT roles.

Key institutional roles in digital transformation

88. **Romania's digital transformation governance is supported by several key entities tasked with coordinating public administration digitalization projects and measures.** At the forefront is the Committee for e-governance and red tape reduction (*Comitetul pentru e-guvernare și reducerea a birocrăției* - CERB), chaired by the Prime Minister and comprising representatives from 29 public institutions¹²⁷. Despite being an inter-ministerial body without legal personality, CERB is responsible for ensuring a coherent implementation of digital government policies, fostering inter-ministerial coordination for electronic public services, and establishing compliance frameworks for technical standards and regulations. Its high-level oversight aims to promote alignment and reduce fragmentation in digital transformation efforts across the public sector.
89. **The Technical-Economic Committee (CTE)¹²⁸, led by ADR, plays a technical and monitoring role in implementing national digital transformation policies.** It focuses on ensuring system interoperability, avoiding duplication of funding, and preventing functional overlaps in ICT projects. Key responsibilities also include endorsing technical projects, feasibility studies, and procurement documentation for ICT components, ensuring their compliance with national ICT and cybersecurity strategies, and evaluating the implementation of national ICT strategies across the public administration. The CTE operates through a two-tier structure comprising senior government officials and technical experts from ADR and other relevant institutions. By reviewing and providing recommendations for proposed projects from central and local government institutions, the CTE serves as a crucial platform for assessing and guiding digital initiatives. In addition, in the context of the implementation of Romania's NRRP, a dedicated Task Force for Digital Transformation was set up,¹²⁹ responsible for the Implementation and Monitoring of Reforms and Investments. The Task Force is expected to oversee and manage the implementation of large IT projects under the responsibility of the parent ministry responsible for digitalization.

127. As per Prime Minister's decision no. 331/2021, as amended and updated in 2024. The initial configuration included 27 members.

128. Set-up through GD 941/2013. CTE is subordinated to ADR.

129. As per GEO 30/ 2022 on measures to strengthen the institutional and administrative capacity of the Ministry of Research, Innovation and Digitization and the Authority for Digitization of Romania necessary for the implementation of Component C7 - Digital Transformation of the National Recovery and Resilience Plan, and other categories of measures. Available at: <https://legislatie.just.ro/public/DetaliiDocument/253157>

90. **ADR holds critical responsibilities in the digital transformation process.** At top level, the Ministry of Economy, Digitalization, Entrepreneurship and Tourism (MEDET) has taken over the mandate for digital policies from the Ministry of Research, Innovation and Digitalization at the end of 2024. The parent ministry ensures policy coordination in areas such as communications, cybersecurity, and digitalization. Subordinated to the MEDET, ADR plays a key strategic and policy role. ADR was set up in 2020 and was tasked with driving the digital government agenda, managing eGovernment platforms like the Electronic Public Procurement System (SEAP),¹³⁰ and ensuring national and European-level interoperability. ADR is responsible for developing and implementing strategies for digital transformation and the information society, as well as for contributing to the creation of legal and institutional frameworks, including for ensuring interoperability of public sector IT systems. ADR represents the government in national, regional, European, and international organizations and acts as a state authority to monitor and enforce compliance with regulations. It also manages administrative tasks, promotes, coordinates, monitors, and evaluates digital policies and the national interoperability framework.
91. **Other key institutions include: the General Secretariat of the Government (GSG), the Ministry of Investments and European Projects (MIPE) and the National Directorate for Cybersecurity (DNSC).** GSG has a broad mandate for supporting the alignment of strategic public administration goals. MIPE manages EU funds for digital initiatives. DNSC is responsible for ensuring the availability, security, confidentiality, integrity, and resilience of Romania's national civil cyberspace by collaborating with relevant institutions and establishing strategies, policies, and regulations to support the country's cybersecurity vision. Among other, it is also tasked with creating a national framework for cybersecurity training and certification¹³¹, in collaboration with relevant national institutions. Additionally, eight Regional Development Agencies (RDAs)¹³² play a key role in implementing regional digitalization measures, contributing to the broader objectives of digital transformation in public and private sectors.
92. **Recent assessments of the digital government in Romania highlight challenges related to fragmented governance and unclear institutional roles.** Digital government planning in Romania is driven by collaboration between CERB under the Prime Minister's Office and the ADR under the coordination of the MEDET. However, OECD's recent assessment¹³³ highlighted that this governance structure faces challenges, including unclear roles, limited coordination with other public institutions, and inefficiencies in managing digital government investments. Key decision-making mechanisms supporting digital transformation could be further enhanced and streamlined. For example, the OECD recommended that decisions taken by the existing investment governance mechanisms (CERB and CTE) should be binding already from early stages for funding allocation and financial mechanisms in place, including those stemming from Romania's EU membership¹³⁴.
93. **The ADR, focused on technical assistance, assesses and approves investments via the CTE; clearer coordination mechanisms between ADR and CERB could help align technical and policy efforts more effectively.** These issues are compounded by a technical focus that limits strategic oversight of digital investments, unclear prioritization criteria for ICT projects, and insufficient collaboration with the National Agency for Public Procurement (NAPP)¹³⁵. Additionally, while the ADR has a legal mandate to monitor and evaluate digital policies, there is no comprehensive framework for tracking implementation, performance, or cross-organizational progress.

130. Available at: <https://e-licitatie.ro/pub>.

131. In accordance with art. 4 (e) and (f) of EGO 104/2021.

132. Established by Law 315/2004 on regional development in Romania. Available here: <https://legislatie.just.ro/Public/DetaliuDocument/53040>

133. OECD (2023), Digital Government Review of Romania: Towards a Digitally Mature Government, OECD Digital Government Studies, OECD Publishing, Paris, <https://doi.org/10.1787/68361e0d-en>, p. 15.

134. Ibidem, p. 45.

135. Ibidem, pp. 14-15.

94. **Despite the absence of a national digital transformation strategy, ADR de jure plays a central role in shaping the digital transformation efforts for Romania's central public administration.** Supported by both the regulatory framework and a substantial portfolio of projects, ADR is strategically positioned to assess digital investment needs and secure funding for public administration digitalization. To enhance its impact, ADR's positioning and capabilities should be developed to ensure its ability to lead digital transformation efforts and drive the adoption of digital government policies. The role and capacity of ADR to manage key digital projects should be reinforced, overseeing strategy, planning, budgeting, and execution.

Key institutions mandated for digital competencies in the public administration

95. **On HRM, the institutional responsibilities in the Romanian public administration are split among multiple institutions; NACS plays the central role in managing the civil service and advancing the HRM reform agenda.** Key institutional actors include the Ministry of Regional Development and Public Administration (MRDPA), NACS, the Ministry of Labor, Family, Youth and Social Solidarity (MLFYSS), GSG, INA, the Labor Inspection, and the Ministry of Finance (MF). A comprehensive Baseline Diagnosis of the HRM system and of institutional roles in the public administration was conducted by the Bank in 2019, mapping the roles of the main institutional actors, highlights gaps and overlaps¹³⁶.
96. **GSG is responsible for policy coordination within Romania's central public administration.** As the institution responsible for ensuring the coherence of government policies and administrative reforms, the SGG provides strategic oversight and guidance on civil service policies and capacity development, including digital transformation reform initiatives. It was also a key driver of foundational HRM reforms, supporting NACS' efforts in developing a general competency framework as the backbone of the civil service reform processes that are underway¹³⁷.
97. **MRDPA is responsible for developing public administration policies and strategies,** however its organizational focus is primarily on decentralization and oversight of the overall strategic and legal framework on HRM. NACS and INA are subordinated to MRDPA. Digitalization is closely linked to MDLPA's mandate to ensure efficient governance. Its Institutional Strategic Plan¹³⁸ emphasizes the importance of digitalized and citizen-centered public services while reducing administrative burdens and improving coordination across institutions. Beyond the modernization of the public administration HRM system, MDLPA is responsible for implementing a wide range of strategic projects, from institutional capacity building and administrative reform to the development of regional and national infrastructure, which require robust digital tools and well-developed digital competencies across the public sector. For example, important objectives are also defined in the area of digitalization of processes in territorial planning, urbanism, and construction - areas where modern digital tools not only streamline workflows and permitting, but also enhance data management and inter-institutional cooperation, contributing to more coherent and evidence-based urban development.
98. **The mandate and role of NACS have evolved since 2019 in line with the responsibilities set through the Administrative Code (GEO 57/2019).** Its primary objective is "to develop a professional, stable, and impartial civil service and to manage the database of personnel paid from public funds"¹³⁹. NACS is responsible for developing and proposing policies and strategies for civil service management,

136. World Bank, *Baseline review of the national framework for HRM and its institutionalization*, HRM RAS, May 2019. Available at: <https://sgg.gov.ro/1/wp-content/uploads/2010/01/Livrabilul-11-Baseline-review-of-the-national-framework-for-HRM-and-its-institutionalization.pdf>.

137. GSG was the main beneficiary and NACS' project partner under SIPOCA 136, under which the general competency framework was designed with World Bank support.

138. Available at: <https://www.mdlpa.ro/uploads/articole/attachments/667ac05ebe60e460179224.pdf>.

139. Art 400, para 1 of the Administrative Code (EGO 57/2019).

and providing expert opinions on HRM draft legislation for the civil service. It maintains records of civil service positions, monitors and enforces legal compliance and manages the national electronic system for public sector employment records, as well as specialized HRM digital systems for the civil service. The agency also centralizes civil servant training needs, monitors adherence to norms of conduct, and prepares annual reports on civil service management. The NACS is also mandated since 2022 with the introduction and operationalization of competency-based HRM, based on a general competency framework and specific competencies, as regulated through the Administrative Code. A new competency-based recruitment system was piloted and already introduced by NACS in the central public administration.

99. **As the primary institution responsible for civil service training, INA also integrated digital competencies into its professional development programs.** It is responsible for designing and delivering training programs to enhance administrative capacity across the public sector. INA collaborates with relevant authorities, including NACS, to identify priority areas for training and ensure alignment with public administration reforms¹⁴⁰. Training programs on basic digital skills and tools for digitalization are already available as part of INA's training offer on ITC¹⁴¹. An overview of relevant program for digital skills is included in section 3.4. INA's role will remain critical in the continuous adaptation and development of training programs to evolving digital competency needs.
100. **The current legal framework also sets out specific institutional roles related to what is currently defined as digital competencies – usually referenced as “IT knowledge”.** The legislation in place at the time of the assessment mentions digital competencies in connection to some HR processes, even if the digital competencies are not systematically structured or defined. NACS, INA, and public institutions have specific legal mandates in this area, as outlined below:
- ➔ **NACS has clearly defined roles in ensuring competency-based HR processes and in certain cases “IT knowledge” is currently explicitly mentioned.** In this sense, for example, NACS is responsible for making available¹⁴² the test centers where the preliminary testing of the general knowledge (including the *theoretical IT knowledge* at beginner user level)¹⁴³ which is part of the national recruitment competition, is conducted¹⁴⁴, and purchases the sets of tests that are used for assessing the theoretical IT knowledge at beginner user level.¹⁴⁵ In addition, *digital competencies* are implicitly part of the competencies based on which NACS should set out, in collaboration with the INA, the priority areas for the professional learning and development as well as the topics specific to the professional training programs for civil servants.¹⁴⁶ Also, NACS is responsible for endorsing the specific competences (including, where appropriate, the *digital competences*) identified by public authorities and institutions based on the job analysis process.¹⁴⁷
 - ➔ **Public authorities and institutions** are expected to identify, through the special working groups, the *specific competences* (including, where appropriate, the digital competences) required for the civil service positions within their organizational chart.¹⁴⁸ In the case of state and territorial civil service positions, public institutions need to conduct, through the competition committee, the selection stage¹⁴⁹, which entails verifying the required specific competences (including, where

140. According to Article 401(1)(h) of GEO No 57/2019 on the Administrative Code.

141. <https://ina.gov.ro/cursuri/programe-de-perfectionare/t-i-c-tehnologia-informatiei-si-comunicatiilor>.

142. According to Article 48(1) of Annex No 10 to GEO No 57/2019 on the Administrative Code.

143. According to Article 3(ee) of Annex No 10 to GEO No 57/2019 on the Administrative Code.

144. The first phase of the competition for state and territorial civil service positions

145. According to Article 3(ee) of Annex No 10 to GEO No 57/2019 on the Administrative Code.

146. According to Article 401(1)(h) of GEO No 57/2019 on the Administrative Code.

147. According to Article 401(1)(m) of GEO No 57/2019 on the Administrative Code, to Article 30 of Annex No 8 to GEO No 57/2019 on the Administrative Code, and to Order No 332/2024, issued by NACS.

148. According to Articles 26-29 of Annex No 8 to GEO No 57/2019 on the Administrative Code, and to Order No 332/2024, issued by NACS.

149. The second stage of the competition for state and territorial civil service positions.

appropriate, the *digital competences*).¹⁵⁰ The same applies for the competence-based individual professional performance appraisal process.¹⁵¹

101. **NACS has taken on an ambitious role in defining and advancing digital competencies within the Romanian civil service.** Building on its mandate in competency-based management, NACS leads the development of a general digital competency framework as part of the TSI project under which the current report was developed, ensuring alignment with public administration digitalization goals. Additionally, it manages a large-scale digital skills training program for 30,000 civil servants, as part of the NRRP measures. Details regarding this upskilling initiative are included in section 3.4.
102. **ADR is also mandated with a key role in the area of digital skills.** It is responsible for drafting and implementing the *national plan for the development of digital competencies in the public administration*¹⁵², in coordination with other competent authorities and in accordance with legal provisions¹⁵³. While such national plan has not been yet developed, ADR proactively developed a structured approach to identifying relevant digital competencies that could be used for upskilling the central public administration (see section 3.4).
103. **The success of the future operationalization and updating of the general digital competency framework necessitates clear institutional roles and sustained inter-agency cooperation beyond the TSI project.** It is crucial to define responsibilities in overseeing the digital competency framework, conducting training needs assessments for digital skills and specialized digital roles, and ensuring the effective targeting of training programs. Collaboration with the line ministries responsible for digitalization and public administration should also be strengthened and reflected in a *national digital skills plan*, embedded within a broader digital transformation strategy.

Role of universities in shaping digital skills for the public administration

104. **Graduates of master's programs across various disciplines are expected to hold basic general digital skills, such as digital text creation, digital communication, folder management.** Regardless of their field of study, graduates can be expected to be proficient in document processing, structured file organization, and basic digital collaboration tools, as these skills are fundamental for operating in a modern administrative environment, especially if they graduated in the past 5 to 7 years.
105. **Beyond these basic competencies, digital competencies are increasingly integrated into Romanian higher education across various fields of study.** Based on the accreditation standards¹⁵⁴ and the academic practice, the presence and depth of digital education vary significantly between disciplines. For example, graduates of computer science and engineering programs develop expertise in programming, AI, and cybersecurity, while those from economics and business fields gain skills in data analytics and financial information systems. Similarly, public administration graduates acquire knowledge of e-governance and legal informatics, and social sciences programs incorporate digital media, Big Data analysis, and digital security. Below is a summary of the key areas where digital-related subjects are included:

150. According to Article 467(3)(b) of GEO No 57/2019 on the Administrative Code and to Article 92 and Article 97(1) of Annex No 10 to GEO No 57/2019 on the Administrative Code.

151. According to Article 485¹ of GEO No 57/2019 on the Administrative Code.

152. According to Article 47(I) of Regulation on the organization and functioning the Authority for Digitization of Romania (available at <https://www.adr.gov.ro/wp-content/uploads/2024/07/ROF-ADR-2024.pdf> - accessed 16.02.2025), the Programs and Projects Service within the Authority for Digitization of Romania is tasked with drawing up the national plan for the development of digital competences in central public administration and with ensuring its implementation, in cooperation with other competent authorities, in accordance with the law.

153. According to Article 5(a)(4) of GD No 89/2020.

154. These standards are issued by the Romanian Agency for Quality Assurance in Higher Education and substantiate the decision of the Ministry of Education to accreditate a specific university or program. The comprehensive list of standards are available here: <https://www.aracis.ro/standarde-specific-e-evalua-re-licenta/>.

- Computer science and engineering: Strong focus on programming, artificial intelligence, cybersecurity, databases, and software development. Engineering programs also include applied informatics and intelligent systems.
- Social sciences and humanities: While some fields have minimal digital integration, others include courses in digital media, Big Data analytics, and applied informatics, particularly in communication, security studies, and public administration.
- Natural and applied sciences: Geographic Information Systems (GIS) applications, scientific computing, and statistical analysis are common in fields like geography, physics, and environmental sciences.
- Economics and business: Business informatics, data analytics, and information systems are essential components, particularly in management, finance, and marketing.
- Medicine and health sciences: Medical informatics and biostatistics are present in most healthcare-related programs, supporting data-driven decision-making.
- Arts and design: Digital technologies are integrated into design, media, and performing arts, focusing on digital content creation and processing.



TABLE 1: Digital competencies across academic programs in Romania

Field of Study	Relevant Disciplines	Digital Competencies
Computer Science and Engineering	Programming, Artificial Intelligence, Cybersecurity, Databases, Software Development, Computer systems architecture, Control systems and Applied informatics.	Software development, AI & ML, cybersecurity, database management, automation, Computer systems architecture, Electronic Engineering, Telecommunications and Information Technologies, etc.
Social Sciences and Humanities	Digital Media, Social Informatics, e-Governance	Content creation, data analysis, public sector digitalization, digital security
Natural and Applied Sciences	GIS, Computational Modeling, Scientific Computing, Data Visualization	Geospatial analysis, computational modeling, scientific data processing
Economics and Business	Business Informatics, Data Analytics, FinTech, Digital Marketing	Data-driven decision-making, financial security, online consumer analysis
Medicine and Health Sciences	Medical Informatics, Biostatistics, Health Technology, AI in Healthcare	Electronic health records, telemedicine, AI applications in healthcare
Arts and Design	Computer-Assisted Design, Multimedia Production, Digital Animation	Graphic design, animation, virtual/augmented reality, multimedia processing
Public Administration	E-Governance, Cyber Law, Legal Informatics, Blockchain	Digital public services, regulatory compliance, legal data management

Source: Authors' elaboration based on review of current accredited programs

106. **One noticeable gap in the Romanian higher education system is the limited presence of digital competencies in law programs.** While some universities recommend introductory courses in informatics or legal informatics, there is no systematic integration of digital tools and technologies that are increasingly relevant to the legal profession and public administration. In comparison

I	Introduction	II	The EU policy framework	III	National strategies, policies and institutional arrangements	IV	Job analysis	V	International experiences	VI	Foresight	VII	Conclusions
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to European practices, universities in Netherlands¹⁵⁵, for instance, have started to include specialized courses in cyber law, artificial intelligence in legal practice, blockchain for smart contracts, and digital case management systems. These competencies are essential for preparing future legal professionals to navigate the growing field of digital law, data protection (GDPR), and legal tech applications.

107. **Digital competencies acquired in university should be formally recognized at entry into the public administration system.** Given that many academic programs already integrate digital education — ranging from programming and cybersecurity to data analytics and e-governance — these competencies should be considered during recruitment processes to ensure that new civil servants possess foundational digital skills. Establishing mechanisms for acknowledging university-acquired digital competencies would streamline the recruitment process, limit overreliance on specific certifications (such as ECDL) and allow better targeting of digital training at the initial stages of employment.
108. **Furthermore, collaboration between public administration and universities is essential for ensuring timely and relevant upskilling opportunities for civil servants.** Public administration institutions should work with universities to develop targeted training modules, adapt curricula to evolving digital skill needs, and facilitate access to cutting-edge digital resources.
109. **These two aspects — (i) the recognition of digital competencies acquired outside of the public administration system (including in university) and (ii) the collaboration between universities and public institutions for continuous digital upskilling - will be explored in depth during the design phase of the project.** The analysis will focus on identifying mechanisms for integrating university-level digital education into the certification and assessment of digital skills for civil servants, as well as developing structured partnerships between academia and public administration. Output 3 under the TSI project will build on this report and explore the pillars and mechanisms that can ensure an effective and sustainable operationalization of the future digital competency framework.

155. Leiden University offers a specialization within its **Public Administration Bachelor's program**, titled **Digitalization, Governance, and Society**. This program prepares students for a future where digital issues and governance are deeply interconnected. Students learn how to **translate technological developments, such as artificial intelligence, into concrete policies** and how to responsibly utilize technology in public administration. The curriculum addresses topics such as **data-driven policymaking, cybersecurity, and the ethical implications of digital governance** (details here: <https://www.universiteitleiden.nl/en/education/study-programmes/bachelor/public-administration/digitalisation-data-and-governance>). Also, Maastricht University's **Law and Tech Lab** provides education at the intersection of law and technology, aiming to train the next generation of thinkers, practitioners, and policymakers. Their program - Bachelor in Law and Technology blend AI and data science with critical legal principles, offering students interdisciplinary skills necessary to navigate and shape the digital world (details here: <https://www.maastrichtuniversity.nl/law-and-tech-education>).

3.3

Vision and initiatives impacting digital competencies in the public administration

Overview of Romania's vision for digitalization of the public administration

110. **Romania's strategic priorities in digitalization are scattered across various strategies and policy documents.** The country's digital transformation is guided by multiple strategic documents, including the National Digital Decade Action Plan (PNADD), the National Recovery and Resilience Plan (NRRP), the Governmental Cloud Infrastructure Strategy, the National Cybersecurity Strategy 2022-2027, and the National Artificial Intelligence Strategy 2024-2027. These policies aim to modernize public services, enhance interoperability between institutions, and improve cybersecurity while fostering innovation in artificial intelligence and emerging technologies.
111. **At the EU level, Romania's performance in digital transformation has been assessed through the Digital Economy and Society Index (DESI), where the country has ranked among the lowest in the European Union.**¹⁵⁶ While Romania has made notable progress in broadband connectivity and government cloud infrastructure, it continues to lag behind in areas such as digital public services, digital literacy, and the adoption of artificial intelligence in governance. A key challenge remains the low percentage of citizens with basic digital skills, as well as the slow integration of interoperable platforms across public institutions. Additionally, the country faces difficulties in fully deploying 5G infrastructure, which is crucial for next-generation digital services.¹⁵⁷ Addressing these challenges is essential for Romania to meet the targets outlined in the EU Digital Decade 2030 strategy and to close the digital gap with other EU member states. Despite progress in some areas, Romania faces challenges in bridging the digital divide, developing digital skills, and ensuring the interoperability of public administration systems.



Romania faces several challenges, with only 28 percent of citizens having basic digital skills, far below the EU average of 54 percent. Consequently, the country has set a less ambitious target, 50 percent of the population to have at least basic digital skills by 2030. Despite a low share of ICT specialists of 2.6 percent, below the EU average of 4.8 percent, Romania ranks second in the ICT graduate rates with 6.7 percent of all higher education graduates. Moreover, Romania ranks first in female representation in the ICT sector, with women reaching up 26 percent of ICT specialists, surpassing the EU average of 19.4 percent.

Source: European Commission: Romania 2024 Digital Decade Country Report.

112. **While an integrated Digital Transformation Strategy and Action Plan for Romania's central public administration was developed in 2023, the document was not yet officially adopted.** The

156. EC (2024). Digital Decade. Country Report 2024: Romania. Available at: file:///C:/Users/wb450939/Downloads/Digital_Decade_country_report__Romania_2RErXS43VQ0F9upt7eWNwxF1U_106692.pdf

157. European Commission, Romania 2024 Digital Decade Country Report. Available at: <https://digital-strategy.ec.europa.eu/en/node/12837/printable/pdf>.

document was developed under a TSI project, led by ADR. Its stated aim is to create an efficient, transparent, and citizen-centric government by integrating digital technologies across institutions. It envisions a fully digital public administration, improving service delivery, institutional cooperation, and citizen engagement. The strategy outlines key priorities, including governance and regulation, digital service optimization, adoption of advanced technologies, and strengthening digital competencies. As a strategic reference, the document builds on the Public Policy in eGovernment 2021-2030¹⁵⁸. In this context, the draft strategy also mandates public institutions to develop tailored digital transformation strategies. The draft strategy is structured around three pillars: enhancing administrative operations, improving digital public services, and developing civil servants' digital competencies. Measures include standardized digital services, secure authentication via ROeID, cloud infrastructure expansion, and a GovTech Lab to foster public-private innovation. A core focus is the digital upskilling of public sector employees.

113. **In the absence of an integrated strategy on digital transformation, the Public Policy in eGovernment is the main reference for long-term objectives**, aiming to expand and improve digital public services by 2030. The public policy has three key objectives: increasing the number and quality of services reaching at least level 4 of digital sophistication, enhancing institutional capacity to operate in an advanced digital environment, and strengthening digital competencies among public sector staff, including IT specialists. To achieve these goals, the policy includes a set of strategic and complementary measures such as establishing an interoperability hub, national service catalogue, digital identity systems, expanding cloud infrastructure, promoting advanced technologies like AI and blockchain, and creating a dedicated eGovernment specialist corps, supported by updates to legal and institutional frameworks.
114. **Various strategies set a fragmented vision and objectives for a modernized, efficient, and interoperable public administration that leverages digital tools to improve service delivery and reduce bureaucracy**. One of the primary objectives is the implementation of a Government Cloud Infrastructure, established under Ordinance No. 89/2022, which seeks to centralize IT resources, reduce duplication, and increase efficiency. The introduction of the National Interoperability Platform (PNI) further supports this goal by enabling real-time data exchange between institutions. This move is expected to eliminate redundant paperwork and streamline interactions between governmental bodies, ultimately benefiting both civil servants and citizens.
115. **The country is also focused on ensuring that all public services are available online by 2030**. The government aims to fully digitalize public services, ensuring that all administrative processes are accessible online. Platforms such as [Ghiseul.ro](https://ghiseul.ro) have already begun to facilitate online tax payments, while the development of the *ROeID system* aims to provide citizens with a secure means of authentication. By 2026, at least five million electronic ID cards (CEI) will be issued, allowing citizens to authenticate securely for various government services¹⁵⁹.
116. **Cybersecurity remains a priority, as demonstrated by the adoption of the National Cybersecurity Strategy (2022-2027)**. This initiative seeks to strengthen Romania's digital resilience by enforcing strict security measures, fortifying the National Cybersecurity Directorate (DNSC), and ensuring compliance with EU regulations. With the increasing reliance on cloud computing and data sharing, securing sensitive government data is crucial to maintaining public trust in digital services.
117. **Connectivity remains an essential part of Romania's digital strategy, with a commitment to providing high-speed broadband access to all public institutions**. The expansion of 5G technology is also crucial, although the country still lags behind other EU states in coverage. To maximize the

158. Available at: <https://sgg.gov.ro/1/wp-content/uploads/2016/04/Propunere-de-politica-publica-in-domeniul-e-guvernarii-adoptata-3-iun-2021.pdf>

159. In accordance with Romania's NRRP targets.

benefits of digitalization, the government plans to ensure that 80% of citizens acquire basic digital skills. This is particularly important as more services become digital-first, and a digitally literate population is necessary for widespread adoption.

118. **Romania also plans to integrate AI-driven tools into at least half of administrative processes by 2030.** In line with the National Strategy on Artificial Intelligence (2024-2027), AI is expected to assist in policymaking, data analytics, and service automation, further streamlining government functions and improving responsiveness to citizen needs.
119. **Progress was made in digital infrastructure development and cloud service adoption.** The National Interoperability Platform (PNI) is under active development and, once fully operational, will allow seamless communication between public institutions. This will reduce bureaucratic inefficiencies and improve collaboration across different levels of government.
120. **The NRRP plays a crucial role in achieving these objectives by allocating over €1.5 billion for the development of digital public services, cybersecurity measures, and digital training programs for public administration employees.** Investments under the NRRP focus on modernizing critical IT infrastructure, expanding e-governance services, and strengthening data protection mechanisms. The plan supports initiatives such as the development of a centralized electronic health record system, the expansion of electronic case management in the judiciary, and the implementation of integrated digital platforms for public procurement. Furthermore, the NRRP finances the deployment of digital platforms for tax collection and customs automation, reducing manual processing and increasing efficiency.
121. **NRRP provides funding for several key initiatives, including the establishment of a national e-health system, expansion of e-learning platforms, and deployment of secure cloud-based databases for government agencies.** Additionally, the plan supports the implementation of a unified digital identity system, ensuring seamless authentication across public services. Other projects financed through the NRRP include the modernization of the National Trade Register Office's digital platform and the development of an integrated system for real-time monitoring of energy consumption in public institutions. However, while the NRRP has provided a large amount of funding for digitalization investments, such large-scale reforms take time and not all of the reforms envisioned under the NRRP might be achieved under its implementation timeframe, which ends in August 2026.
122. **The Smart Growth, Digitalization, and Financial Instruments Program (POCIDIF) complements the NRRP by providing financial incentives for businesses and public institutions to adopt AI-driven automation and cloud computing solutions.** The POCIDIF program aims to accelerate Romania's digital transformation by increasing the use of emerging technologies in both the public and private sectors. POCIDIF also promotes **digital innovation hubs**, supporting startups and SMEs in adopting AI, big data, and cloud technologies.
123. **The adoption of the Digital Transformation Strategy for Central Public Administration developed by ADR could be an important step forward towards ensuring a more systematic and integrated approach to digital modernization, particularly from the perspective of developing digital competencies** within the public sector. A fragmented approach to digital transformation, without a clear link to digital skills development, risks creating a gap between the introduction of new technologies and the ability of civil servants to effectively use them. A structured plan for developing digital competencies should be embedded within a broader cohesive strategy, ensuring that public employees are continuously trained to operate and manage digital systems, AI-driven processes, and data interoperability frameworks. The proposed Digital Administration Code is critical in this regard, as it would provide a clear regulatory foundation for standardizing digital skills requirements, integrating digital competencies into HR processes, and ensuring that capacity-building efforts align with technological advancements. Without this connection between skills development and digital

transformation initiatives, public administration modernization efforts will be hindered by a lack of preparedness among civil servants, ultimately limiting the impact of digital government reforms.

124. **The digitalization of the public administration in Romania requires civil servants to adapt to new technologies and systems to ensure efficient service delivery and governance.** Several measures and priorities outlined in the National Recovery and Resilience Plan (NRRP) and Smart Growth, Digitalization, and Financial Instruments Program (POCIDIF) will significantly impact how public sector employees perform their jobs. The next section of the report includes an overview of the key measures and their impact on the digital skills needed by civil servants.

Strategic digital initiatives at national level

125. **The digital transformation of Romania's public administration is structured around five key areas: data interoperability, cloud computing adoption, AI-assisted decision support systems, cybersecurity, and digital public services.** These initiatives impact all sectors (like healthcare, education, transport, environmental sustainability, labor, financial governance) and all major life events for citizens and businesses. A significant concern remains the urban-rural digital divide and digital literacy challenges. Several initiatives under NRRP, POCIDIF, and PNADD aim to bridge this gap through broadband expansion, smart municipal services, and digital literacy programs.
126. **One of the most transformative initiatives is the implementation of the Government Cloud Infrastructure, which will consolidate public sector data and services into a secure, centralized system.** The Governmental Cloud, established under the NRRP – Component 7 (Digital Transformation) is intended to provide a centralized IT ecosystem, allowing public institutions to store, process, and share data securely while reducing operational costs. The cloud migration process, managed by ADR in collaboration with the Romanian Intelligence Service (SRI) and Special Telecommunications Service (STS) involves the migration, as a first stage, by 2026, of over 30 key public administration applications.
127. **The National Interoperability Platform (PNI) plays a crucial role in connecting different government institutions.** The platform¹⁶⁰ aims to eliminate data silos and facilitate real-time information exchange between agencies, supporting the application of the “Once-Only Principle”, ensuring that citizens and businesses do not have to provide the same information multiple times across different government departments.
128. **While in early implementation phases, important efforts are envisaged to incorporate AI and automation into the public administration.** AI-driven tools are targeted in various government operations¹⁶¹, particularly in: (i) Automated Public Procurement Systems – AI-powered fraud detection mechanisms for e-procurement processes; (ii) Predictive Analytics in Healthcare – AI models assisting in disease trend forecasting and patient record management and (iii) Judicial Case Management Systems – AI-assisted tools for organizing court cases and legal document processing. NRRP supports investments in AI-driven automation, particularly in law enforcement and regulatory compliance. For instance, the Romanian Competition Council (RCC) has implemented AI tools to monitor price fluctuations in the fuel and retail sectors through the platform *Monitorul Prețurilor*. The implementation of the measures foreseen in the strategy will enhance real-time policy monitoring by identifying trends and potential inefficiencies before they become critical, automate data analysis, reducing human error and speeding up the policy evaluation cycle and strengthen risk assessment capabilities in areas such as public health, economic forecasting, and urban planning.

160. Implemented under Law No. 242/2022 on Interoperability.

161. As envisaged under Romania's National Artificial Intelligence Strategy (2024-2027).

129. **Important measures are also under implementation in line with Romania's Cybersecurity Strategy for Digital Public Services, which aims to protect digital governance by securing public sector IT networks and data infrastructure against cyber threats.** Key initiatives include implementing a centralized cybersecurity monitoring system, adopting AI-driven threat detection tools, and integrating blockchain technology for data integrity and secure transactions. These measures enhance secure data exchange between public institutions, improve real-time cyber threat intelligence, and reduce data breaches, ensuring the integrity of public data used in policymaking. To strengthen digital resilience, Romania is also reinforcing cybersecurity for the Government Cloud and PNI, aligning security protocols with EU standards, and fostering collaboration between public and private entities to mitigate cyber risks.
130. **Digital public services are an overarching priority for Romania's digital transformation agenda.** Efforts focus on enhancing efficiency, accessibility, and interoperability across institutions to improve service delivery for citizens and businesses. Below are examples from selected sectors that illustrate progress and ongoing initiatives in this area.
131. **ADR is developing the Single Digital Platform for Romania (PDURo26) to modernize the public administration and facilitate citizen access to digital public services.** This initiative is aligned with the EU Single Digital Gateway, aiming to provide a centralized and user-friendly interface for accessing government services. A key feature of PDURo26 is the implementation of the "Once-Only" principle, which reduces redundancy by enabling seamless data exchange between institutions across the EU. Furthermore, the platform will be fully integrated with Romania's digital identity system (ROeID), ensuring secure authentication and supporting interoperability with other EU member states. Through enhanced digital accessibility, transparency, and efficiency, PDURo26 strengthens citizen-government interactions and reinforces Romania's commitment to the EU's digital transformation agenda.
132. **Taxation and financial systems are a key focus of Romania's digitalization efforts, with significant investments in modernizing infrastructure.** The National Agency for Fiscal Administration (ANAF) is implementing key initiatives such as *e-Factura*, an electronic invoicing system designed to automate tax collection and reduce fraud, and *e-TVA*, a digital VAT declaration and refund system that streamlines processes and minimizes manual paperwork. The *Standard Audit File for Tax (SAF-T)* was adopted as an international standard for the electronic exchange of reliable accounting data between organizations and national tax authorities. Implemented from January 1, 2022, this system mandates large Romanian-resident companies and certain foreign companies to submit tax returns electronically. The SAF-T facilitates efficient data collection and analysis, enabling tax authorities to monitor compliance effectively and develop informed fiscal policies. Additionally, funding from NRRP supports the development of a customs automation system that leverages blockchain technology to track imports and exports, significantly reducing border clearance times.
133. **In education, the current legal framework¹⁶² includes provisions on the digital transformation of the primary and secondary education system.** This includes the development of digital competencies among teachers and students, the use of online educational resources, and the implementation of digital platforms for process and data management. It aims to expand access to digital education and enhance skills development through technology-driven learning platforms. Key measures include equipping schools with high-speed internet and smart classrooms, providing interactive e-learning platforms with AI-driven personalized learning, and training over 32,500 teachers and students in digital competencies. These advancements promote inclusivity by bridging the digital divide for rural students, expanding remote learning opportunities to reduce education disruptions, and supporting students with disabilities through assistive learning technologies. These initiatives aim to enhance the digital maturity of the education system, thereby supporting data-driven policymaking in the education sector.

162. Law on Pre-university Education no. 198/2023. Available here: <https://legislatie.just.ro/public/DetaliiDocument/271896>

134. **The digital transformation of EU funds management systems aims to enhance the transparency, efficiency, and accountability through digital tools.** Key initiatives include automating financial reporting, developing digital dashboards to track fund allocation and usage, and integrating AI and big data for fraud detection and compliance monitoring. This transformation enables real-time monitoring of spending trends, optimizes resource distribution, strengthens audit capabilities with automated compliance reports, and supports adaptive policymaking by allowing dynamic adjustments based on data insights.
135. **The digitalization of health services (e-Health and Telemedicine) foreseen under the *draft* National Digital Health Strategy (2024-2030) will improve healthcare accessibility through telemedicine, digital health records, and AI-powered diagnostics.** Key proposed measures include connecting over 25,000 healthcare providers to a national digital health network, expanding telemedicine services for remote consultations and prescriptions, and leveraging AI and big data for predictive healthcare monitoring. These advancements enhance inclusivity by bridging healthcare access gaps in rural and underserved areas, reducing hospital waiting times and administrative inefficiencies, and improving early disease detection and patient monitoring for better health outcomes. It also includes implementing a National Electronic Health Record (EHR) system, integrating AI for predictive disease modeling and health risk assessment, and establishing a National Health Data Observatory for centralized monitoring and policy evaluation.
136. **Social protection and labor services also benefit from NRRP measures on digitalization.** Key measures include implementing AI-driven eligibility assessments for social benefits, automating labor market data collection and employment services, and developing online platforms for managing pensions and unemployment benefits. These advancements enhance accessibility for elderly citizens and low-income groups, reduce fraud and inefficiencies in benefit distribution, and ensure faster, more transparent processing of social support applications.
137. **The digitalization of civil service management is also actively purposed.** E-NACS digital platform will streamline civil servants' career tracking and administrative processes¹⁶³. The new recruitment system also relies on dedicated platforms for registration and on-line testing phases. Reforms also include integrating data analytics for workforce planning and HR procedures, reducing bureaucratic inefficiencies.
138. **At the local level, local governments are encouraged to adopt Internet of Things (IoT) technologies to improve urban services.** Several municipalities have begun deploying smart city solutions, including:
- ➔ Traffic management systems – AI-driven real-time monitoring of congestion and road conditions.
 - ➔ Digital waste collection platforms – sensors that optimize garbage collection routes.
 - ➔ Energy efficiency monitoring tools – IoT-based electricity and water usage tracking in public buildings.
- Romania aims to expand these initiatives by integrating 5G connectivity, which is still underdeveloped compared to other EU nations.
139. **The digitalization of local governance (#DigiLocal)¹⁶⁴ is focused on digital public service delivery, data sharing, and enhanced citizen engagement at the local level.** Key measures include integrating municipal IT systems with national e-Government platforms, expanding digital payment services

163. <https://www.anfp.gov.ro/proiecte/proiecte-in-implementare/proiecte-pnrr/proiecte-pnrr-lista/e-anfp-dezvoltarea-si-extinderea-platformei-de-gestiune-a-functionarilor-publici/>.

164. <https://digilocal.mcid.gov.ro/#/>.

for local taxes and fees, and deploying AI-powered chatbots for automated citizen services. These advancements support data-driven policymaking by improving policy responsiveness through citizen interaction analysis, enabling real-time tracking of municipal service performance and urban planning needs, and enhancing transparency through open data initiatives.

140. **Romania's commitment to open data is reflected in its participation in the Open Government Partnership (OGP - data.gov.ro).** The National Action Plan 2020-2022 emphasizes the publication of open datasets to enhance transparency and citizen engagement. Romania contributes to the EU *Open Data Portal*, which consolidates datasets from EU institutions and member states. By aligning with this initiative, Romania ensures that its public data is accessible for reuse, promoting transparency and enabling data-driven policymaking.
141. **Many of these digital priorities are also highlighted in the Institutional Strategic Plans (ISPs),** where institutions have aligned their objectives and measures with the ongoing strategies and plans on digital transformation.

 **TABLE 2:** Examples of key digital initiatives from ISPs¹⁶⁵

Initiative	Objective	Citizen-focus
Government Cloud Platform	Centralized infrastructure for public digital services	Simplifies citizen interaction with government portals
Electronic Identity (e-ID)	Secure citizen authentication for online services	Eliminates in-person bureaucracy, improving access for all citizens
e-Health and Telemedicine	Digital healthcare services & remote consultations	Reduces rural-urban healthcare gap
Social Protection Digitalization	Automation of welfare benefits & pension services	Enhances transparency & faster access to aid
Smart Education (SMART.Edu)	Digital education tools & online learning platforms	Improves access to education in underserved areas
Rural Broadband Expansion	High-speed internet access for remote communities	Enables digital participation for marginalized groups
Digital Judiciary	AI-powered case management & e-justice	Increases access to legal services & reduces delays

Source: Authors' elaboration based on the measures included in the ISPs.

165. Institutional strategic Plans of central authorities for 2025-2028.

Implications of the vision and strategic initiatives for public administration digitalization on digital competencies

142. **To effectively operate the new digital systems and tools civil servants should develop foundational and specialized digital skills.** Data management and interoperability competencies are essential, as the implementation of the Government Cloud Infrastructure and the National Interoperability Platform (PNI) requires employees to handle data securely, ensure compliance with cybersecurity standards, and facilitate seamless data exchange across institutions. Civil servants should understand how to work with cloud-based storage, digital workflows, and AI-assisted decision-making tools, particularly in areas such as electronic public services, procurement, taxation, and health records management. Additionally, proficiency in AI-driven analytics and automation tools is critical, as Romania is incorporating AI in fraud detection, public procurement, healthcare diagnostics, and judicial case management.
143. **Moreover, cybersecurity awareness and digital identity management will be crucial for civil servants to protect sensitive governmental and private data and ensure secure citizen interactions.** With the adoption of ROeID for secure authentication, government employees should be trained in digital identity verification and compliance with EU cybersecurity regulations to mitigate cyber threats. Additionally, the rise of e-Government platforms and smart municipal services requires public employees to become proficient in using and securing automated service platforms, AI-powered chatbots, and digital payment systems to improve public service efficiency. Enhancing digital literacy across the administration will also help bridge the urban-rural divide, ensuring that all employees can effectively leverage digital tools for governance, policymaking, service delivery and citizen engagement.
144. **The interoperability of public administration systems, facilitated by the National Interoperability Platform (PNI) will change the way civil servants handle information processing and administrative tasks.** Rather than relying on separate databases and redundant paperwork, employees will need to safely navigate large and integrated digital platforms, verify and analyze real-time data, and ensure accurate reporting across agencies. As a result, civil servants will be required to enhance their data literacy skills, as decision-making will increasingly rely on analytics and real-time information.
145. **AI-driven automation will reshape the responsibilities of civil servants.** The NRRP funds several initiatives aimed at integrating AI into administrative processes, including AI-assisted case management in the judiciary, predictive analytics for healthcare planning, and automated public procurement systems. Civil servants will need to adapt to AI-powered tools that assist in decision-making, fraud detection, and resource allocation. Rather than manually reviewing cases or processing financial transactions, employees will work alongside AI algorithms that can identify patterns, flag inconsistencies, and optimize workflows. This shift requires a fundamental change in how civil servants approach their responsibilities, focusing more on oversight, interpretation, and strategic planning with due ethical consideration rather than repetitive tasks.
146. **Data analytics and digital communication become foundational competencies for civil servants.** The ability to process and interpret findings from large datasets and make data-informed policy decisions is crucial for improving governance efficiency and accuracy. Likewise, digital communication skills are essential as government employees increasingly engage with citizens through online platforms that enable fast and far-reaching communication rather than in-person consultations on policymaking decisions and public service design and delivery.
147. **Digitalization in sectors will require not only foundational digital competencies but also the development of specific digital skills.** For example, employees of tax and customs departments will need to familiarize themselves with specific digital financial tools, blockchain verification processes, and automated compliance monitoring systems to perform their roles effectively. Civil servants working

in healthcare administration will need to adapt to managing patient data in a digital environment, coordinating with AI-assisted diagnostics, while ensuring compliance with GDPR regulations for personal health information. In law enforcement and judicial administration, the introduction of digital evidence management systems and e-court platforms will change how civil servants perform their duties. Court clerks, legal analysts, and law enforcement personnel will be required to navigate digital case files, conduct virtual hearings, and utilize AI-driven analytics to support legal decision-making.

148. **Local government employees will also need to be equipped with specific digital skills to be able to manage and analyze data from interconnected infrastructure such as smart traffic systems, digital public transportation platforms, and energy monitoring grids.** Civil servants will need to develop expertise in data interpretation, urban planning analytics, and automation management to optimize municipal services.



Civil servants need to transition from traditional administrative roles to technology-enabled governance functions.

Employees will need to have **foundational skills in data analytics, cybersecurity, basic understanding of cloud computing, AI integration, and specialized skills in digital service management.**

The abilities to interpret real-time information and use digital collaboration platforms can be expected to become core competencies in the public administration.

3.4

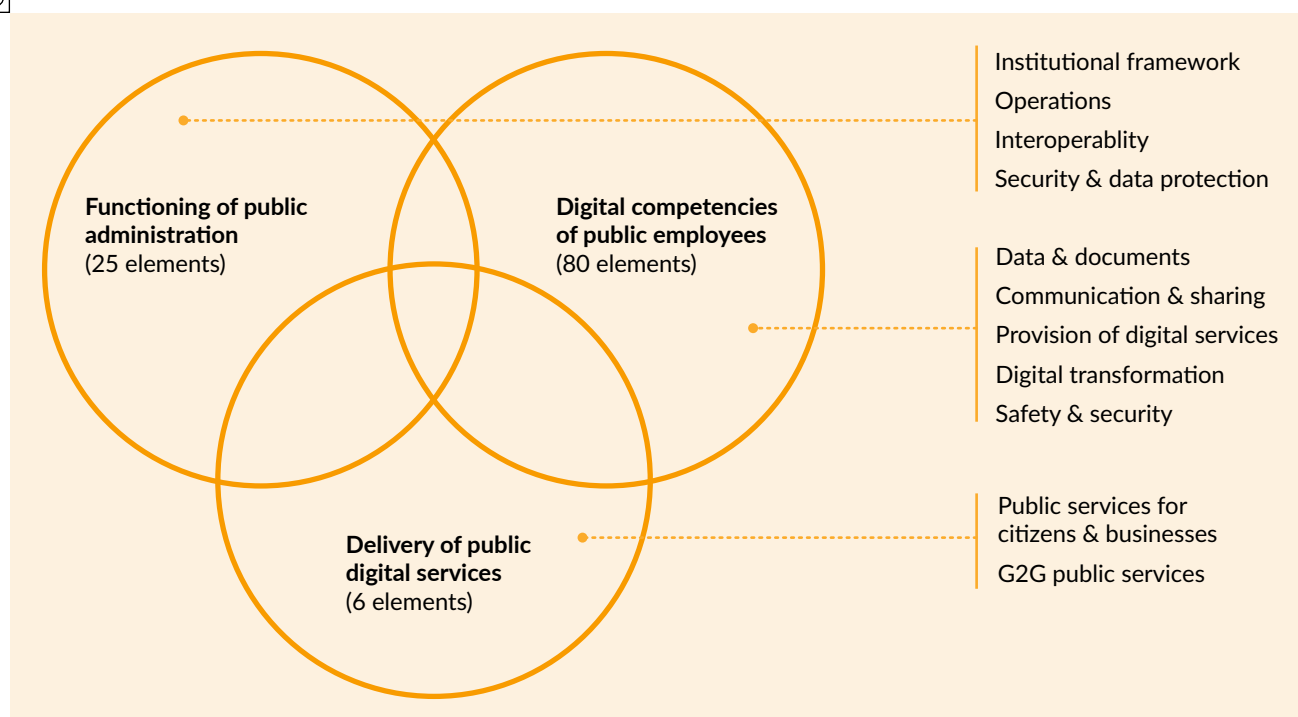
Digital skills initiatives in the public administration

ADR's "digital maturity framework" includes a structured framework for digital competencies

149. The ADR recently developed a "digital maturity conceptual framework" for the central public administration, which also covers digital skills. The framework was prepared under a TSI project finalized in 2023. Based on the conceptual model, the digital maturity of Romania's central public administration was assessed across three key dimensions, as reflected in Figure 10: (i) the internal functioning of public institutions, focusing on available methods and tools; (ii) the delivery of public digital services, including their availability, usage, and quality; and (iii) the digital competencies of public employees, essential for driving digital transformation.



FIGURE 10: Digital maturity framework developed by ADR under a TSI project¹⁶⁶



150. Based on the conceptual framework developed by ADR, the digital maturity of Romania's central public administration was assessed at basic (low) level, with digital transformation efforts lacking a coherent, system-wide approach. Existing initiatives were considered fragmented due to the absence

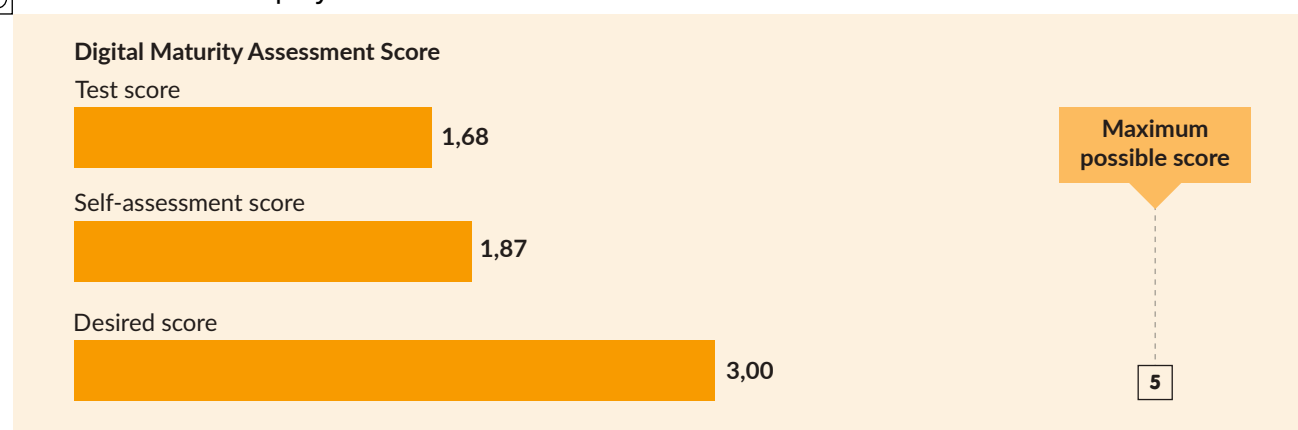
166. *Digital Maturity Conceptual Framework*, detailed in Report 1, The Digital transformation process in the Romanian public administration, Annex 3, 2023, developed under TSI project REFORM/SC2021/107 (21RO13).

of a governance framework, and existing institutional tools and methods are misaligned with broader objectives. Digital competencies among public employees were rated as below the required level, limiting their ability to leverage available technology for service delivery. The evaluation indicates that while public administration operations and digital service provision are at a basic level (42% and 30%, respectively), digital skills among employees remain below the required level at 24%.

151. **The assessment of digital skills of public employees in the central public administration conducted by ADR in 2023 revealed significantly low results.** The assessment was based on a digital skills model adapted based on the Italian Syllabus on Digital Skills for the Public Administration. This model developed by ADR was conceptually linked to the digital maturity conceptual framework, but it was not informed by a digital competency mapping exercise for jobs in the Romanian public administration. However, the model is aligned with DigComp and builds upon the maturity of the Italian competency model from which key statements were derived. The digital competency assessment included a self-evaluation questionnaire covering 80 professional skills. Respondents rated their own competency level, and those who self-assessed at a basic level were given a single-choice test question (Type 1). Those who rated themselves at an intermediate or advanced level received a multiple-choice test question (Type 2). The digital competency assessment of central public administration employees shows that over two-thirds of respondents (based on a representative sample) do not meet the basic digital competency level (corresponding to a minimum score of 2) and are significantly below the desired level (3), as shown in Figure 11. However, the Digital Maturity model was not informed by a digital competency mapping exercise tailored to public sector roles, which may have impacted the alignment between the skills assessed and those practically needed in administrative functions.



FIGURE 11: Digital maturity assessment results – score of digital skills for central public administration employees¹⁶⁷



152. **Beyond the assessment results, the digital skills model developed by ADR serves as a key reference for designing the future digital competency framework.** The model defines public administration-specific digital skills across core areas such as data management, digital communication, digital service delivery, digital transformation. Its structured formulation of descriptors, tailored to public administration needs, provides a strong foundation for the framework's development. To ensure full relevance, the model will be used alongside the DigComp framework, integrating both general digital competencies and those specific to the public sector. The ADR model is included as a reference in **Annex 1**.

167. ADR, *Analysis of the current situation and digital transformation needs of Romania's central public administration*, 2023, developed under TSI project REFORM/SC2021/107 (21RO13).

NACS' structured digital upskilling program for 30.000 civil servants

153. **NACS is implementing an EU-funded training program aiming at developing digital competencies for 30,000 civil servants by 2026, as part of Romania's NRRP¹⁶⁸.** The program aims to create a digitally competent public workforce, capable of implementing e-government services, document management systems, digital signatures, and data analytics tools. The program aims to modernize public administration, ensuring that civil servants can use digital tools effectively to improve governance and service delivery. The program also supports Romania's broader digital transformation goals, with 2,500 managers being trained in digital leadership. The program is fully funded by the EU and training is delivered free of charge. Public institutions sign cooperation protocols with NACS, enabling their employees to enroll. The program runs over a 35-month period and is delivered by consortia of training providers, selected through a competitive process, including Romanian and international firms and academic institutions. The programs' duration varies across modules depending on complexity, programs ranging between 40 and 175 training hours, all including on-line and face-to-face training components¹⁶⁹.
154. **The expected impact of this training program is significant, as it targets 22% of all occupied civil service positions¹⁷⁰, representing a substantial portion of Romania's public administration workforce.** By the second half of 2024, significant progress had been made, with nearly half of the target reached¹⁷¹. Between June 2024 and January 2025, 11,693 civil servants successfully completed the training programs and received certification. Additionally, from February 2024 to January 2025, 1,733 managers were certified after completing courses on leadership and talent management in the context of new technologies and digital transformation.
155. **The training program features a complex, multi-tiered curriculum comprising 13 modular programs tailored to different digital areas and proficiency levels** relevant for the public administration. It consists of:
- ➔ **Basic digital literacy and digital public administration skills.** Modules like "Management in the context of public administration digitalization", "Communication in the context of digitalization", "Digital Finance", and "Digital Back-Office" equip staff with the know-how to integrate digital tools into administrative processes
 - ➔ **Data analysis and data-driven decision making.** Given the growing importance of data, the program includes training in advanced statistics and data interpretation. Civil servants learn to collect, process, and analyze data using modern tools, fostering an evidence-based approach to policy and management
 - ➔ **Online collaboration and citizen engagement.** With remote work and virtual engagement becoming the norm, courses on digital tools for remote work/teleworking and online consultation instruments teach participants how to effectively collaborate via teleconferencing, project management software, and how to run e-consultations or surveys to engage citizens online.
 - ➔ **ICT specialized technical skills and cybersecurity.** For IT-specialist roles, the program offers hands-on modules in operating system installation and administration, database management, network administration and IT security. Recognizing the need for custom digital solutions, training in desktop application development and web design is provided on a foundational level.

168. This initiative (funded under Investment 16, Component C7) contributes to Target 185: "Civil servants who have completed a digital training course", strengthening the administration's capacity to adapt to digital transformation.

169. More information available at: <https://formaredigitalaanfp.ro/>.

170. Calculations considered a total of 132.700 occupied positions, in accordance with NACS' Annual report on the management of the civil service, 2024. Available at: <https://www.anfp.gov.ro/R/Doc/2024/Rapoarte/Raport%20privind%20managementul%20func%C8%9Biei%20%C8%99i%20func%C8%9Bionarilor%20publici%202023.pdf>.

171. Idem.

I	Introduction	II	The EU policy framework	III	National strategies, policies and institutional arrangements	IV	Job analysis	V	International experiences	VI	Foresight	VII	Conclusions
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➔ **Digital leadership.** The curriculum covers strategic technology management and change management skills necessary to drive transformation in their organizations.

156. **A “Mastering DigComp” module is integrated across all training packages as a transversal component, aiming to develop advanced digital competencies aligned with Level 5 of the DigComp framework.** This module covers areas such as advanced data search strategies, strategic communication and collaboration, digital content creation, cybersecurity expertise, and management. By embedding this module throughout the curriculum, the program ensures that participants acquire a comprehensive skill set.
157. **Lessons from this training initiative are shaping the development of the future digital competency framework for civil servants.** The program’s assessment of training needs and impact analysis provides data on the types of digital skills that are most relevant. The structured approach, covering basic to specialized skills, also serves as a model for categorizing competencies by role and proficiency level. In addition, NACS’s collaboration with universities can inform future delivery models by integrating certified academic programs, blended learning approaches, and research-driven curriculum development. Insights from implementation challenges and successes—including enrollment trends, completion rates, and trainee feedback—will guide the framework’s design, ensuring it is supported by practical training pathways, certification processes, and digital learning platforms.

INA’s training portfolio – a sequenced approach to developing digital skills

158. **INA has developed structured training initiatives that cover both foundational digital skills and specialized tools for digitalization.** These programs aim to equip public sector employees with essential knowledge and practical skills required for effective digital governance.
159. **A key program covers basic digital foundational skills.** This course covers essential IT skills, including computer operation, Microsoft Office applications such as Word and Excel, and online communication tools like email, Zoom, Webex, Teams, and Google Drive. Participants also receive training on digital documents, **electronic** signatures, and fundamental cybersecurity concepts. By addressing these core competencies, this program ensures that civil servants, regardless of their roles, possess the necessary digital foundation to perform their daily tasks efficiently and securely.
160. **The training program focused on digitalization tools targets skills for the transition to a more data-driven and technology-enabled public administration.** This course covers electronic document management systems, digital public service platforms, data analysis for decision-making, public-private digitalization partnerships, and cybersecurity. The program is designed to help civil servants enhance administrative efficiency through digital tools and optimize data-driven decision-making processes.
161. **Moving forward, INA has a sequenced approach to develop targeted learning curriculum building on the future digital competency framework.** Through TSI funding, INA will be developing curriculum for digital training for selected target groups. HR staff and managers will be trained in applying digital competencies in HR processes, and a targeted program will develop skills for digital transformation leaders.
162. **The development of digital skills in the public administration requires a coordinated approach, with a key responsible training entity but also mobilizing all relevant stakeholders capable of addressing the diverse needs across the system.** Key stakeholders such as the NACS, INA, along with universities and other public and private training providers, play a critical role in delivering training tailored to different target groups, from technical staff to civil servants involved in policymaking or administrative management. International examples from Spain, Italy, Estonia, illustrate the value of collaborative institutional ecosystems where continuous training is flexible, modular, and results-oriented. In this context, Romania has the opportunity to strengthen a coherent training system for digital competencies, which is essential for the successful digital transformation of the public sector.



Baseline legal framework on digital competencies in the civil service

Current legal framework referencing general versus specific digital competencies

163. **The development of a digital competency framework for Romania's public administration needs to build on the existing general competency framework, adopted through the Administrative Code¹⁷².** Competencies are already referred to in the current legal framework as the cornerstone of the main stages of the HR management process (recruitment, career development, performance appraisal¹⁷³). The competency model regulated through the Administrative Code includes the *general competency framework* and *specific competencies*. The general competency framework was initially applied only in the national recruitment competition¹⁷⁴ and is gradually being expanded to other HR processes. The specific competencies are determined at the institutional level for each job and include technical expertise relevant to the role, such as digital competencies, foreign language skills, or sector-specific knowledge.
164. **The general competency framework includes eleven competencies, grouped into five categories: personal** efficiency, interpersonal efficiency, social responsibility, managerial competencies, and leadership. Each general competency includes descriptors and behavioral indicators that define expected performance. Four proficiency levels are defined: basic, operational, enhanced, and strategic (Table 3).

172. GEO No 57/2019 on the Administrative Code.

173. The Administrative Code provides for competence based professional performance appraisal only for staff holding high-level civil service positions or state or territorial management and execution level civil service positions (competence based professional performance appraisal is not provided for local civil service positions). According to Article 597(1)(i) of GEO No 57/2019 on the Administrative Code, the provisions on competence based professional performance appraisal apply to the activity carried out starting from 01.01.2025.

174. The new recruitment system is competency-based, and it was piloted in 2023 and expanded in 2024.

TABLE 3: General competencies in the Romanian civil service¹⁷⁵

Competency cluster	Competency	Administrative staff	Execution level	Technical Manager	Mid-level manager	High Level Civil Servant
GENERAL COMPETENCY FRAMEWORK						
Personal Effectiveness	Problem Solving and Decision Making	basic	operational	enhanced	enhanced	strategic
	Initiative	basic	operational	enhanced	enhanced	enhanced
	Planning and Organizing	operational	operational	enhanced	enhanced	strategic
Interpersonal Effectiveness	Communication	operational	operational	enhanced	enhanced	strategic
	Team Work	operational	operational	operational	enhanced	enhanced
Social Accountability	Citizen Centricity	operational	operational	operational	enhanced	strategic
	Integrity	operational	operational	operational	enhanced	enhanced
Managerial Abilities	Managing Performance			operational	enhanced	enhanced
	Team Development			operational	operational	operational
Leadership	Create Engagement				operational	operational
	Promote Innovation and Guide Change				operational	enhanced

165. **Theoretical IT knowledge and digital competencies are the two concepts used in the current legal framework.** A distinction should be made between, on the one hand, IT knowledge/digital competences as a prerequisite for filling a civil service position and, on the other hand, acquiring/enhancing IT knowledge/digital competences while holding a civil service position. This distinction has several consequences. The former entails that the responsibility for having the required IT knowledge/digital competences lies solely with the candidate, while the latter entails a shared responsibility between (i) the employer, who identifies, where appropriate, the training/development needs regarding the IT knowledge/digital competences and provides the necessary funding for attending the professional training/development programs¹⁷⁶, and (ii) the civil servant, who must attend those programs.¹⁷⁷ Failure to have the former prevents a candidate from filling a civil service position, whereas failure to have the latter does not, directly,¹⁷⁸ have any bearing on holding a civil service position.

175. Table extracted from World Bank, Deliverable 3.2, Draft of the competency framework, developed under the HRM RAS. <https://sgg.gov.ro/1/wp-content/uploads/2010/01/Livrabilul-3.2-Draft-of-the-competency-framework.pdf>.

176. According to Article 458(4) of GEO No 57/2019 on the Administrative Code, and to Article 14(1)(a) of GD No 1066/2008, public authorities and institutions should provide the funds for civil servants attending professional training/development programs organized on the initiative or in the interest of the public authority or institution.

177. According to Article 14(1)(b) and (c) of GD No 1066/2008, civil servants can also attend professional training/development programs on their own initiative, with the agreement of the head of the public authority or institution that employ them. In such cases, the cost of attending training/development programs in areas which are included in the job description may be split between the employer and the civil servant, while the cost of attending training/development programs in areas which are not included in the job description is entirely borne by the civil servant.

178. Nonetheless, such failure may be reflected in a poorer professional performance, which in turn may lead to the civil servant being released from the civil service on grounds of professional incompetence, as per the provisions of Article 458(4) of GEO No 57/2019 on the Administrative Code.

166. **In the current legal framework, the terms “theoretical knowledge of information technology” and “digital competencies” have a precise and mutually exclusive meaning** in the context of the recruitment of civil servants. Current legal provisions on competence-based HR management in the civil service differentiates between, on the one hand, general competences (including general knowledge) and, on the other hand, specific competences and specialist knowledge. *Theoretical IT knowledge* is regulated as a type of general knowledge and is required for filling any civil service position, while *digital competences* are regulated as a type of specific competences, are required only for filling certain civil service positions.
167. **According to the Administrative Code, candidates for any civil service position must have theoretical IT knowledge at beginner user level,¹⁷⁹ but the meaning of this reference is subject to interpretation.** Annex No 10 to Administrative Code provides further information on the meaning of the beginner user level, but only in the context of state and territorial civil service positions (i.e. this information does not apply to local civil service positions). Theoretical IT knowledge is assessed for the “beginner user” level similar to the ECDL or ICDL certification levels.¹⁸⁰ While the reference seems to add more precision to this requirement, in fact, identifying the ECDL/ICDL certification level equivalent to a “beginner user” level is more complicated. For example, ICDL offers several certifications that could be construed as corresponding to a “beginner user” level (i.e., certifications other than ICDL Standard and ICDL Full Standard): ICDL Essentials (covering two modules: Computer Essentials and Online Essentials)¹⁸¹, ICDL Base (covering four modules: Computer Essentials, Online Essentials, Spreadsheets and Word Processing)¹⁸² and ICDL Prime (covering four modules: Computer Essentials, Online Essentials, Information Literacy and Application Essentials)¹⁸³. It should be noted that referencing ECDL/ICDL certifications, which attest that a person has certain digital skills/competences, blurs the distinction set out in the Administrative Code between theoretical IT knowledge and digital competences. Furthermore, referencing ECDL/ICDL certifications is confusing since, in fact, candidates for state or territorial civil service positions can prove they have the required theoretical IT knowledge only by passing the relevant preliminary testing described in paragraph 167 of this report, not by submitting certificates.
168. **Theoretical IT knowledge of candidates for state or territorial civil service positions is assessed in the preliminary testing,¹⁸⁴ which is part of the recruitment stage (also called the national competition)¹⁸⁵.** Preliminary testing of the theoretical IT knowledge is conducted in testing centers,¹⁸⁶ and consists of solving grid-tests,¹⁸⁷ using the competition IT platform.¹⁸⁸ The sets of tests that NACS purchases for assessing the theoretical IT knowledge of candidates must be endorsed by a public or private Romanian or foreign authority in the relevant area or by a pre-university or university educational institution with a department in the relevant area.¹⁸⁹
169. **The requirement to have theoretical IT knowledge at beginner user level is currently suspended for most of the civil service positions.** GEO No 121/2023 has set out transitional measures regarding the recruitment of civil servants. These measures include suspending the enforcement of the requirement to have theoretical IT knowledge at beginner user level in the case of local civil service positions until

179. According to Article 465(1) (g') of GEO No 57/2019 on the Administrative Code.

180. According to Article 47(3) of Annex No 10 to GEO No 57/2019 on the Administrative Code.

181. <https://www.icdl.it/moduli-e-certificazioni/icdl-essentials> (accessed: 08.02.2025).

182. <https://www.icdl.it/moduli-e-certificazioni/icdl-base> (accessed: 08.02.2025).

183. <https://www.icdl.it/moduli-e-certificazioni/icdl-prime> (accessed: 08.02.2025).

184. According to Article 3(ee) of Annex No 10 to GEO No 57/2019 on the Administrative Code.

185. The recruitment stage (national competition) is the first stage of the competition, which is one of the ways to fill state and territorial civil service positions.

186. According to Article 48(1) of Annex No 10 to GEO No 57/2019 on the Administrative Code.

187. According to Article 45(1) of Annex No 10 to GEO No 57/2019 on the Administrative Code.

188. According to Article 45(4) of Annex No 10 to GEO No 57/2019 on the Administrative Code.

189. According to Article 47(1) of Annex No 10 to GEO No 57/2019 on the Administrative Code.

31.12.2026,¹⁹⁰ and in the case of state and territorial civil service positions until the Government decision on the first recruitment plan¹⁹¹ enters into force.¹⁹² As an exception, the requirement to have theoretical IT knowledge at beginner user level was not suspended and still applies in the case of certain state and territorial civil service positions, namely, execution-level positions at the professional grade of entry-level and assistant, and management-level positions of director and deputy director,¹⁹³ included in the recruitment plan approved by Order No 243/2024, issued by NACS, which are subject to the extended national competition.

170. **According to the Administrative Code, specific competences, including, if applicable, digital competences, are used in the recruitment of civil servants, in the appraisal of the individual professional performance of certain civil servants, and in implementing changes to the service relationship of civil servants.**¹⁹⁴ Specific competences required for state or territorial civil service positions are assessed in the selection stage, which is the second phase of recruitment for these position,¹⁹⁵ while specific competences required for local civil service positions are assessed in the job-based competition¹⁹⁶. Specific competences are also used in the appraisal of the individual professional performance of staff holding high-level civil service positions and state and territorial management and execution level civil service positions.¹⁹⁷ Finally, specific competences are assessed when the service relationship of civil servants is changed as a result of promotion to a management level position,¹⁹⁸ secondment,¹⁹⁹ transfer,²⁰⁰ and holding a management-level or a high-level civil service position on a temporary basis.²⁰¹
171. **The specific competences for each civil service position, including, if applicable, the digital competences, are expected to be identified by the public authorities and institutions, and to be reflected in the job descriptions.** Every public authority/institution can identify the specific competences for each of the civil service positions in its organizational chart, following an analysis process conducted by a working group set up at the level of the public authority/institution.²⁰² The identified specific competences are subject to the approval of the head of the public authority/institution²⁰³ and, afterwards, to endorsement by NACS.²⁰⁴ After receiving the endorsement issued by NACS on the specific competences put forth by the public authority/institution, the standardized job description is filled in with those specific competences²⁰⁵.

190. According to Articles V(2) and VII of GEO No 121/2023.

191. According to Article 467(5) of GEO No 57/2019 on the Administrative Code, a recruitment plan for the state and territorial civil service positions to be filled by way of the competition referred to in 467(3) of GEO No 57/2019 on the Administrative Code should be drawn up by NACS and approved by Government decision.

192. According to Articles V(2) and XV of GEO No 121/2023.

193. According to Articles V(3) and XIII of GEO No 121/2023.

194. According to Article 6 of Annex No 8 to GEO No 57/2019 on the Administrative Code.

195. According to Article 467(3) of GEO No 57/2019 on the Administrative Code.

196. According to Article 467(7) of GEO No 57/2019 on the Administrative Code.

197. According to Article 398¹ and Article 485¹ of GEO No 57/2019 on the Administrative Code.

198. According to Article 482 of GEO No 57/2019 on the Administrative Code.

199. According to Article 505 of GEO No 57/2019 on the Administrative Code.

200. According to Article 505 of GEO No 57/2019 on the Administrative Code.

201. According to Article 505 of GEO No 57/2019 on the Administrative Code.

202. This analysis process is regulated in Annex No 8 to GEO No 57/2019 on the Administrative Code and in Order No 332/2024, issued by NACS.

203. According to Article 30(3)(c) of Annex No 8 to GEO No 57/2019 on the Administrative Code and Article 6(1)(c) of the framework methodology approved by Order No 332/2024, issued by NACS.

204. According to Article 30 of Annex No 8 to GEO No 57/2019 on the Administrative Code and Article 15(1) of the framework methodology approved by Order No 332/2024, issued by NACS.

205. According to Article 31 of Annex No 8 to GEO No 57/2019 on the Administrative Code and Article 17 of the framework methodology approved by Order No 332/2024, issued by NACS.

Current legal provisions regarding proficiency levels and certification of digital skills

172. **For each of the specific competences of a given civil service position, a required level of complexity is expected to be set out in the job description.** The Administrative Code provides that the levels of complexity for digital competences are set out in reference to the ECDL/ICDL certification levels or in a similar way to the levels provided for the digital competence test at the baccalaureate exam (namely: beginner user level, intermediate user level, advanced user level, expert user level).²⁰⁶ Where appropriate, the levels of complexity for digital competences are set out following the analysis and approval process port. When referring to the levels of complexity for digital competences, the Administrative Code includes only generic references to ECDL/ICDL certification levels and to a sui generis scale consisting of several levels of complexity mirroring the scale provided for the relevant test in the baccalaureate exam. While this approach does confer a higher degree of freedom in defining the required types of digital competences and their levels of complexity, it also places an added strain on public authorities and institutions' HR staff to define and apply them.
173. **There are no guidelines/methodology for public authorities/institutions to apply when determining the level of complexity of digital competences required for a given civil service position.** This can lead to cases in **which** the level of complexity of digital competences required for similar positions varies between different public authorities/institutions depending on their understanding of these levels. Since NACS is involved in endorsing all specific competences (including digital competences) put forth by public authorities/institutions, the agency could, in theory, oversee and enforce a common understanding of the connection between the duties of a type of position and the required level of complexity of the digital competences; in reality, this solution would be hindered by the fact that it would entail (i) NACS being able to commit additional, specialized resources to the process of endorsement of digital competences and (ii) fundamentally changing the nature of this endorsement process from a verification of compliance with the formal legal requirements to an in-depth analysis of the duties set out for each position.
174. **There is no indication on how the sui generis scale of the complexity levels of digital competences (beginner, intermediate, advanced, expert) should be defined and applied.** In the case of the scale used in the baccalaureate exam, which is quoted as the reference, the legislation clearly defines how the different levels of digital competencies can be achieved. Thus, in the *Procedure for the organization and conduct of the test for assessment of digital competences (Test D) within the national baccalaureate exam – 2024*,²⁰⁷ the level of digital competence that candidates achieve is linked to the final score they obtained (0-30 points – beginner user; 31-55 points – intermediate user; 56-74 points – advanced user; 75-100 – expert user) in tests that are developed at national level by a single institution (namely, the National Center for Policy and Evaluation in Education) and then applied locally by each baccalaureate exam committee. Employing a similar approach to define and apply a scale of the levels of complexity of digital competences, as a type of specific competences required to fill a civil service position, faces several significant obstacles:
- ➔ Since there are no legally binding definitions of the criteria corresponding to the different levels of the scale, each public authority/institution uses, in fact, its own definitions, with the consequence of potentially having multiple and non-comparable scales (e.g., the criteria for achieving a beginner user level may be defined differently by each public authority/institution).
 - ➔ Even if legally binding definitions for criteria corresponding to the different levels of the scale did exist, the way in which compliance with those criteria is verified and interpreted would depend on

206. According to Article 11(4) of Annex No 8 to GEO No 57/2019 on the Administrative Code.

207. Available at https://cdn.edupedu.ro/wp-content/uploads/2024/11/Procedura_nr_3669_06_11_2024_bac_2025_proba-D.pdf (accessed 13.02.2025).

each public authority/institutions, since there are no standardized and comparable set of tests used to assess digital competences in all public authorities and institutions.

175. **The digital competencies required to fill a civil service position are verified either (i) by a digital competences certificate²⁰⁸ or (ii) by an additional test.²⁰⁹** The public authority/institution or, where appropriate, the competition committee for the recruitment of high-level civil servants decide on the way in which candidates for a given civil service position must prove that they have the required digital competences. Where digital competences are verified by certificate, that verification is part of the document-based assessment of eligibility requirements. Where digital competences are verified by additional test, that test is conducted by persons that have specialist training attested by law in the relevant field²¹⁰ (either civil servants within the public authority/institution or external consultants contracted by the public authority/institution),²¹¹ and the outcome of the additional test is either "admitted" or "rejected"²¹² (i.e. the additional test is limited to assessing whether or not the candidates meet the minimum requirement regarding the level of complexity of digital competences, not to assess the actual level of complexity of the digital competences that candidates actually have – e.g., where the requirement would be to have digital competencies at intermediate user level, the additional test will determine if candidates have digital competencies at intermediate user level, notwithstanding whether they have, in fact, digital competencies at beginner user level or at advanced user level).

176. **Using certificates as a proof of having the required digital competence raises some practical issues that derive mainly from the lack of clear legal references definitions regarding on how digital competences and their level of complexity should be defined:**

- Where the required digital competences are set out in reference to an ECDL/ICDL certification: there are no legal provisions on the rules/methodology regarding the equivalence between digital competences certifications issued by different providers (e.g., how do certifications issued outside the ECDL/ICDL framework compare to the ECDL/ICDL certifications). An exhaustive list of equivalence between all possible digital competence certifications may not be feasible. Nonetheless, an indicative list with the most widely used digital competence certifications, cross-referenced with the most common digital competences required for civil service positions, could be useful.
- Where the required digital competences are set out in reference to a scale (beginner user/intermediate user/advanced user/expert user): there are no legal provisions on the rules/methodology regarding the types of certificates that would correspond to a given level of complexity on that scale (e.g., which ECDL/ICDL certification would prove having digital competences at the intermediate user level). For example, such a methodology is provided for the acknowledgment and equivalence of ECDL and CERTIPOINT certifications in the context of the digital competences test (test D) within the national baccalaureate exam.²¹³ Such a regulatory solution may be more difficult to apply to digital competences required for civil service positions, due to the lack of a common scale of levels of complexity and to the wider range of possible digital competences required in the public administration.

208. According to Article 21(3)(b) of Annex No 8 to GEO No 57/2019 on the Administrative Code.

209. According to Article 21(1) of Annex No 8 to GEO No 57/2019 on the Administrative Code. The template of the job analysis report set out in Annex No 2 to Order No 332/2024, issued by NACS, provides that for each specific competence within the categories of language competences or digital competences the reference "document or documents attesting the specific competence in question/testing of specific competence by an additional test" must be filled.

210. According to Article 21(4) of Annex No 8 to GEO No 57/2019 on the Administrative Code.

211. According to Article 21(5) of Annex No 8 to GEO No 57/2019 on the Administrative Code.

212. According to Article 21(7) of Annex No 8 to GEO No 57/2019 on the Administrative Code.

213. The Methodology for the acknowledgment and equivalence of results obtained in examinations with European recognition for the certification of digital competences with the digital competences assessment test in the baccalaureate exam, laid down in Annex No 3 to the Order No 5219/2010. For example, according to this methodology, holders of the ECDL PROFIL BAC certification or the CERTIPOINT IC3 GLOBAL STANDARD 4 or IC3 GLOBAL STANDARD 5 are deemed to be expert users.

177. The additional test for verifying digital and other specific competences must be conducted in compliance with the procedure approved by the head of each public authority/institution.²¹⁴

While the minimum content of these procedures is laid down in the Administrative Code,²¹⁵ it is, as can be expected, generic and formal, leaving thus the decision on how the additional test will be effectively conducted entirely to the public authorities and institutions. Review of the publicly available procedures for conducting the additional test for specific competences has revealed that, usually, they are developed particularly for digital competences (i.e. not for all specific competences), without referring to a particular digital competence, and are focused on the administrative/operational aspects of the test (e.g., the fact that the involved experts must develop two sets/options of tests), without any indication on the content/topics of the test.²¹⁶ Some cases of procedures that are dedicated to certain digital competences and/or that have detailed indications on the topics for assessing digital competences have also been identified (these procedures include the topics for assessing digital competences referring to office suite software, broken down by type of application: word processor, spreadsheet, presentation, database etc.).²¹⁷

178. Currently, most of the provisions regulating specific competences (including digital competences) are either suspended or are yet to effectively enter into force. As in the case of the requirement to have theoretical IT knowledge at beginner user level, GEO No 121/2023 has set out transitional measures that suspend the enforcement of the legal provisions on the use of specific competences (including digital competences). Thus, in the case of local civil service positions, the provisions on using specific competences for recruitment²¹⁸, and for implementing changes to the service relationship are suspended until 31.12.2026.²¹⁹ Furthermore, the provisions on using specific competences for recruiting civil servants by way of the competition regulated in Article 467(3) of the Administrative Code are suspended for most of the state and territorial civil service positions²²⁰ until the Government decision on the first recruitment plan²²¹ enters into force²²². Finally, the provisions on using specific competences in

214. According to Article 21(6) of Annex No 8 to GEO No 57/2019 on the Administrative Code.

215. According to Article 21(6) of Annex No 8 to GEO No 57/2019 on the Administrative Code, the procedure for organizing and conducting the additional test must comprise at least: (i) the description of the additional test; (ii) the method of evaluation and of determining the "admitted" or "rejected" outcome; (iii) the way in which the "admitted" or "rejected" outcome is to be notified; (iv) the time limit for submitting complaints and the time limit for solving the complaints; (v) the way in which the final outcome of the additional test is to be notified.

216. Such procedures/methodologies for conducting the additional test for digital competences include:

→ the procedure developed by NACS, approved by Order No 675/2024, issued by NACS (available at https://www.anfp.gov.ro/R/Doc/2024/Proceduri%20concurhuri/Procedura%20testare%20competente%20IT_06.2024.pdf – accessed 16.02.2025);

→ the procedure developed by the National Integrity Agency, approved by Order No 16720/2024, issued by the National Integrity Agency (available at <https://integritate.eu/wp-content/uploads/2024/10/procedura-testare.pdf> https://www.anfp.gov.ro/R/Doc/2024/Proceduri%20concurhuri/Procedura%20testare%20competente%20IT_06.2024.pdf – accessed 16.02.2025);

→ the procedure developed by the National Agency for Child Rights Protection and Adoption, approved by Order No 587/2024, issued by the National Agency for Child Rights Protection and Adoption (available at <https://copii.gov.ro/1/wp-content/uploads/2024/06/Procedura-proba-suplimentara-testare-competente-IT.pdf> https://www.anfp.gov.ro/R/Doc/2024/Proceduri%20concurhuri/Procedura%20testare%20competente%20IT_06.2024.pdf – accessed 16.02.2025);

→ the methodology developed by the Competition Council (available at <https://www.consiliulconcurentei.ro/wp-content/uploads/2024/03/Metodologie-competente-digitale.pdf> – accessed 16.02.2025).

217. Such procedures/methodologies for conducting the additional test for assessing digital competences referring to office suite software include:

→ the procedure developed by the National Agency for Public Procurement, approved by Order No 1717/2024, issued by the National Agency for Public Procurement (available at <https://anap.gov.ro/web/wp-content/uploads/2024/07/Ordinul-nr.-1717-din-19.07.24.pdf> – accessed 16.02.2025);

→ the methodology developed by the National Institute of Statistics, approved by Order No 1333/2024, issued by the National Institute of Statistics (available at <https://insse.ro/cms/files/concurs/2024/metodologie-procedura-testare.pdf> – accessed 16.02.2025).

218. According to Article VII(2) of GEO No 121/2023.

219. According to Article VIII(2) of GEO No 121/2023.

220. With the exception of execution-level positions at the professional grade of entry-level and assistant, and management-level positions of director and deputy director.

221. According to Article 467(5) of GEO No 57/2019 on the Administrative Code, a recruitment plan for the state and territorial civil service positions to be filled by way of the competition referred to in 467(3) of GEO No 57/2019 on the Administrative Code should be drawn up by NACS and approved by Government decision.

222. According to Articles V(2) and XV of GEO No 121/2023.

I	Introduction	II	The EU policy framework	III	National strategies, policies and institutional arrangements	IV	Job analysis	V	International experiences	VI	Foresight	VII	Conclusions
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the individual professional performance appraisal process for civil servants that hold state or territorial civil service positions apply for the activity carried out starting from 01.01.2025.²²³

179. **Finally, ICT is one of the priority areas for the professional training and development of civil servants set out by NACS.** Each year public authorities and institutions must approve the annual professional development plan of the civil servants²²⁴, which summarizes the professional training and development needs of the civil servants they employ, as identified, mainly, in the individual professional performance appraisal process.²²⁵ The priority areas for the professional training and development as well as the topics specific to the professional training and development programs for civil servants are set out by NACS²²⁶ (the annual professional development plans may also include proposals for other topics than those set out by NACS). One of the priority areas for the professional training and development of civil servants, as set out in Order No 234/2022, issued by NACS, is ICT, which comprises 20 specific topics, like (i) obtaining the ECDL/ICDL, (ii) using project management applications, (iii) designing e-Government systems, (iv) web design (developing web applications), or (v) artificial intelligence (including helpdesk use).

223. According to Article 597(1)(i) of GEO No 57/2019 on the Administrative Code.

224. According to Article 459(1) of GEO No 57/2019 on the Administrative Code. This planning instrument is also mentioned in GD No 1066/2008.

225. According to Article 21(2) of Annex No 6 to GEO No 57/2019 on the Administrative Code and to Article 16 of GD No 1066/2008.

226. According to Article 401(1)(h) of GEO No 57/2019 on the Administrative Code.

3.6

Key takeaways informing the design of a digital competency framework and its institutionalization mechanisms

180. **Gaps in foundational digital competencies exist across the Romanian public administration, limiting the capacity to support digital transformation.** The digital competency assessment of public employees conducted by ADR shows a low level of digital proficiency, civil servants lacking essential digital skills.
181. **Lack of an integrated strategic framework and fragmented governance arrangements and overlapping institutional roles can potentially hinder the systematic development of digital competencies.** Digital transformation efforts are weakened by incompletely developed and fragmented strategic framework. Romania lacks a unitary digital transformation vision. This is compounded by unclear institutional mandates and weak coordination. ADR has a legal mandate to coordinate the digital transformation of the central public administration, but lacks enforcement mechanisms. ADR is also legally mandated to prepare and implement a national plan for the development of digital competencies in the central public administration, while NACS is responsible for competency-based HRM, including the identification of priority areas for training, but does not formally lead digital skills planning. INA has a structured approach to digital training, but lacks sufficient resources to advance its role. NACS is de facto advancing an impactful digital upskilling initiative targeting a quarter of all civil servants. A national digital skills plan for the public administration is needed to ensure structured coordination and alignment with digital transformation priorities.
182. **Legal and HR framework limitations create inconsistencies in digital competency recognition and application.** While IT knowledge is assessed in some recruitment processes, the lack of clear guidelines on defining and verifying digital competencies creates inconsistencies across institutions. Reliance on private certification schemes (e.g., ECDL) without clear equivalencies limits flexibility, and there is no mechanism to integrate digital competencies into performance management and career development.
183. **While universities offer relevant mostly initial digital education across disciplines, digital competencies acquired through academic programs are not formally recognized** in recruitment or career advancement in the public administration. In addition, improved focus on digital skills and attitudes, not only on knowledge acquisition is needed. Strengthening ties between universities and public administration could ensure more targeted digital (up)skilling.
184. **The insufficient institutionalized training and continuous learning mechanisms slow digital competency development.** INA and other training providers, including universities and private sector training providers offer digital skills programs, but there is no structured mechanism to align training content with evolving digital competency needs. In addition, no unitary quality standards for public administration staff training are in place. NACS training initiative under NRRP is a significant step forward but lacks a long-term sustainability strategy.

185. **The effective operationalization of Romania's digital transformation initiatives needs a public administration workforce equipped with foundational and specialized digital skills.** Foundational competencies relate to basic data literacy for data management and digital workflows, digital content handling, including digital communication and collaboration, cybersecurity awareness, and digital transformation skills.
186. **The multitude and complexity of digital transformation initiatives presents a challenge for defining general digital competences that would be expected to apply similarly across the entire civil service.** While foundational digital skills should be defined for all, the construction of specific profiles could be explored to tailor proficiency levels and specific competencies to different roles. Policymakers for example will need digital competencies in data-driven decision-making, AI-assisted governance, regulatory oversight of emerging technologies, and public data ethics. For service delivery roles, skills in digital workflow management, E-service platforms, digital identity systems, digital communication through specific service interfaces, and automated public service applications are required. IT specialists must develop expertise in system interoperability, Cloud computing, AI deployment, cybersecurity operations, and database management to ensure development, operation and support in use of critical infrastructure.
187. **The need for digital leaders is critical to drive digital transformation within the public administration.** Digital leaders require competencies beyond technical expertise, including strategic digital governance, change management, the ability to lead digital innovation, manage digital transition processes, and ensure alignment between technology adoption and public sector modernization goals.
188. **A core set of specific digital competencies should be defined for sectors, to ensure proper differentiation from general digital competencies.** In healthcare, digital health record management, telemedicine coordination, and AI-assisted diagnostics are critical. In education, digital teaching tools, online curriculum development, and adaptive learning technologies are needed. In financial administration, blockchain for tax compliance, e-procurement systems, and digital financial analytics are essential.
189. **For the design of the future digital competency framework, the implementation of the digital initiatives in Romania's public administration implies general and specialized digital skills.** Unlike the foresight-driven roles envisioned for the long term that are included in Chapter VI, the roles highlighted below focus on the medium-term digital transformation, aligned with ongoing initiatives such as the Government Cloud Infrastructure, National Interoperability Platform (PNI), and AI-driven automation in governance. These roles span strategic leadership, ICT-intensive technical expertise, and service-oriented functions (Table 4).

TABLE 4: Examples of digital roles and digital skills derived from the review of the national digital initiatives

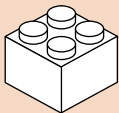
Strategic digital roles (Overseeing governance, compliance, and long-term digital transformation)	ICT-intensive roles (Technical expertise in AI, data, and cybersecurity)	Service delivery and citizen-focused roles (Bridging digital systems with public needs)
<i>Digital transformation officer</i> – Leads modernization efforts across government agencies, ensuring alignment with national digital strategies.	<i>Cloud and interoperability specialist</i> – Supports the integration of cloud-based services and ensures seamless data exchange across government agencies.	<i>Citizen engagement and digital literacy officer</i> – Supports public access to digital services, reducing the digital divide, particularly in rural areas.
<i>Chief data officer</i> – Oversees data governance, interoperability, and AI-driven analytics to support decision-making.	<i>AI and automation specialist</i> – Develops and oversees AI-driven tools for case management, predictive analytics, and fraud detection.	<i>Digital service integration coordinator</i> – Facilitates collaboration between automated systems and human oversight in service delivery.
<i>Cybersecurity and digital governance officer</i> – Manages regulatory compliance, risk mitigation, and data protection across public institutions.	<i>Cybersecurity and digital identity specialist</i> – Manages secure authentication systems such as ROeID and ensures compliance with EU cybersecurity regulations.	<i>Digital communication and open data officer</i> – Manages government transparency efforts and ensures public accessibility to digital platforms.
<i>E-government platform manager</i> – Develops and maintains digital service platforms, ensuring accessibility and efficiency.	<i>Data governance and compliance officer</i> – Ensures secure data handling, adhering to GDPR and interoperability standards.	<i>Hybrid services coordinator</i> – Ensures seamless interaction between digital and in-person government services.
<i>Legal and regulatory digital specialist</i> – Interprets and enforces compliance with emerging e-government regulations and digital service frameworks.	<i>Tax and customs digital specialist</i> – Implements blockchain verification, automated compliance monitoring, and AI-driven financial oversight.	<i>Multilingual and accessibility support expert</i> – Improves digital services for linguistic minorities and people with disabilities.
<i>Smart infrastructure and municipal services coordinator</i> – Supports local governments in integrating and optimizing smart city initiatives.	<i>Judicial technology officer</i> – Manages digital evidence systems, e-court platforms, and AI-assisted legal analytics.	

190. **For the future digital competency framework, institutional roles will need to be clarified and enhanced.** NACS will manage and oversee the competency-based HRM system in the civil service by integrating digital skills, but ADR could also collaborate and potentially lead digital competency planning, especially for specialized roles, working closely with NACS and INA.
191. **A national digital skills plan for public administration should be established to ensure structured coordination and long-term alignment with digital transformation priorities.** Detailed institutional arrangement and capacity implications will be discussed in Output 3 under the TSI project. that will be developed under the TSI project on Developing a general digital competency framework for civil servants in Romania.
192. **Digital training programs should be expanded and institutionalized to ensure systematic digital upskilling.** Both bottom-up and top-down approaches to identify competency enhancement needs could be used. Whereas public authorities and institutions as ultimate beneficiaries of training could be involved in identifying the competency improvement needs according to their functioning needs, authorities and institutions responsible for the governance of the system could focus on the needs deriving from the strategic ambitions concerning the digital transformation of the public administration. INA and NACS could collaborate to develop standardized training modules linked to digital competency levels. The current NRRP-funded digital training conducted by NACS could evolve into a permanent, institutionalized digital capacity-building program with clear learning pathways. Specialized digital

skills will require training programs tailored to specific roles and the updating of the competency profiles for those roles will require close collaboration between NACS, ADR and INA.

193. **Recognition of digital competencies should be clarified and expanded to reflect the various pathways for digital skills development.** General and specific digital skills gained in higher education should be formally recognized in recruitment and career development processes.
194. **Collaboration between academia, INA and other accredited training providers, and public administration should be further explored, to co-develop training programs, research digital competency needs, and facilitate knowledge transfer.** Training providers can facilitate **specialized** courses, webinars, and workshops aimed at enhancing the digital skills of civil servants. By offering micro-credentials or other forms of certification in these domains and collaborating with international organizations and peer institutions, they can ensure that the public sector workforce remains up to date with evolving knowledge and good practices. These programs can be customized for different levels of public employees - from entry-level staff to senior policymakers - and delivered through various formats, including online, blended learning, workshops, and in-person training sessions. Moreover, universities can serve as research hubs for continuous improvement in these competency areas, fostering a feedback loop between academic research and public sector practice. This collaboration between academia and government would help cultivate a culture of lifelong learning within the public sector, enabling civil servants to adapt to the rapid pace of digital transformation.

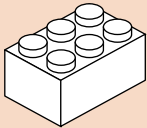
IV. Job analysis – digital competencies for current civil service roles



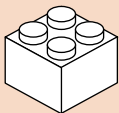
95 Scope of the review and methodological approach



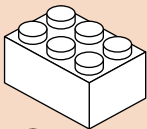
98 Overview of digital skills outlined in job descriptions



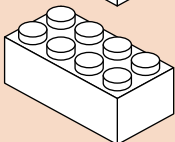
106 Core digital competency needs for general non-ICT roles: stakeholders consultations



109 Digital competencies for digital public services and digital transformation



112 Analysis of ICT roles in the public administration



120 Key takeaways informing the design of the digital competency framework and ICT roles

4.1

Scope of the review and methodological approach

195. **The bottom-up analysis focused primarily on the central public administration and was grounded in previous methodologies used to develop the general competency framework.** The data collection process, led by NACS and supported by the Bank team, covered 20 institutions within the central public administration. The process was designed to ensure the collection of information that would make the future framework relevant for the administration in Romania. During the design stage care will be taken to cover the specificities of the territorial and local levels of the public administration i.e., their predominant focus on public service delivery.
196. **To ensure a structured and comprehensive approach to data collection, the research methodology incorporated several key components,** as detailed below. The bottom-up analysis was structured around key research questions aimed at understanding the digital needs across various roles, from general civil service positions to specialized IT roles. The goal was to provide a comprehensive understanding of how digital competencies influence both current job functions and the evolving landscape of public administration. The research questions are included in **Annex 10**.
197. **First of all, a systematic analysis of job descriptions mapped relevant tasks to explicit and implicit digital skills required to performs those tasks.** DigCompRo²²⁷ and eCF were used to categorize digital competencies across various roles, including digital security, digital transformation, e-governance, public communication, digital content development, database management, IT infrastructure administration, software development, data analysis, and technology training and support. By assessing civil service job descriptions against the DigComp framework, the research ensured that mapped competencies aligned with current relevant frameworks.
198. **In total, 2,380 unique files were collected from 18 out of 20 targeted institutions.** These documents, primarily job descriptions, served as the foundation for identifying current digital competencies within the public administration. Before analysis, each file underwent a quality assessment to ensure its suitability for automated processing, thereby guaranteeing accuracy and efficiency. Ultimately, 2,326 files were identified as valid job descriptions from 17 institutions. Of these, 2,300 (99%) were machine-readable, and 2,217 (96%) were successfully processed through automated methods. The job descriptions were meant to cover all types of jobs (civil service and contract-based jobs) across all professional grades. In this way, the sample collected was representative for the central public administration, across various types of organizations (ministries, agencies and control and inspection organizations).

227. Adopted through GEO 27/2025 on the approval of the Digital competency framework for the citizens of Romania.

TABLE 5: Successfully processed job descriptions by types of organizations

Category	Institution	Job descriptions processed
Service Delivery	NACS, National Fiscal Agency, Agency for Payments and Intervention in Agriculture, National Agency for Payments and Social Inspection, ADR, DNSC, National Institute of Statistics	800
Inspection & Control	Competition Council, Romanian Court of Accounts, Labor Inspection	146
Policy Making	Ministry of Internal Affairs, Ministry of Agriculture and Rural Development, Ministry of Energy, Ministry of Finance, Ministry of Justice, Ministry of Labor, Family, Youth and Social Solidarity, MIPE, SGG	1,271
Total	-	2,217

Source: Authors' elaboration

199. **The analysis of job descriptions followed two complementary approaches.** First, HR experts from the Bank team manually reviewed samples of job descriptions, identifying both explicit and implicit digital skills. At the same time, the Bank's AI tool was also used to process the anonymized data from job descriptions to categorize digital skills based on job profiles, department types, and institutions. This AI-driven process also included a comparative assessment against the Spanish digital competency framework.
200. **Additionally, internal procedures, methodologies, and guidelines related to the use of ICT systems were collected** (including the list of digital applications/tools/systems used in each institution, procedures, methodologies, list of projects with components in this area etc.). These materials provided insights into the explicit and implicit digital skills required across different sectors, guiding the future formulation of digital competencies.
201. **Secondly, stakeholders consultations provided critical insights into competency expectations.** Structured interviews and focus groups with experts in strategic planning, HR specialists, IT professionals, and policymakers ensured that practical job responsibilities aligned with documented expectations, allowing for necessary adjustments based on evolving digital competency needs.
- ➔ **Six focus groups were conducted between November and December 2024, engaging experts from the public administration:** experts in human resources, ICT specialists, strategic planning professionals, and those involved in digital components of EU-funded projects. The focus groups aimed to identify digital competency needs and existing gaps, particularly those not yet captured in job descriptions. Participants engaged in exercises analyzing job descriptions, identifying critical roles for digital transformation, and assessing existing competencies.
 - ➔ **In parallel, 23 interviews were conducted with heads of human resources, ICT departments, and leaders of strategic digital projects,** in January 2025. The interviews with HR and general administrative roles focused on identifying essential digital competencies, the challenges in ensuring these competencies, recent digital transformation initiatives, the role of AI in public administration, and expectations regarding a general digital competency framework. The interviews with ICT managers and experts aimed to identify essential digital competencies, challenges in ensuring these competencies, recent digital transformation initiatives, the role of AI in public administration, and expectations regarding a general digital competencies framework and the definition of specialized ICT roles.

202. **Finally, two working groups consisting of HR and ICT specialists were convened in February 2025 to discuss the preliminary findings.** Within the HR working group, the discussion revealed that while some areas were seen as less relevant, DigComp was generally confirmed to cover the core digital competencies required in public administration. However, certain processes and roles were not directly identifiable within the framework.
203. **The analysis faced a series of limitations stemming from the quality of job descriptions and the subjective nature of stakeholders' consultation.** One key limitation was the variability in job descriptions across institutions, which might have led to potential inconsistencies in documenting digital competencies. Additionally, differences in stakeholder perspectives on digital competencies may have influenced the interpretation of the competency framework. To address these challenges, the WB technical team supported a comprehensive stakeholders mapping and implemented proven working models, previously used for the development of general competencies in Romania. The consultation process was comprehensive, involving structured discussions with ICT managers, digitalization project leaders, trainers, program developers, gathered through focus groups, interviews and working groups.
204. **For the analysis of ICT roles, the Bank team examined relevant EU frameworks targeted to ICT professionals, namely the European e-Competence Framework (e-CF) and the European Cybersecurity Skills Framework (ECSF).** Other frameworks were also studied, namely SFIA (which is also targeted to ICT professionals), ESCO (which addresses all occupations) and DigComp (which addresses the general public). A summary of the e-CF and ECSF is included in *Annex 2. E-Competence Framework (e-CF) and European Cybersecurity Skills Framework (ECSF)*. Desk research was also conducted, and no gaps were identified between e-CF and ECSF frameworks and current payroll functions (law 153/2017) and other public documents, such as Rules of order and operation IT Department Ministry of Finance²²⁸ - see also *Annex 3. Analysis e-CF competencies*.
205. **The initial assessment confirmed that e-CF and ECSF competencies comprehensively cover the needs of ICT professionals in Romanian PA institutions.** As a result, both frameworks were used to structure and conduct the second phase of the bottom-up analysis, including focus groups and interviews, and will continue to guide the design phase.

228. https://mfinante.gov.ro/static/10/Mfp/rof2024/4_21_CNIF.pdf

4.2

Overview of digital skills outlined in job descriptions

206. **The analysis of digital competencies based on the job descriptions revealed structural inconsistencies but also relevant trends that define the current digital skills landscape in public institutions.** The dataset of job descriptions provided a substantial base for understanding digital competency requirements. A systematic methodological approach was applied, incorporating natural language processing (NLP) techniques, clustering algorithms, and statistical tests to extract meaningful insights. The complexity of the dataset required advanced processing steps such as text normalization, anonymization, and dimensionality reduction. Despite this, challenges arose due to the lack of standardized document formatting across institutions, inconsistent job classification systems, and vague competency descriptions, which often led to the necessity of extracting digital competencies implicitly from job responsibilities.

BOX 4: Methodological steps for data structuring (analysis of job descriptions)

During the review and extraction of job descriptions, several challenges emerged that influenced the automation workflow. The lack of standardized formatting across institutions required adaptive methods to capture relevant fields. The presence of multiple file formats demanded varied extraction approaches and conversion techniques. Additionally, inconsistencies in job classification and file naming conventions created difficulties in mapping positions to job descriptions. Inconsistent terminology across institutions resulted in divergent definitions of roles and responsibilities.

To address these complexities, the Bank team established a structured workflow. The first step involved systematically identifying and filtering the files, where documents were inventoried, reviewed, and categorized to isolate valid job descriptions while removing irrelevant or duplicate files. Next, the data was cleaned and standardized to eliminate duplicates and normalize file names, ensuring streamlined classification. Machine-readable files were then processed using text-extraction algorithms, whereas non-editable PDFs were flagged for manual intervention or OCR. Finally, the team integrated the extracted text into a standardized database, facilitating large-scale competency analysis. Of the 2,300 machine-readable job descriptions, 2,217 (96%) were successfully processed, forming a robust dataset for subsequent analysis.

Moving forward, the Bank team:

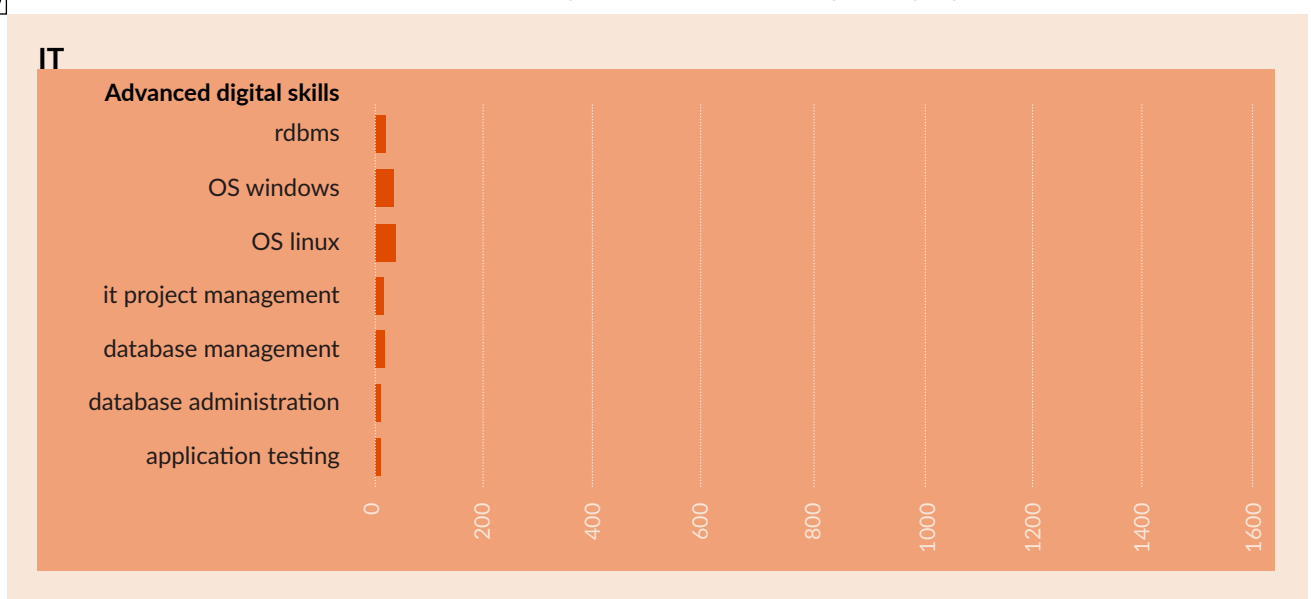
- **enabled a detailed examination of workforce competencies, by transforming the unstructured job descriptions into an analyzable format, highlighting patterns in skill requirements and variations in job classifications.** The subsequent phase involved the application of advanced Natural Language Processing (NLP) methodologies and further data refinement activities. The Bank team conducted a systematic verification of processed job descriptions to identify discrepancies, correct formatting issues, and ensure data integrity. Preparatory NLP tasks, including standardization, feature extraction, tokenization, lemmatization, and vector embeddings, were applied to enable deeper analytical exploration, with some tasks leveraging World Bank AI tools to ensure comprehensiveness. Finally, the Bank team integrated the cleaned and standardized job descriptions into a centralized workforce database, allowing for cross-institutional comparisons.
- **classified competencies into explicit and implicit mentions.** Explicit mentions included clearly stated skills such as “advanced Excel” or “SQL database administration,” while implicit mentions referred to skills inferred from responsibilities, like “data entry” implying familiarity with spreadsheet tools.
- **used data normalization and clustering methods to analyze competency distribution.** Principal Component Analysis (PCA) and spherical K-means clustering helped provide insights into competency overlaps, revealing the hybrid nature of many public sector roles.

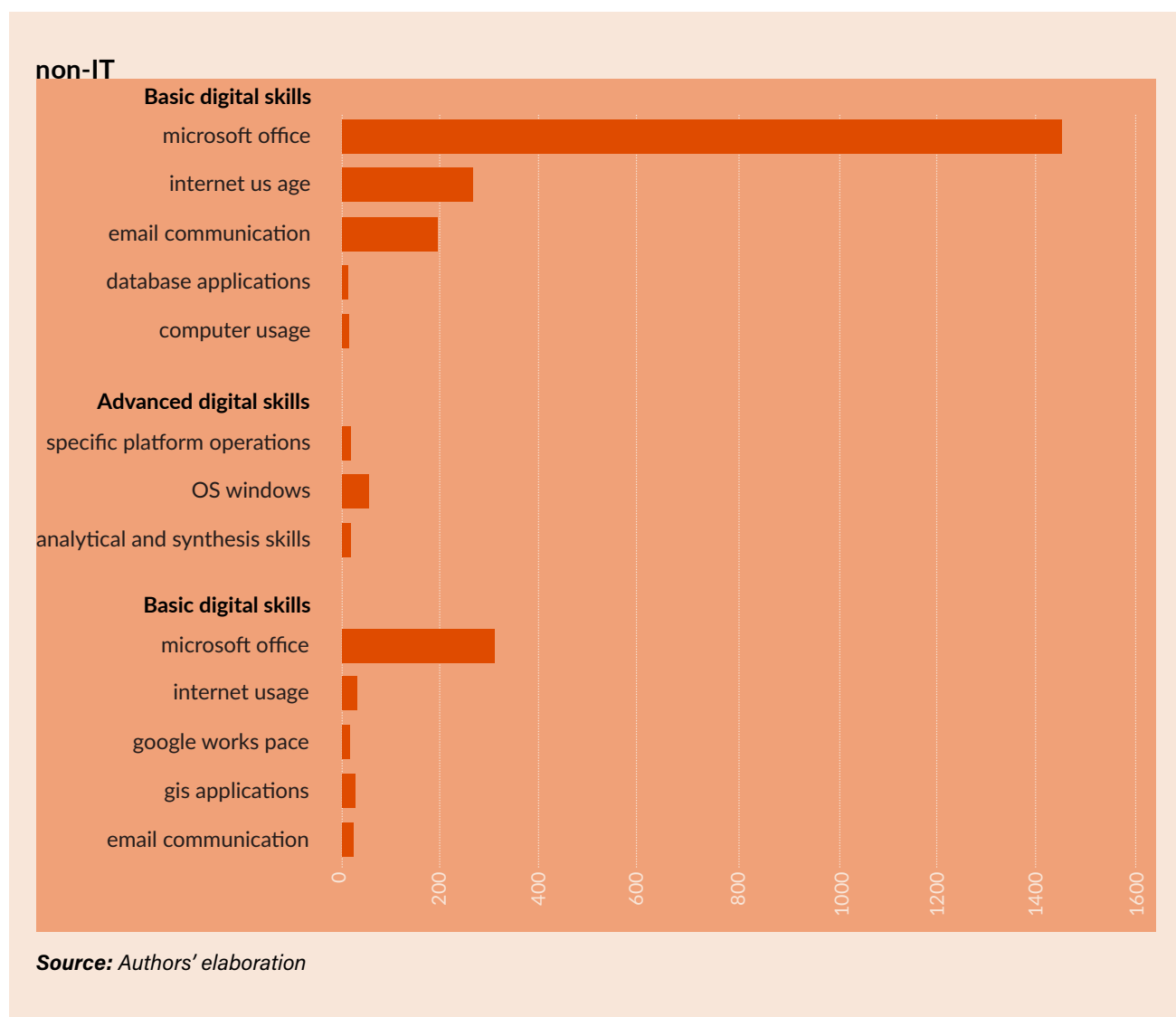
Explicit digital competencies

207. **The presence of explicit digital competencies in job descriptions is uneven, with a strong emphasis on basic office productivity skills.** Microsoft Office proficiency is the most frequently referenced digital skill, appearing in 74% of job descriptions. Excel, Word, PowerPoint, and Outlook dominate, with no significant variance between institutions, departments or seniority levels. Beyond these, general IT literacy, email communication, and internet usage are commonly referenced but often vaguely formulated.
208. **Other digital competencies such as cybersecurity, database management, cloud computing, and data analytics only appear sporadically.** Notably, 15% of job descriptions contain no mention of digital skills at all, suggesting that digital proficiency is often assumed rather than explicitly defined. Implicitly, the analysis revealed additional digital competencies such as database usage, digital document archiving, online communication tools (Zoom, Webex, Teams), and cybersecurity, though their presence was scattered and inconsistently applied across roles.
209. **A major shortcoming is the failure to distinguish between general digital literacy and skills for specialized IT jobs.** Non-IT job descriptions frequently list digital tools without specifying required proficiency levels. In contrast, IT job descriptions reference a broad range of specialized skills, including Windows and Linux administration, database management, programming languages, and IT project management. However, no single digital competency dominates IT roles in the way Microsoft Office does in non-IT positions (see Figure 12).
210. **Additionally, job descriptions frequently lack clarity on how competencies align with relevant qualification standards and/or certifications.** Only a small number of job descriptions explicitly mention concrete certification requirements (e.g., ECDL), and even within IT roles, certification expectations remain vague, with broad references to “IT-related studies” rather than specific qualifications. This lack of formal digital certification requirements weakens evaluation across various HR processes, making it difficult to ensure that employees possess the necessary digital proficiency for their roles. Furthermore, while institutions have expressed interest in digital certification for employees, these requirements have not been reflected in job descriptions, creating a gap between institutional goals and formal competency expectations.



FIGURE 12: Top 10 Basic vs advanced digital competencies by category in IT vs non-IT roles





Implicit expectations of competency Levels: comparison with the Spanish Digital Competencies of Public Employees: Reference Framework

211. **The analysis of job descriptions also included a comparative assessment against the Spanish digital competency framework**, which helped identify implicit expectations regarding competency levels across various institution categories, hierarchical levels, professional grades, and role typologies. These findings provide insights into how digital skills levels could be better integrated into the public administration job descriptions in Romania. The analysis also confirmed the relevance of the Spanish framework for the Romanian public sector.
212. **The mapping of implicit digital skills revealed important implications in terms of types of institutions.** Inspection & Control institutions could be expected to place greater emphasis on compliance-related digital skills, Policy Making institutions prioritize data literacy and digital governance, and Service Delivery institutions require more hands-on digital proficiency. Specific applications, such as SICAP/SEAP in procurement, financial reporting tools in accounting, and specialized databases in legal and audit functions, further highlight institution-specific digital competency needs.
213. **While digital competency expectations remain moderate across institution types, significant statistical differences were observed across institutions.** An analysis of digital competency levels

across institutional categories based on the Spanish framework of digital competencies allowed mapping of proficiency levels based on the Spanish scale, which has three levels of proficiency levels — basic (A), intermediate (B), and advanced (C). The analysis revealed that the majority of job descriptions include responsibilities that imply digital skills usually at B level, indicating a moderate degree of digital proficiency. However, statistical comparisons confirm that digital skill requirements vary significantly across institutions.



FIGURE 13: Most Frequent Competency Levels by Institution Category

Competency	Institution Category		
	Inspection & Control	Policy Making	Service Delivery
6.2 Innovation in Public Services	B	B	B
6.1 Objectives and Mechanisms of Digital Transformation	B	B	B
5.2 Identifying Gaps in Digital Competence and Self-Learning	B	B	B
5.1 Identifying Technological Needs and Solving Technical Problems	B	B	B
4.3 Health and Environmental Protection	A	A	A
4.2 Personal Data Protection and Digital Identity	B	B	B
4.1 Device Protection	B	B	B
3.2 Copyright and Licenses	A	A	A
3.1 Digital Content Development	B	B	B
2.3 Digital Identity	B	A	A
2.2 Communication and Collaboration with Citizens	B	B	B
2.1 Communication and Collaboration within My Administration	B	B	B
1.5 Data Analysis and Exploitation	B	B	B
1.4 Storage and Retrieval of Information	A	A	A
1.3 Evaluation of Information	B	B	B
1.2 Navigation, Search, and Filtering of Information	A	A	A
1.1 Literacy in Digital Environments	B	B	B

Source: Authors' elaboration, using the proficiency levels of the Spanish framework of digital competencies (basic (A), intermediate (B), and advanced (C)).

214. **The hierarchical level of each public administration job in the data set does not significantly impact overall digital competency requirements, but it influences the nature of implicit digital skills.** Both execution-level and managerial positions in the data set exhibit similar overall digital competency distributions. However, while operational roles emphasize hands-on digital tool usage, management positions focus more on IT coordination and governance. Statistical tests, such as the Mann-Whitney U test, confirm that digital competency expectations shift from execution-level digital fluency to strategic digital oversight as employees move up the hierarchy. This is reflected in the lower emphasis on office productivity tools in management roles and a higher prevalence of skills related to IT governance, digital transformation leadership, and project management. Additionally, job descriptions for managerial roles often reference the ability to analyze and interpret data but rarely specify the tools required for these tasks.



FIGURE 14: Most frequent competency levels by hierarchical level

Competency	Hierarchical Level	
	Conducere	Executie
6.2 Innovation in Public Services	B	B
6.1 Objectives and Mechanisms of Digital Transformation	B	B
5.2 Identifying Gaps in Digital Competence and Self-Learning	B	B
5.1 Identifying Technological Needs and Solving Technical Problems	B	B
4.3 Health and Environmental Protection	A	A
4.2 Personal Data Protection and Digital Identity	B	B
4.1 Device Protection	B	B
3.2 Copyright and Licenses	A	A
3.1 Digital Content Development	B	B
2.3 Digital Identity	B	A
2.2 Communication and Collaboration with Citizens	B	B
2.1 Communication and Collaboration within My Administration	B	B
1.5 Data Analysis and Exploitation	B	B
1.4 Storage and Retrieval of Information	B	A
1.3 Evaluation of Information	B	B
1.2 Navigation, Search, and Filtering of Information	B	A
1.1 Literacy in Digital Environments	B	B

Source: Authors' elaboration, using the proficiency levels of the Spanish framework of digital competencies (basic (A), intermediate (B), and advanced (C)).

215. **Professional grades also influence digital competency expectations.** Employees in debutant (entry-level) and assistant (junior) roles show the highest number of digital competencies explicitly mentioned, as their work often involves direct engagement with digital tools. Mid-career employees (principal) maintain a similar competency profile, whereas senior positions (superior) show a decrease in explicitly stated digital skills, likely due to their shifting focus toward supervision, coordination, and decision-making. The Analysis of Variance (ANOVA) test²²⁹ results confirm that digital implicit competency expectations change significantly based on job grade, with professional grade exerting a greater influence on digital competency requirements than hierarchical level. Additionally, while entry-level positions emphasize hands-on digital tool use, senior-level positions incorporate digital governance, IT project management, and strategic oversight more prominently.

229. The ANOVA (Analysis of Variance) test is a statistical method used to compare the means of three or more groups to determine if there are any statistically significant differences between them and help identify the sources of variation in the data.



FIGURE 15: Most frequent competency levels by professional grade

Competency	Professional Grade					
	Debutant	Asistent	Principal	Superior	Management	Necunoscut
6.2 Innovation in Public Services	A	A	B	B	B	B
6.1 Objectives and Mechanisms of Digital Transformation	A	A	B	B	B	B
5.2 Identifying Gaps in Digital Competence and Self-Learning	A	A	B	B	B	B
5.1 Identifying Technological Needs and Solving Technical Problems	A	A	B	B	B	B
4.3 Health and Environmental Protection	A	A	A	A	A	A
4.2 Personal Data Protection and Digital Identity	A	A	B	B	B	B
4.1 Device Protection	A	A	B	B	B	B
3.2 Copyright and Licenses	A	A	A	A	A	A
3.1 Digital Content Development	A	A	B	B	B	B
2.3 Digital Identity	A	A	A	A	B	B
2.2 Communication and Collaboration with Citizens	A	A	B	B	B	B
2.1 Communication and Collaboration within My Administration	A	A	B	B	B	B
1.5 Data Analysis and Exploitation	A	A	B	B	B	B
1.4 Storage and Retrieval of Information	A	A	A	A	B	B
1.3 Evaluation of Information	A	A	B	B	B	B
1.2 Navigation, Search, and Filtering of Information	A	A	A	A	B	B
1.1 Literacy in Digital Environments	A	A	B	B	B	B

Source: Authors' elaboration, using the proficiency levels of the Spanish framework of digital competencies (basic (A), intermediate (B), and advanced (C)).

216. **The differences between IT and non-IT roles are substantial, both in the breadth and depth of required digital competencies.** IT roles display highly specialized and fragmented skill requirements. The most commonly mentioned competencies in IT job descriptions include system administration, network security, database management, programming, and cybersecurity. Unlike non-IT roles, where Microsoft Office proficiency is almost universally required, IT roles show a wide distribution of specialized digital skills without a clear competency standard. In contrast, non-IT roles overwhelmingly prioritize office productivity tools. Regulatory and administrative competencies also appear frequently in non-IT job descriptions, reinforcing the importance of digital document handling, the use of public procurement systems, and regulatory compliance tools. Despite this, job descriptions do not clearly distinguish between digital competencies needed for different levels of expertise within IT roles, leading to a lack of structured progression.



FIGURE 16: Most frequent competency levels, IT vs Non-IT roles

Competency	Role Category	
	IT	non-IT
6.2 Innovation in Public Services	B	B
6.1 Objectives and Mechanisms of Digital Transformation	B	B
5.2 Identifying Gaps in Digital Competence and Self-Learning	B	B
5.1 Identifying Technological Needs and Solving Technical Problems	B	B
4.3 Health and Environmental Protection	A	A
4.2 Personal Data Protection and Digital Identity	B	B
4.1 Device Protection	B	B
3.2 Copyright and Licenses	A	A
3.1 Digital Content Development	B	B
2.3 Digital Identity	B	A
2.2 Communication and Collaboration with Citizens	B	B
2.1 Communication and Collaboration within My Administration	B	B
1.5 Data Analysis and Exploitation	B	B
1.4 Storage and Retrieval of Information	B	A
1.3 Evaluation of Information	B	B
1.2 Navigation, Search, and Filtering of Information	B	A
1.1 Literacy in Digital Environments	B	B

Source: Authors' elaboration, using the proficiency levels of the Spanish framework of digital competencies (basic (A), intermediate (B), and advanced (C)).

217. **Digital competency proficiency expectations also vary across job roles, despite similar intermediate ratings (B).** IT roles consistently maintain intermediate competency levels, with few exceptions rated basic (A). Core policy and service delivery roles exhibit nuanced differences, with some skills like digital identity often assessed at level A. Statistical analysis (Kruskal-Wallis) confirms significant distribution differences, indicating that while broad competency levels are aligned, specific skill requirements vary based on role-specific operational demands.
218. **The findings from the analysis of job descriptions suggest that while digital competencies are recognized as essential across public administration, their integration into job descriptions remains highly inconsistent and underdeveloped.** While basic digital literacy is a near-universal requirement, more advanced digital competencies are poorly defined and inconsistently applied across roles. IT job descriptions show a fragmented distribution of specialized skills, while non-IT roles focus primarily on office productivity. The absence of clear digital certification requirements, the vague articulation of digital skill expectations, and the lack of a structured competency framework all contribute to inefficiencies in workforce planning, hiring, and training. Furthermore, a conceptual inconsistency in defining digital competencies - mixing knowledge, skills, and tools without clear role differentiation - reduces the effectiveness of job descriptions as recruitment and performance management tools. A more structured approach to defining and integrating digital competencies in public administration job descriptions is necessary to improve workforce efficiency and adaptability to digital transformation. The evidence strongly supports the need for a standardized digital competency

framework, building on DigiComp, to clearly define required digital skills across different job categories. Improved competency articulation, clearer certification requirements, and enhanced HR integration of digital skill assessments will be essential in ensuring that public sector employees are adequately prepared for the demands of a digitalized government.



FIGURE 17: Most frequent competency levels, role typology

Competency	Role Typology		
	Core policy/ service delivery	IT	Support roles
6.2 Innovation in Public Services	B	B	B
6.1 Objectives and Mechanisms of Digital Transformation	B	B	B
5.2 Identifying Gaps in Digital Competence and Self-Learning	B	B	B
5.1 Identifying Technological Needs and Solving Technical Problems	B	B	B
4.3 Health and Environmental Protection	A	A	A
4.2 Personal Data Protection and Digital Identity	B	B	B
4.1 Device Protection	B	B	B
3.2 Copyright and Licenses	A	A	A
3.1 Digital Content Development	B	B	B
2.3 Digital Identity	A	B	A
2.2 Communication and Collaboration with Citizens	B	B	A
2.1 Communication and Collaboration within My Administration	B	B	B
1.5 Data Analysis and Exploitation	B	B	B
1.4 Storage and Retrieval of Information	A	B	A
1.3 Evaluation of Information	B	B	B
1.2 Navigation, Search, and Filtering of Information	A	B	A
1.1 Literacy in Digital Environments	B	B	B

Source: Authors' elaboration, using the proficiency levels of the Spanish framework of digital competencies (basic (A), intermediate (B), and advanced (C)).

4.3

Core digital competency needs for general non-ICT roles: stakeholders consultations

219. **Current job descriptions often emphasize basic proficiency with Microsoft Office tools, but the digital landscape of public administration demands a far more extensive skill set.** Public administration staff must navigate complex administrative responsibilities that require more than just familiarity with Word, Excel, and PowerPoint. Focus group discussions with experts in strategic planning, HR specialists, IT professionals, and policymakers have revealed a pressing need for foundational digital competencies that encompass cybersecurity awareness, document management, digital communication tools, and electronic signatures. These skills are no longer supplementary but essential for ensuring efficiency, security, and compliance in modern governance.
220. **Proficiency in digital tools is a prerequisite for all public administration staff, yet this proficiency extends beyond merely using software.** Employees must not only operate Microsoft Office programs, email, and internet browsers but also have the ability to navigate folder systems, recognize cybersecurity threats, and implement protective measures - such as secure passwords, device protection, and identifying malicious emails. Effective document management practices, including archiving, scanning, and utilizing document management systems, enhance workflow efficiency. Meanwhile, digital communication tools, including videoconferencing platforms like Teams and Zoom, facilitate internal and external collaboration. Mastery of digital signatures and GDPR compliance for document transmission is increasingly necessary to maintain secure and lawful practices.
221. **Beyond these fundamental competencies, certain roles require specific digital skills, which are specific to a functional domain, a certain job profile or an institution.** HR professionals must be proficient in recruitment platforms, workforce planning tools, and HR management systems. Financial specialists rely on budgeting software, financial reporting platforms, and data analysis tools, while auditors and analysts need deep expertise in databases and data analysis and interpretation. Legal professionals require familiarity with legal databases to conduct research, while IT staff must possess advanced technical skills tailored to system administration, cybersecurity, and network management. The increasing reliance on data has also created a need for potentially defining a specific profile of data analyst within public institutions. However, many public administration staff struggle to develop such competencies due to demanding workloads, and skill development remains sporadic.
222. **Participants to focus groups have called for a structured approach to digital training, incorporating both general and role-specific skill development.** Public institutions need to address institution-specific digital competencies by ensuring that employees receive training in proprietary software and platforms. Distinguishing between the digital needs of IT and non-IT staff is crucial in providing the right training and tools for each role.

223. **In focus groups, job description reflection exercises have highlighted the importance of both explicit and implicit digital skills, particularly in policymaking and strategic planning.** Participants emphasized the necessity of proficiency in data analysis and visualization tools, dashboards, spreadsheets, and cloud-based platforms. These tools are indispensable for decision-making, forecasting, and monitoring policy impacts. As AI tools become more integrated into government operations, officials must be equipped to query AI systems effectively and critically interpret outputs. The ability to use statistical analysis software and create visual representations of complex data is also growing in importance, particularly when presenting insights to policymakers. Strong presentation skills are vital in transforming raw data into digestible, actionable reports. Additionally, access to macro-level data and international policy trends through specialized platforms and libraries has become integral for civil servants engaged in policy development and strategic planning.

224. **Despite digital advancements, significant gaps remain in data-related competencies.** While most ministries collect and process data - often using Excel - there is a pronounced disparity in the ability to analyze, interpret and apply data insights effectively. Some respondents to interviews advocate for widespread data literacy across all roles, while others believe these competencies should be concentrated in policy development, data analysis, and strategic planning teams. A proposed solution in focus groups was the designation of specific jobs within each institution to manage, analyze, and present official data, ensuring evidence-based decision-making.

225. **Cybersecurity remains a crucial but underprioritized digital competency.** While many civil servants acknowledged its importance, only 21% of those who participated in interviews considered it critical for daily work, and 47% believed it should be a priority for all public employees. IT departments often lead cybersecurity awareness initiatives on safe browsing, GDPR compliance, and risk mitigation. However, focus groups showed that perspectives vary on whether cybersecurity should be an organization-wide responsibility or remain under IT's purview. Some dismiss cybersecurity as nonessential, reflecting a persistent gap in understanding its role in safeguarding institutional integrity. Despite some institutions implementing cybersecurity training, participation remains low due to competing priorities and a lack of perceived urgency.

226. **The digital tools most frequently used in the public administration reflect the competencies deemed essential for public administration staff.** These include Microsoft Office, email platforms, videoconferencing software, SharePoint, cloud storage, and digital signatures. Institution-specific applications - such as MySMIS,²³⁰ Revisal,²³¹ SNI²³² databases, and European Commission procurement portals - are usually learned on the job rather than being a prerequisite for employment. This reliance on informal, ad-hoc learning contributes to inconsistencies in digital competency levels across departments. Many participants in interviews reported difficulties in the civil service with fundamental applications, with almost 70% of the public administration workforce estimated to be struggling with advanced Excel and Word functions. Furthermore, underutilization of features such as Outlook's calendar and reminder functions exacerbates inefficiencies. These disparities underscore the urgent need for structured training programs and standardized competency (self)-assessment.

230. MySMIS2021/SMIS2021+ is the unified IT system developed for the management of non-reimbursable financial assistance for the financial period 2021-2027, managed by the Ministry of European Investments and Projects, which interacts with the European Commission's IT system - SFC 2021 and which is designed on the principle of ensuring interoperability with other IT systems, so that it can provide at any time operational overviews as well as specific and detailed reporting, according to the needs of users. The MySMIS2021/SMIS2021+ information system includes the MySMIS2021 and SMIS2021 software applications and related software applications.

231. The General Register of Employees' Records (REVISAL) contains all individual employment contracts, with their related actions: conclusion, modification, suspension or termination. All employers are required to complete the Revisal register and can do so using the software distributed free of charge by the Labor Inspectorate or through their own software applications.

232. The purpose of the SNI is to interconnect local and central government IT systems and the data associated with these systems in a way that data can be shared between parties, regardless of the technology used to build the systems and regardless of the type of databases used. Access to the data shared through the SNI shall be exclusively via API connectors.

227. **Digital literacy is essential across all aspects of the public administration, from drafting official documents to managing digital projects and approving electronic workflows.** As new platforms - such as NACS' upcoming system for managing public administration staff' information - are introduced, digital proficiency will become even more central to administrative functions. However, the effectiveness of digital tools is often hindered by outdated IT infrastructure and resistance to change among employees. While younger staff tend to adapt quickly, they sometimes overlook accuracy, whereas older employees frequently struggle with digital adoption and prefer traditional methods.
228. **Ensuring that all public administration staff possess the necessary digital competencies is no longer optional but imperative.** Departments should conduct comprehensive assessments to identify and address digital skill gaps, ensuring employees are adequately prepared for modern administrative demands. The growing adoption of digital platforms in EU institutions - such as E-Translation for document translation and E-Survey for registration management - illustrates the increasing necessity of digital fluency. Recruitment challenges also persist, as institutions struggle to attract and retain talent, with many professionals migrating to the private sector for better salaries and working conditions. This shortage places additional strain on teams, which are often overburdened, leading to burnout and high turnover rates.

4.4

Digital competencies for digital public services and digital transformation

229. **Digital transformation in public institutions requires leadership at both strategic and operational levels to guide the process effectively.** In focus groups, the discussions on who should lead digital transformation presented a balanced perspective, suggesting that the most effective approach combines both high-level strategic leadership and skilled operational management. At the strategic level, a senior civil servant such as a Secretary General or a political appointee, such as a State Secretary could take the lead. This role includes providing clear direction, ensuring alignment with the institution's priorities, securing necessary resources and budgets, and promoting the adoption of new digital infrastructures, processes and tools across all levels of the organization. The strategic leader should also play a crucial role in overcoming resistance to change and fostering a culture of digital transformation.
230. **Operational leadership is equally important for the day-to-day implementation of digital transformation projects.** A project manager or a *digital transformation officer*, ideally a director or a highly skilled professional, should lead the execution of these initiatives. This role requires a combination of strong project management skills and digital expertise, as well as the ability to coordinate cross-functional teams, including business, HR, IT, legal, and finance departments. The project manager must be able to translate strategic goals into actionable steps, ensuring that all team members understand their roles and responsibilities and that the digital initiatives align with broader institutional objectives, and that plans are implemented effectively and efficiently.
231. **The responsibility for implementing and managing digital solutions spans multiple departments and roles.** The IT department plays a central role in procuring, maintaining, and developing digital solutions, ensuring security, and providing ongoing technical support. Successful digital transformation requires close collaboration between departments, with the General Secretariat (SG) often overseeing the process, ensuring that initiatives align with broader government strategies.
232. **IT departments are seen at the heart of digitalization and digital transformation, being expected to provide the necessary technical expertise to drive digital projects forward.** As shown in section 4.5, their current responsibilities, beyond IT support for the other units, include creating and maintaining applications that improve institutional processes, procuring new technologies, and ensuring that cybersecurity standards are met. IT teams also collaborate with HR and business departments to ensure that the digital solutions implemented align with institutional needs and that employees are trained on the new systems. Despite their critical role, staffing shortages in key IT positions remain a challenge, and many institutions struggle to fill these vacancies, further complicating the digital transformation process.
233. **Non-IT personnel are also integral to the success of digital transformation initiatives.** They are responsible for defining project requirements e.g., by setting the parameters of the business processes pending digitalization, providing feedback, and ensuring that digital solutions meet both the operational needs of the organization and expectations of the service beneficiaries, either internal or external. Their

involvement in user testing, documentation management, and compliance monitoring is essential for the effective implementation of digital infrastructures, processes and tools. While they may not be involved in the project on a continuous basis, their contributions are crucial to ensuring that digital solutions are properly integrated into real-world workflows. In some institutions, business experts are formally included in the digital transformation process, helping to bridge the gap between technical teams and operational departments.

234. **Critical digital competencies need to encompass also the relevant attitudes.** Public administration employees must be able to navigate complex and rapidly changing internal and external conditions and processes and adapt to change. An innovative mindset, combined with the ability to cooperate with stakeholders and communicate the benefits of digital processes and tools, is crucial for overcoming resistance, internally among older employees who may be hesitant to embrace new technologies and externally, among citizens and businesses valuing stability and predictability over change.
235. **To effectively coordinate and lead digital transformation efforts, the introduction of a *Digital Transformation Manager* role was explored as a possible solution in focus groups.** This role would involve aligning modernization initiatives with institutional objectives, facilitating cross-departmental collaboration, and providing strategic oversight. Complementing this proposed role, other key existing positions include strategic leaders who provide vision and guidance, project leaders who ensure implementation, IT specialists who translate business needs into functional solutions, technical experts who analyze workflows and ensure compliance, process experts who map interdepartmental interactions, change management experts who address resistance, and financial and procurement specialists who handle budgeting and acquisitions. Additionally, trainers ensure that staff are prepared to effectively use new systems. Strong leadership from a central institution, like the ADR, is necessary to provide strategic vision, support capacity-building programs, and facilitate networking opportunities for digital transformation leaders.
236. **As the digital transformation landscape evolves, discussions have increasingly shifted toward the role of generative AI in public administration.** Consultations highlighted AI's significant potential to enhance efficiency, automate repetitive tasks, and improve service delivery. The majority of respondents identified automation as the most impactful benefit, allowing employees to redirect their efforts toward more complex, value-added responsibilities. AI tools can also facilitate faster access to critical information, support chatbot development for citizen-facing services, and streamline administrative processes. As AI adoption grows, ensuring ethical implementation and use and developing a well-defined strategy for AI integration within public institutions will be crucial.
237. **Training and upskilling are fundamental to the successful implementation of AI.** While advanced digital skills are not required for basic AI usage, respondents emphasized the need for structured training in data security, AI interaction, and responsible usage. The development of key competencies such as data literacy, AI awareness, and critical thinking is essential for public servants to make informed decisions and use AI responsibly. Basic digital literacy remains important, with skills such as word processing, internet navigation, and data interpretation being critical for effective AI integration. The effectiveness of training also depends on the delivery method. Forty percent of respondents favored in-person training, valuing its hands-on approach and the opportunity for real-time interaction with instructors and peers. In contrast, 30% preferred online training for its flexibility, while 20% saw value in a hybrid approach that combines the best of both in-person and online learning. Regardless of the delivery method, training should focus on practical skills that can be directly applied in the workplace, ensuring that public servants are equipped to use AI tools effectively.
238. **For digital public services, a set of key competency areas derived from focus groups and interviews for digital service delivery employees: data literacy, digital identity management, cybersecurity, digital collaboration and skills for user-centered service design, as shown in Box 5.**

BOX 5: Digital skills for digital service delivery – needs derived from the job analysis phase

- *Data analysis, digital identity and basic interoperability.* Beyond data literacy, public administration employees involved in digital public services (ICT-dependent jobs) need to be able to analyze and interpret data and be able to operate with digital identity management systems. Their skills should also cover the use of electronic signatures and secure authentication methods, to facilitate seamless and secure interactions between citizens and government services. A working knowledge of interoperability frameworks is equally important, as public services extensively rely on integrated digital platforms that must function smoothly across multiple agencies.
- *User centric service design and delivery.* Skills that ensure accessibility and user-friendly service design and delivery are essential. Public administration employees working on digital services should be trained in human-centered design, usability testing, and accessibility standards to ensure services meet the needs of all users.
- *Communication, collaboration and agility.* Beyond technical skills, strong communication and collaboration abilities are crucial, as effective digital transformation requires cooperation across departments and with external stakeholders. For example, Italy's Three-Year Plan for IT in Public Administration (2024-2026) underlines the importance of user experience (UX) design, accessibility compliance, and agile development in improving public-facing digital platforms.
- *Cybersecurity* is another critical area, particularly in protecting public sector data and ensuring compliance with privacy regulations such as GDPR. Public employees responsible for digital services could be expected to have foundational competencies in risk management, data protection measures, and cyber incident response, which should be targeted through regular training. Italy's National Cybersecurity Agency (ACN), for example, has implemented a Cybersecurity Awareness Program in collaboration with more than 30 public institutions to strengthen cyber resilience and promote good practices in the government sector and for citizens. There is a strong need for continuous training and structured upskilling in this area to keep pace with evolving digital threats and ensure public sector professionals can effectively manage secure digital services.



Analysis of ICT roles in the public administration

Key characteristics and challenges of IT jobs in the central public administration²³³

239. **ICT jobs in the central public administration represent only a small fraction of the total workforce, ranging between 1% and 3% of all positions²³⁴.** For this report, the Bank team estimates that, on average, ICT positions make up approximately 1.5% of total PA positions. This equates to roughly 12,500 ICT specialists out of an estimated 830,000 total positions in PA²³⁵. On the other hand, according to the Digital Decade Report 2024, the percentage of ICT specialists in employment has declined from 2.8% in 2023 to 2.6% in 2024 and is below the EU average of 4.8%²³⁶ (Spain has 4.4% and Italy 4.1%).

240. **ICT jobs encompass both civil servant and contract-based functions (job positions).**²³⁷ Within the Romanian context, the core theoretical distinction (with limited practical applicability) between civil servants and contractual staff is that only the former contribute to public authorities and institutions exercising state power prerogatives. The majority of ICT professionals are classified under the civil servant category. However, the job titles in this category don't clearly reflect the actual ICT roles and responsibilities as they are usually mapped in the organizational charts as "counsellors (advisors)" or similar civil service job titles. This lack of distinction makes it difficult to accurately define and align ICT positions with their specific functions, leading to ambiguity in role assignments.

241. **The analysis of the Public Sector Pay Law 153/2017, which regulates the public sector wage system, reveals an inconsistent approach to defining ICT roles.** In cases where ICT roles are specified in function (job position) titles, they are generally broad and unspecific, including titles such as IT Specialist, Programmer Analyst, and System Engineer. However, in some organizations, there are either more detailed ICT payroll functions (as seen in DNSC) or more specific ICT-related activities (such as those outlined for the Ministry of Internal Affairs and The Special Telecommunications Service²³⁸).

233. For ICT jobs, the terms in this section (e-CF competencies, ECSF roles profiles, and ICT roles), along with abbreviations, full names, and the target audience for the five frameworks (e-CF, ECSF, DigComp, ESCO, SFIA), are detailed in the Glossary section.

234. Ministry of Internal Affairs has around 124,000 total headcounts (positions), out of which 2200 ICT positions. Ministry of Finance has around 300 ICT specialists in central IT Unit and around 24,000 positions).

235. <https://mfinante.gov.ro/domenii/bugetul-de-stat/numar-salariati-bugetari>

236. Document available at: <https://digital-skills-jobs.europa.eu/en/european-interactive-map/romania>.

237. More details about civil servants and contractual employees www.anfp.gov.ro/R/Doc/2024/Publica%C8%9Bii/pliante/02pliant%20page%20by%20page.pdf

238. Law 153/2017, Chapter 2 Article XV: Personnel within the Special Telecommunications Service and the Ministry of Internal Affairs nominated in project teams financed from non-reimbursable/reimbursable external funds who carry out business analysis, development, testing, administration, operation, support and maintenance activities, including ensuring communications and cybersecurity for IT systems and applications for managing non-reimbursable/reimbursable financial assistance, benefit from an increase in basic salaries/position balances, calculated according to the hourly rates provided in the contracts/agreements/decisions/financing orders, regardless of the number of projects in which they are involved.

242. **The public sector environment faces several constraints that make ICT roles particularly challenging.** Unlike the private sector, government institutions operate under bureaucratic structures, complex hiring processes, and salary limitations. These factors make it difficult to attract and retain highly skilled IT professionals, who often seek better compensation and career growth opportunities in the private sector.
243. **One of the defining aspects of ICT personnel in the central public administration is the diversity of roles and responsibilities they fulfill.** ICT specialists perform various tasks, from system administration and network management to cybersecurity, software development, database administration, and ICT project management. Often, multiple roles are combined into a single position - for example, the same ICT specialist may serve as both a system administrator and a database administrator - resulting in an increased workload and multiple specialization.
244. **ICT units primarily focus on providing end-user support to ensure the daily operation of ICT systems.** A significant part of their workload is dedicated to assisting non-IT staff with basic office-related tasks, mainly due to the limited digital skills within the broader workforce. This misallocation of resources prevents ICT specialists from engaging in more complex and strategic activities, such as system development, cybersecurity, and digital transformation initiatives. As a result, highly skilled ICT professionals often find themselves performing routine technical support instead of leveraging their expertise for more advanced projects. This inefficient use of talent can demotivate, reduce job satisfaction, and potentially lead to higher staff turnover within ICT teams. The main findings related to ICT in PA are similar to those from the Justice Functional Review²³⁹ developed by the World Bank. The review examines the distribution of ICT professionals, vacancy rates, education levels, and key challenges such as staffing shortages, limited training programs, and resource constraints. The analysis highlights that most ICT activities focus on operational support rather than strategic digital transformation, emphasizing the need for better workforce planning and investment in ICT capabilities to drive modernization in the sector.
245. **ICT professionals in the public administration are often overwhelmed and overburdened.** Not only do they juggle multiple responsibilities — including administration of local networks, office equipment, software development, and server maintenance — but they also often perform non-ICT tasks. The core roles of developers, analysts, and testers are frequently combined into single positions, leading to burnout, demotivation, and further attrition. Moreover, ICT professionals are frequently tasked with responsibilities outside their domain, such as business analysis, specification writing, and procurement, simply because there is no structured collaboration between ICT and non-ICT staff.
246. **Another major challenge is the competency gap within IT teams.** Many institutions still rely on outdated legacy systems, requiring significant efforts to modernize and integrate new technologies. To keep up with digital transformation initiatives, ICT personnel must frequently undergo reskilling or upskilling. However, structured training programs and professional development opportunities remain limited in the public sector.
247. **Even within larger ICT departments, there is a similar absence of well-defined roles and competencies.** Despite having more resources, these departments still have unclear job structures, leading to inefficiencies and skill mismatches. A common practice observed across public institutions is the duplication of job descriptions for ICT specialists. In many cases, job descriptions are copied from one position to another, assigning almost identical competencies and responsibilities to various ICT roles that, under normal circumstances, should be distinct. This approach results in a lack of role specialization, making it challenging to align workforce skills with the actual needs of the institution.

239. World Bank, Report on the Functional Review of the Romanian Justice System, 2024. Available at: <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/099030124124017333>.

248. **The pressure on ICT job roles is also due to the widespread lack of basic digital competencies among non-ICT personnel.** Many ICT professionals find themselves diverted from their primary responsibilities to provide basic technical support for common office tools like Word, Excel, and email. This inefficient use of ICT expertise places additional strain on an already overworked workforce.
249. **Limited financial resources further constrain IT departments.** Budget restrictions often result in insufficient investments in new technologies, training, and recruitment. While the NRRP and other EU funding programs provide financial support for specific IT infrastructure and personnel interventions, these investments are often short-termed, misaligned with needed digital transformation processes and focused on particular issues.
250. **The attraction and retention of IT talent remains an ongoing challenge²⁴⁰.** Given the significantly higher salaries and better benefits available in the private sector, public institutions face difficulties in retaining experienced IT professionals. Average wage gaps for typical public administration IT profiles range between 40% and 100% compared to private sector jobs, for comparable profiles. This results in frequent staff turnover, leading to knowledge gaps and disruptions in IT service continuity. There is also an aging trend, especially due to issues on attracting and retaining highly skilled ICT specialists.
251. **Another major hurdle in retaining ICT specialists is the reluctance of institutions to invest in their training.** The fear that employees will leave after acquiring new skills has led to hesitancy in funding professional development. Attempts to mitigate this by contractually obligating employees to remain in the institution for a set period after receiving training have largely failed. Consequently, recruitment remains difficult, and many ICT job offers struggle to attract experienced candidates. Additionally, the certifications and training requirements often imposed do not always align with the practical needs of the roles, further complicating hiring efforts.
252. **Compounding these issues, training budgets are often the first to be cut when financial constraints arise.** Many professionals have not received relevant or high-quality training for years, or even since their initial hiring. Limited access to training stems from inadequate self-assessment and evaluation mechanisms, as well as a lack of alignment between training content and institutional needs. Additionally, the quality and recognition of ICT certifications vary significantly, and the absence of a standardized competency framework further restricts funding for essential training.
253. **The current ICT job roles in the central public administration are not aligned with the ambitions of the digital initiatives at EU and national levels.** The expanding framework of EU legislation adopted in the area of digitalization (see Chapter II) needs to be implemented by central public administrations and IT specialists are expected to play a key role in delivering the reform agenda. The Romanian Government is also investing actively to expand digital public services (mostly through EU funding), requiring ICT personnel to adapt to emerging technologies such as cloud computing, artificial intelligence, and advanced cybersecurity measures. Another critical challenge is the implementation and deployment of ongoing digitalization and digital transformation projects, on top of delivering the current and future day-to-day administration, management and maintenance of e-Government systems, such as electronic public services, e-procurement systems, government databases, etc. However, without adequate ICT human capacity and resources, these activities and long-term sustainability of these solutions remain uncertain and pose significant operational risks.

240. Analysis of public sector pay data conducted by the Bank. While salaries for junior staff are competitive, experienced MoF IT specialists experience an average wage gap of at least 40% compared to similar private sector profiles. This substantial disparity is a source of difficulties in retaining experienced talent within the Ministry. Moreover, the demographic distribution within the MoF IT unit skews towards older age groups, suggesting potential challenges in maintaining a skilled workforce. Addressing this wage gap is essential to bolstering the MoF's ability to retain skilled IT professionals and ensure operational effectiveness.

254. **A significant medium-term challenge, projected beyond 2026 (closure of the NRRP), is the continuation of the current approach where ICT teams in the central public administration remain understaffed.** This persistent shortage of skilled ICT professionals could significantly affect the sustainability and effectiveness of digital transformation initiatives within the public sector. In the coming years, many ICT projects currently being implemented under the NRRP will reach completion. As these projects transition from development to operational phases, the demands placed on ICT specialists will change significantly. Institutions will require a more significant number of ICT professionals and staff with better defined roles and more specialized skills to manage, maintain, and further develop the newly implemented systems. The shift from project-based implementation to long-term system development, administration and optimization will necessitate expertise in areas such as cybersecurity, data governance, system integration, and emerging technologies. If the current trend of understaffing in ICT departments persists, public institutions may struggle to fully leverage the benefits of digital transformation. The lack of sufficient ICT personnel could lead to inefficiencies, heightened cybersecurity vulnerabilities, and difficulties in maintaining and upgrading critical digital infrastructure. Addressing this risk requires a strategic approach to workforce planning, investment in ICT talent acquisition and retention, and a strong commitment to developing digital skills across all levels of PA.
255. **As digital systems become fully operational, there will be an increasing need for non-ICT personnel to become more digitally proficient.** Many administrative tasks will be automated or digitized, requiring staff across various departments to adapt to new workflows, use digital platforms effectively, and ensure compliance with evolving cybersecurity and data protection regulations (see section 3.3). This challenge highlights the necessity for continuous training programs and structured upskilling initiatives to bridge the digital skills gap among non-IT personnel.
256. **The absence of structured ICT roles and dedicated resources for upskilling negatively impacts the work of these specialists. Several aspects were identified during focus groups.**
- Excessively ambitious expectations from business (non-IT) towards ICT regarding detailed ICT support/assistance for basic digital competencies (e.g. basic utilization of office software such as Word/Excel).
 - Excessively ambitious expectations from ICT regarding process specifications, and especially for Business Process Reengineering (BPR) aspects of digital transformation initiatives, for implementation (modernization) of ICT systems.
 - Absence of upskilling opportunities.
 - The teamwork approach for Digital Transformation projects involving Business Process Reengineering (BPR) is limited.
257. **The absence of a clear, standardized framework for defining ICT roles and competencies limits not only effective human resource management but also the overall efficiency and security of digital services in the public sector.** Addressing this issue requires a structured approach to workforce planning, including developing clear job descriptions, competency frameworks, and role specialization guidelines that align with good practices in digital governance.
258. **Lack of clear definitions and common understanding between the terms/concepts of "digitization", "digitalization" and "digital transformation" is also a challenge.** Very often, what is called digital transformation projects are, in fact, digitization projects in the international concept (see GovTech concepts of WB and OECD). The first significant consequence is that there are different business practices, including responsibilities (IT and business) in project teams, especially on digital transformation projects. Another important consequence is the limited involvement of business leadership in business process reengineering (BPR) necessary for a successful implementation of digital transformation initiatives.

259. **The absence of clear and coherent business practices for outsourcing specific ICT roles is another significant challenge.** In other countries, a structured mechanisms exist for hiring individual experts on a short-term basis. For example, the World Bank engages short-term consultants, and the Directorate-General for Digital Services within the European Commission follows a similar approach to supplement existing IT staff. However, in Romania, the current legal framework provides limited opportunities for contracting an individual specialist that are different from procuring services from a company. Institutions should have more flexibility in addressing short-term capacity needs in order to contract expertise when needed, particularly in critical situations such as responding to cybersecurity incidents.

Exploring specialized ICT roles: foundations and design factors

260. **The initial assessment indicates that the competencies outlined in the e-CF²⁴¹, along with the associated e-CF and ECSF²⁴² roles, provide a comprehensive and well-structured foundation for defining ICT roles in the public administration.** These frameworks include detailed descriptions of skills, responsibilities, and proficiency levels, making them a valuable reference for establishing clear and standardized role definitions for ICT professionals in the public sector. These frameworks were confirmed as relevant for the future design phase. For example, some of the current ICT functions included in the Public Sector Pay Law 153/2017 – covering responsibilities in business analysis, development, testing, administration, operations, support, maintenance, communications, and cybersecurity assurance - can all be mapped to e-CF roles. In the design phase, additional details on competencies could be added to ensure a more precise and comprehensive mapping.

261. **Aligning national job classification standards with the e-CF and ECSF frameworks could help bridge the existing gaps.** This can provide a clearer understanding of ICT responsibilities, reduce inconsistencies, and ensure that professionals are equipped with the necessary skills to support digital transformation initiatives effectively.

262. **Additionally, adopting a competency-based approach to job classifications would facilitate better workforce planning, recruitment, and professional development opportunities for ICT staff** across public institutions. While the definition of IT roles will require an updated job classification system, focus groups revealed a certain preference for consolidating all ICT professionals under a general title, such as "ICT Specialist,." This would still imply using clearly defined role descriptions to ensure proper role differentiation. This approach would ensure that individuals with similar training and expertise receive comparable recognition and salaries, reducing frustration and improving workforce retention. However, this might have implications for the adequate differentiation of specialized roles.

263. **Working group sessions with ICT specialists focused on all 41 competence areas outlined in e-CF and revealed that current resources in selected institutions cover only up to 40% of required ICT competencies; furthermore, this coverage is marked by insufficient level of specialization.** The objective was to assess the extent to which these competence areas are covered within the institutions represented by the working group members, either through internal resources or outsourcing. The analysis revealed that less than half of the competence areas are to some extent present across institutions, and that they are often not fully developed internally. On average, internal resources cover only 30-40% of the required ICT competencies, while the remaining competencies are primarily outsourced or not covered by any internal or external means. An ad-hoc approach to seeking reliance on external services providers was underlined, highlighting the limited in-house capacity for some key specialized ICT functions. The most commonly outsourced services are related to the design of applications and system architecture, reflecting the complexity and expertise required for these tasks. Due to the lack of IT specialists, the most common approach is to hire external vendors for these high-

241. <https://esco.ec.europa.eu/en/about-esco/escopedia/escopedia/european-e-competence-framework-e-cf>.

242. <https://www.enisa.europa.eu/publications/european-cybersecurity-skills-framework-ecsf>

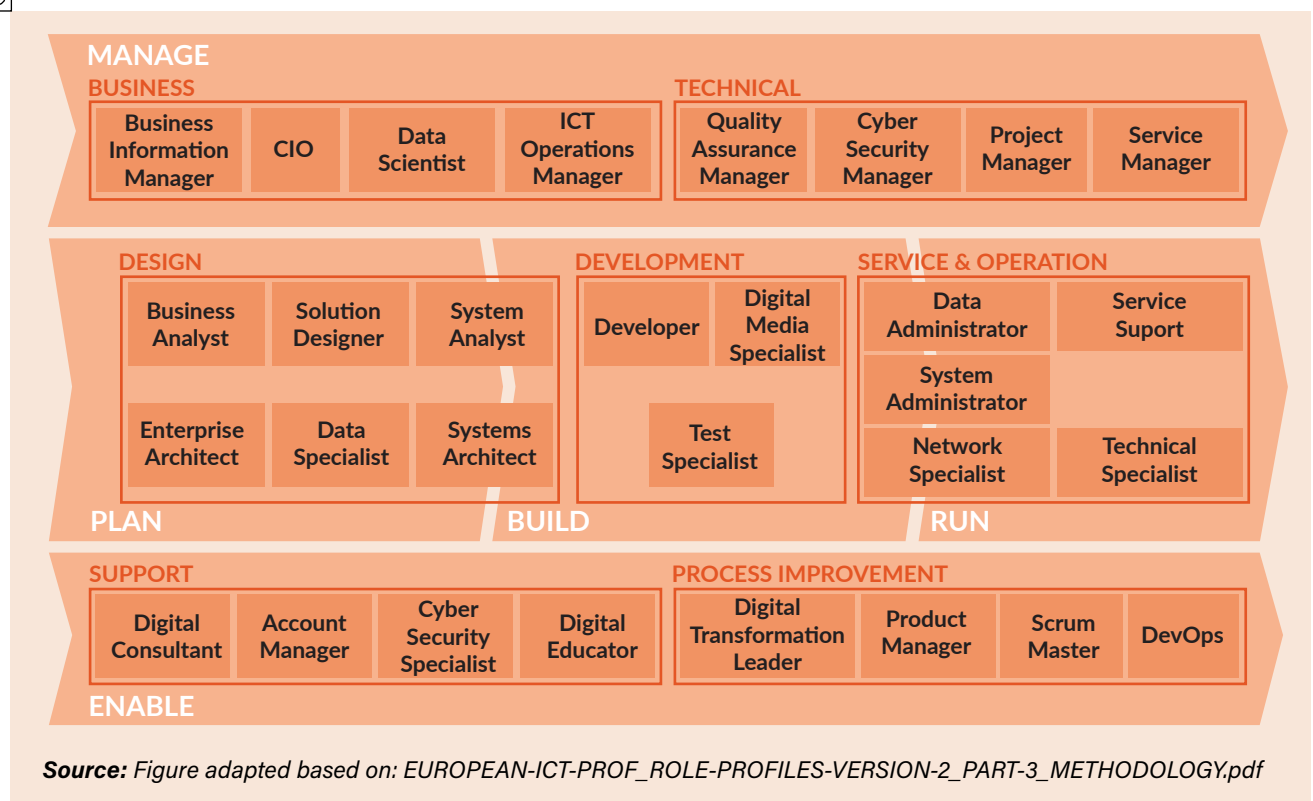
level ICT functions rather than invest in building long-term internal capabilities. Outsourcing is often not doubled by needed in-house capacity for managing the external support. This trend suggests a need for strategic workforce planning to balance internal expertise with external support, ensuring cost efficiency and sustainability in ICT operations.

264. **Building on e-CF, which identifies five key processes (planning, building, running, enabling, and managing), as shown in Figure 18, consultations highlighted that key digital skills would cover:**

- ➔ **General digital competencies:** Basic cybersecurity knowledge (e.g., phishing awareness), proficiency in MS Office, general IT troubleshooting, use of electronic signatures, archiving, and familiarity with cloud platforms.
- ➔ **High-demand specialized ICT roles:** Cybersecurity experts, system analysts, system integrators, experts in emerging technologies like AI, blockchain, and big data analytics.
- ➔ **Standardized IT roles:** Database administrators, server administrators, business analysts, architects, cybersecurity specialists, application testers, technical writers, and risk assessors.



FIGURE 18: The 30 e-CF ICT Professional role profiles



265. **Building on the e-CF²⁴³ and ECSF²⁴⁴ frameworks, the competencies and roles of ICT specialists will be defined through a process that will imply:** (i) clarification of level of general digital competencies that apply to ICT roles, (ii) selection and structuring of both competencies and role profiles using the e-CF and ECSF categories, and (iii) integration with ESCO²⁴⁵ for detailed roles and skills. ESCO ICT occupations will be analyzed as possible alternative titles for ICT roles, while ESCO ICT skills will be explored for potential definition of specific skills for ICT specialists.

243. <https://esco.ec.europa.eu/en/about-esco/escopedia/escopedia/european-e-competence-framework-e-cf>

244. <https://esco.ec.europa.eu/en/about-esco/publications/publication/crosswalk-between-esco-and-european-cybersecurity-skills>

245. <https://esco.ec.europa.eu/en/about-esco/publications/publication/crosswalk-between-esco-and-european-cybersecurity-skills>

TABLE 6: Proposed approach for the design of ICT positions in the Romanian PA

ICT positions in the Romanian central public administration		
Foundation	ICT detailed Role	
General digital competencies common for non-ICT and ICT public staff	ICT role (or ICT roles for multi-roles position)	
	Specific ICT skills (programming languages, databases, ICT technologies, ICT frameworks, etc.)	
	ICT role profile from e-CF and ECSF (for each role)	Level of responsibility (for each role)
In the design phase, the general digital competencies common for non-ICT and ICT public staff will be defined.	In the design phase, a Romanian ICT framework for ICT professionals in the public administration will be developed by simplifying and customizing the e-CF and ECSF. The level of responsibility will be also defined depending mainly on category complexity of ICT system and size of IT department/unit (for management roles)	The framework will flexibly allow for each institution to add for each ICT position additional e-CF competencies (others than those mandatory in the ICT role profile) and specific ICT skills (programming languages, databases, ICT technologies, ICT frameworks, etc.).

Source: Authors

266. **The definition of ICT roles should also reflect the complexity of IT systems managed and the size of the ICT department or unit, based on criteria that will need to be confirmed with key stakeholders, building on the preliminary model defined during the assessment phase.** Each ICT role could have corresponding levels of responsibility separate from individual proficiency levels. In the next phase, ICT systems will be categorized based on their complexity, which will significantly determine the responsibilities assigned to operational and managerial ICT roles. The responsibilities associated with different ICT roles must accurately match system complexity—ranging from managing basic administrative platforms to overseeing sophisticated enterprise-level applications, cybersecurity systems, cloud solutions, and AI-driven technologies. **Annex 4** provides further proposals for categorizing ICT systems by complexity. This proposal developed during the assessment phase was preliminary explored with the ICT working group and will be further adjusted to be used as a design factor that will be used during the design phase.
267. **Institutional mandates will also need to be clearly established for assigning specialized ICT roles, especially for managing critical and complex ICT systems.** This approach requires the engagement of a central authority responsible for defining, overseeing, and monitoring these ICT roles across various institutions.
268. **Clear limits should be established regarding role assignment, ideally restricting each ICT position to maximum 3-4 defined roles to maintain realistic and manageable expectations.** The assignment of ICT roles mapped to certain positions should be simple, based on clear responsibilities of the ICT department and using a common terminology, which will be explored during the design phase.
269. **Additionally, it is essential to clarify the significant role non-IT specialists play in supporting digital transformation.** This should include the operationalization of interdisciplinary teams, which typically include business analysts translating organizational needs into technical specifications, change management specialists ensuring effective integration and adoption of new systems, and specialists in legal, procurement, training, and communications. Implementing this model will ensure technology projects are informed by organizational requirements and strategic user-adoption goals.

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270. **To attract and retain talented ICT professionals, clearly defined career pathways are needed** offering continuous professional growth through relevant certifications, targeted training, and merit-based promotions. Revising salary structures to remain competitive with the private sector is crucial for retaining skilled personnel. Recommendations will be included in Output 3 under this TSI project.

4.6

Key takeaways informing the design of the digital competency framework and ICT roles

271. **Integration with the existing general competency framework in the Romanian public administration is essential** (see further information in Section 3.5). Most of the general competencies outlined within this existing framework inherently encompass *implicit* digital skills. Thus, the future digital competency framework must be designed for straightforward integration and practical use alongside the current general competency framework. This implies that the general digital competencies will also be mapped under the corresponding general competencies already in place.
272. **For proper targeting and to facilitate applicability, the framework could also potentially define some profiles for policy-making roles, service delivery, managers and specialized ICT roles.** From ICT-enhanced jobs (digital skills for evidence-based, innovative policy-making and strategic planning) to ICT-dependent tasks (e.g. advanced data analysis, ensuring digital accessibility, usability of digital interfaces, digital communication, aspects of interoperability) or ICT-intensive tasks (e.g. advanced cybersecurity competencies, Cloud), the framework will need to cover relevant general digital skill areas in the public administration, while allowing proper differentiation across roles.
273. **To ensure smooth integration into HR processes, the framework should specify which competencies are required at hiring and which can be developed within an employee's first year and beyond.** HR professionals in the public administration reiterated during consultations that the framework should explicitly state which competencies are expected at the time of hiring and which should be developed during the first year in service and afterwards. As digital readiness levels vary across institutions, leading to differing perspectives on the expansion of digital competencies, targeted learning plans will be needed.
274. **The assessment confirmed the need for flexible certification of digital skills to address the current lack of guidance and reduce over-reliance on the ECDL, with detailed recommendations to be developed under Output 3.** The bottom-up assessment showed the importance of formal recognition and validation of digital skills to support staff development, career progression, and effective public service delivery. However, it is essential to clarify that the introduction of certification mechanisms should not be intended to impose rigid requirements on civil servants. Instead, it should seek to address the current absence of structured guidance on digital competencies and to reduce the existing over-reliance on the ECDL as the sole reference for digital skills in the civil service. Certification of digital competencies needs to be based on clear prerequisites, including alignment with job profiles, proficiency levels, and the practical application of digital skills in the workplace. Certification/validation mechanisms should be flexible, relevant to functional needs, and supportive of continuous learning rather than serving as a formalistic obligation. The review of international experience also proves the need for a flexible approach to certification/validation but relying on clear guidelines. Detailed recommendations on certification modalities, assessment procedures, and recognition mechanisms, will be developed under Output 3 of this project.

275. **The digital competency framework should be implemented gradually to ensure a smooth transition.** A phased approach should begin with baseline competencies and foundational training, followed by pilot programs to test effectiveness and identify challenges. Expansion to role-specific training must be carefully structured to ensure a logical progression. Training initiatives should be led by change champions within departments who can promote engagement and demonstrate the benefits of digital upskilling. The training methodology should focus on targeted, modular programs addressing two to three competencies at a time. A combination of internal trainers and external specialists should be utilized to ensure expertise is available where needed.
276. **HR professionals and managers should be equipped to define and assess digital competencies effectively.** Institutions expressed concerns that overly demanding digital requirements could pose recruitment challenges. Therefore, competency expectations should be adaptable to different institutional contexts, ensuring that while all organizations adhere to baseline digital standards, they have flexibility in how they implement them. Inter-institutional collaboration should be encouraged to facilitate knowledge exchange and the sharing of good practices in digital training and IT solutions. The role of NACS, INA and ADR in planning, validating and developing digital skills should be central, supplemented by external expertise where necessary. Additionally, outsourcing specialized IT training, particularly through cloud-based solutions, is an effective way to strengthen institutional digital capacities.
277. **Standardizing and aligning job descriptions with the future digital competency framework will be essential.** This process involves defining clear roles and responsibilities that reflect the requirements of digital governance, data-driven decision-making, delivery of digital public services, use of emerging technologies, and cybersecurity. Job descriptions should capture foundational general digital skills and specific digital competencies.
278. **The future digital competency framework should define well-structured clusters of foundational digital skills, reflecting the evolving needs of the public administration.** The development of these competency clusters will consider the analysis of current practices and stakeholder consultations. Focus groups inputs highlighted primarily competencies linked to Office productivity tools, document management and archiving, cybersecurity, digital communication and collaboration, data analysis, monitoring and reporting tools, as well as competencies related to digital transformation.
279. **A preliminary list of general competency areas emerged, which will be refined and updated during the design phase.** Examples of competencies are included illustratively based on findings from the assessment phase. However, these competencies are not meant to cover exhaustively the competencies that will be included in the proposed digital competency framework.

BOX 6: General digital competency areas preliminarily emerging from the bottom-up analysis

Digital literacy and information management

- *understanding, organizing, and verifying digital data and documents*
- *evaluating the credibility of sources (e.g., Eurostat, OECD)*
- *using open data*

Digital communication and collaboration

- *secure use of email, messaging, and document-sharing tools*
- *inter-agency data exchange and interoperability*
- *public engagement through e-government platforms*

Cybersecurity and data protection

- *identifying cyber threats (phishing, ransomware)*
- *applying GDPR-compliant data protection measures*
- *managing secure digital identities and authentication (eID, multi-factor)*

Digital service delivery and process automation

- *implementing once-only, digital-by-default, and mobile-first principles*
- *using AI and automation for administrative efficiency*
- *understanding and ensuring accessibility and usability of public services*

Data analysis and decision support

- *using tools like Excel, Power BI, and AI-driven analytics*
- *interpreting data for policy development and performance monitoring*
- *applying predictive analytics for improved resource allocation*

Digital transformation and digital governance

- *ethical use of AI and automation in decision-making*
- *managing digital records and e-signatures in line with legal frameworks*
- *change management in the context of digital initiatives*

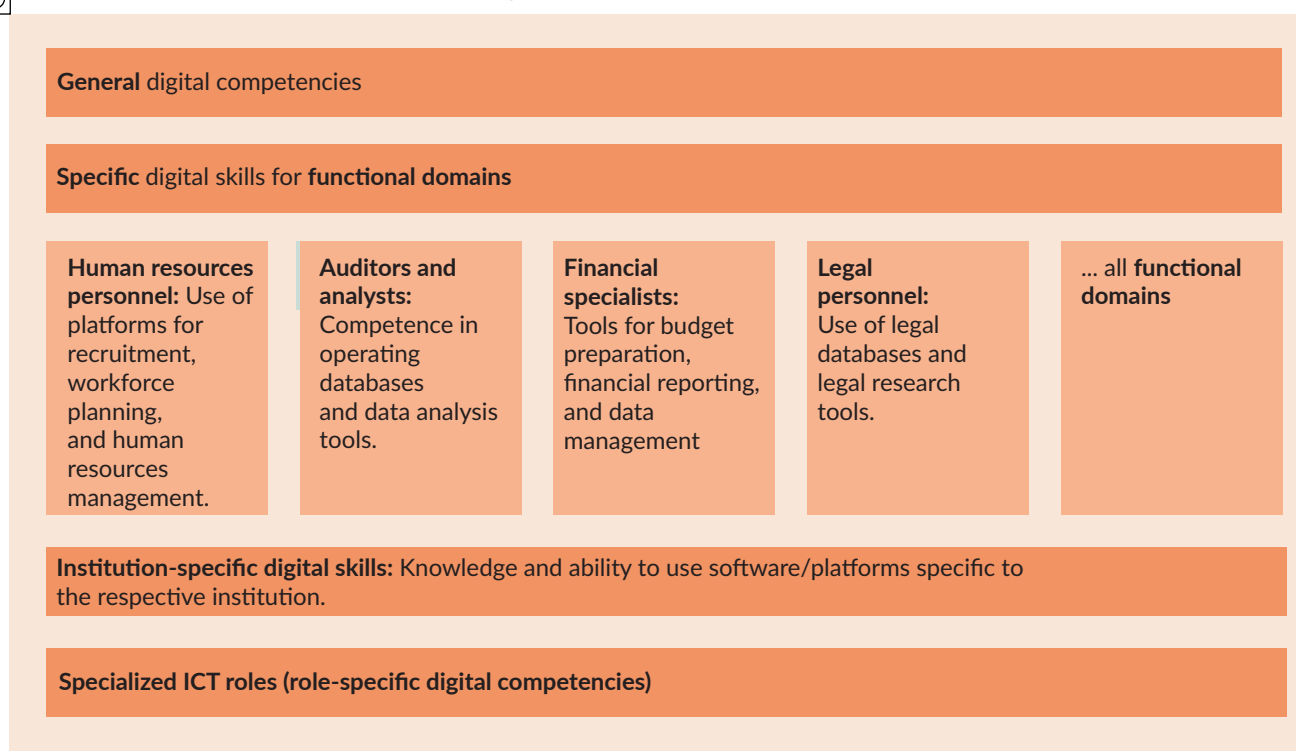
Emerging technologies and innovation

- *understanding cloud computing, blockchain, IoT, and AI in public administration*
- *leveraging big data for predictive policymaking*

280. Detailed competency profiles tailored to specific roles and functional domains are important. The analysis clearly revealed significant variations in digital skill requirements across various roles within the public administration. The digital competency framework would need to be clearly delineated from specific digital skills mapped to certain functional domains, to illustrate how general digital competencies are interlinked with specialized skills necessary for particular roles, for example in HR management, financial management, and auditing. Institution-specific digital skills will also need to be clarified with a set of examples, to allow proper future flexible definition of such skills by each institution. The figure below includes some examples discussed during the focus groups.



FIGURE 19: General and specific digital skills



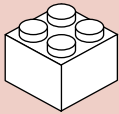
281. **The future definition of *specific* digital skills for functional domains or individual institutions should be informed by clear guidelines to avoid duplicating general digital competencies and to ensure that *specific* skills are limited to those required for particular functions.** While the scope of this project does not extend to the formal identification of *specific* digital skills, illustrative examples will be developed during the design process to clarify the distinction between general and *specific* competencies. Functional domains such as human resources management, public financial management, or public procurement could be used to illustrate how *specific* digital skills may be defined — for example, skills related to digital recruitment platforms, electronic budget execution tools, or e-procurement systems. The formulation of these examples will draw on lessons from the piloting of the general digital competency framework. The selection of the institution for piloting was not confirmed at the time of drafting this report and will influence the choice of the functional domains and the specific digital skills to be showcased. These examples will be included in Output 2 under the TSI project.²⁴⁶

282. **For ICT professionals, a structured approach to defining digital roles and competencies will rely on e-CF and ECSF.** In addition, ICT roles will also be defined based on the complexity of IT systems managed and the size of the ICT department. E-CF and ECSF will be used to distinguish responsibility levels from proficiency. ICT systems will be categorized building on the model included in Annex 4 to ensure operational roles reflect system complexity. Also, each ICT position will need to be restricted to maximum 3-4 clearly defined roles to maintain realistic expectations and operational efficiency. This is especially critical in institutions with limited ICT personnel. This will allow better resource allocation for digital processes and improved targeting of future upskilling initiatives.

246. In parallel, the World Bank is also supporting the NACS on HRM reforms through Reimbursable Advisory Services. That project also includes support to be provided in 2025 for developing a methodology for workforce planning and for “operationalizing the functional domains”. These activities imply the definition of *specific* competencies for institutions where the workforce planning methodology would be tested and for the functional domains to be supported. This implies that *specific* digital skills will also need to be identified for the respective institutions/functional domains. Correlation will be ensured with the TSI project on Developing the General digital competency framework model, allowing to extract relevant examples of specific digital skills.

283. **Beyond defining ICT roles, it is important to define the profiles of digital transformation leaders and of typical profiles needed in interdisciplinary teams for digital transformation.** Business analysts need to translate organizational needs into technical requirements, change management specialists should facilitate system adoption, experts in legal, procurement, training, and communications have also clearly targeted inputs. Digital transformation leaders are an essential missing role as confirmed during the assessment phase.
284. **Institutionally, a central authority will need to oversee ICT role definition, distribution, and oversight.** This authority should standardize role assignments, ensure consistency in managing complex and critical ICT systems, decide on reassignments across institutions for highly specialized profiles and facilitate collaboration between institutions. Clearly defined institutional mandates will enhance ICT governance and operational effectiveness. This will also mitigate risks that overly complex roles that might entail higher salaries are discretionary mapped to institutions with ICT systems that do not require such roles.
285. **Clear career pathways should be defined for ICT professionals, incorporating targeted training, relevant certifications, and merit-based promotions.** To attract and retain skilled personnel, the salary scale should be properly adapted, building on relevant international experience. Competitive compensation and professional development opportunities will ensure a sustainable and capable ICT workforce within public administration.
286. **Finally, while recognizing existing skills gaps, flexible outsourcing strategies and shared services options should be explored,** particularly to address short-term specialist needs in critical areas such as cybersecurity, cloud services management, and AI development. This would ensure continuity and adaptability within public institutions' digital transformation efforts. These aspects will be explored in Output 3 under the TSI project.

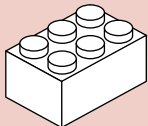
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5.1

Scope of the review and methodological approach

287. **The review of relevant approaches to structuring digital competence across EU member states was carried out to inform the future design of the general digital competency framework for the Romanian public administration.** The review revealed the highlights below on both how other EU countries structured their digital competence frameworks, as well as how they apply their digital competences to advance digital transformation of the public administration. By benchmarking against successful models and identifying gaps and opportunities, this review provides valuable insights for adapting and enhancing Romania's approach to digital skills and competence development in the civil service.
288. **A focused review of EU member states and international organizations guided the analysis of digital competencies.** The desk review focused primarily on EU member states and relevant international organizations, utilizing information from public websites in both English and national languages where available. The analysis reflects data and materials accessible by October 2024. The selection sought countries that have systematically implemented digital upskilling initiatives for civil service employees using structured digital competency frameworks. These case studies serve as a practical guide for tailoring a framework for the Romanian public administration, and focus on:
- The digital competencies identified for general civil service roles and for specialized ICT jobs.
 - The methodologies used to integrate these competencies into the HR management cycle such as public sector training, recruitment, and career development.
289. **An analytical matrix structured the evaluation of digital competence frameworks across national and international initiatives. The matrix focused on the following four key dimensions:**
- **General overview of frameworks:** Target groups, primary objectives, and alignment with broader national digital or public administration strategies.
 - **Areas of competence framework:** Specific competencies areas and specific competencies were mapped to the EU DigComp model, where applicable.
 - **Training and implementation:** Training offers, including how the frameworks are integrated into HR processes or used for certification.
 - **Development process:** Creation and updating of frameworks, stakeholder involvement, and reported implementation challenges.
290. **The review provided the evidence that Spain and Italy have structured digital competency frameworks aligned with DigComp, offering valuable insights for Romania.** These two case studies were selected through consultation with the Romanian beneficiary institutions, based on three main criteria: (i) level of maturity in terms of development and updates (number of updates and use in

different sectors); (ii) governance compatibility and administrative context²⁴⁷, and (iii) conceptual alignment with DigComp in terms of competence areas. Study visits to Spain and Italy²⁴⁸ provided the opportunity for an in-depth examination of how their frameworks are designed and operationalized in the public administration.



TABLE 7: Matrix for the analysis of digital competency frameworks

Details	Details and guiding questions
1. General overview	
1.1 Short description	Short description of the framework or initiative that was mapped
1.2 Year	For the initial iteration
1.3 Target groups	Main categories of people that the framework was designed for or used by
1.4 Key objectives	Main objectives of the framework as presented
1.5 Links to strategic frameworks	Relevance of the framework and connection with other strategic frameworks
2. Competence framework	
2.1 Title of the Framework / Syllabus	
2.2 Latest version	When was the last update of the framework done. Reference moment October 2024
2.3 Areas of competence	Areas of competence and competences, as presented in the framework source. Equivalent of dimension 1 and 2 of EU DigComp
2.4 Levels of proficiency	Equivalent of dimension 3 of EU DigComp
2.5 Examples /learning outcomes	Examples from the framework, as presented in the framework source. Equivalent of dimension 4 of EU DigComp
2.6 Link to DigComp	
2.7 Categories of ICT-focus	Types of jobs/tasks covered using the classification described above
2.8 Profiling	Does the framework define “digital profiles” for various tasks or jobs within public administration (e.g. clerks, managerial level, those in ICT professions)?
3. Training offers related to the Framework	
3.1 Training offers	Do training offers related to the framework exist, are they digital, is there a platform, etc.?
3.2 Used in the HR process	Is/was the framework used in HR processes?
3.3 Assessment and certification	Is/was the framework used/referenced in any assessment and certification process?
4. Process	
4.1 Stakeholders	Who were the stakeholders involved in the development of the framework?
4.2 Development process	How was the development process organized?
4.3 Challenges	What are the challenges with implementing the framework?
5. Links	Main sources of the information for the mapping process.

247. Compatibility of the governance system regarding the development and use of the framework and general administrative tradition

248. Under the TSI 2024 project, the two study visits were organized in February 2025. The information collected during the study visits was used to update this section of the Report.

5.2

Selected case studies from EU countries: Italy and Spain

This section provides an overview of the digital competence models from Italy and Spain; the other cases analyzed are included in Annex 1 to this Report.

Italy - Nuove Competenze per le Pubbliche Amministrazioni and other relevant digital skills frameworks

291. **Italy is committed to an ambitious digital transformation journey**, aimed at increasing efficiency, transparency, and accessibility of public services. This transformation is guided by a strategic framework, combining regulatory reforms, national digitalization plans, and competency-driven workforce development. The *Three-Year Plan for IT in Public Administration* (2024-2026), developed by the Agency for Digital Italy (AgID), serves as the central strategic document directing Italy's digital transition, defining clear objectives and expected results. It sets forth key priorities, including cloud-based infrastructure, AI integration, cybersecurity, and administrative digital ecosystems.
292. **At the core of Italy's digital transformation efforts is the "Syllabus for Digital Skills for the public administration"** (Nuove Competenze per le Pubbliche Amministrazioni)²⁴⁹, which is a structured framework that defines the minimum digital competencies required for all non-managerial public employees. The syllabus is meant to support the development of digital skills of public administration employees in order to enhance their performance and support the administration's digital, ecological, and administrative innovations. This training syllabus was developed and published by Italy's Department of Public Administration. This initiative is part of the broader project, "Digital Skills for PA" ("Competenze Digitali per la PA"), which was funded under the National Operational Program "Governance and Institutional Capacity" between 2014-2020. The first version of the Syllabus was published in 2018 and the latest version in July 2020.
293. **The initial version of the syllabus was drafted under the coordination of the Office for Innovation and Digitization within the Department of Civil Service.** This process involved contributions from experts in public administration training and digital transformation, who participated as both authors and content reviewers. The document underwent a public consultation period from October to December, 2018. During this time, more than 200 comments were received and taken into account in the drafting of the final version.
294. **The syllabus outlines the fundamental knowledge and abilities for all civil servants, excluding IT specialists.** The intended audience for the syllabus includes public administration employees seeking to self-assess and develop their skills, managers responsible for planning training programs for their

249. Sources for this section include the information from the study visit organized by Taiex with Bank support, as well as the following websites:

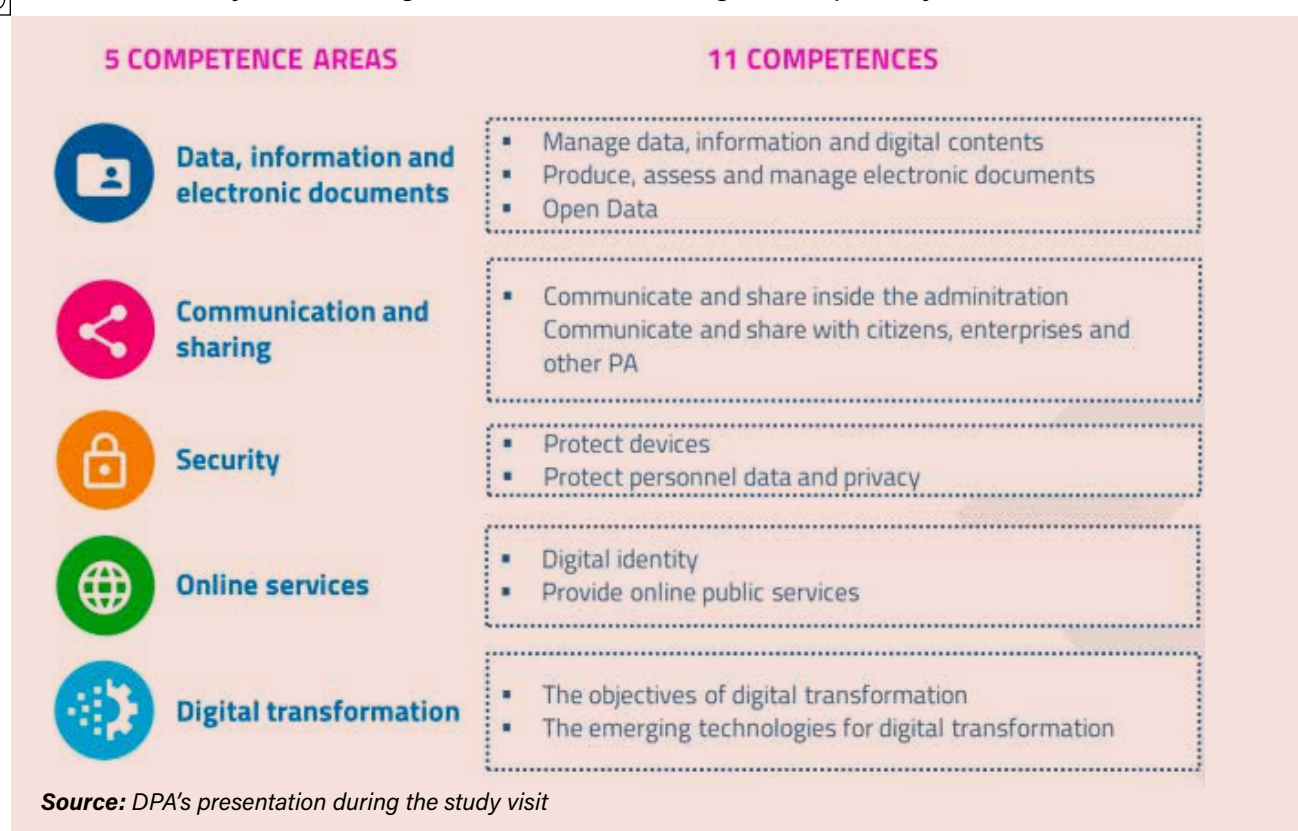
→ https://cdn.syllabus.gov.it/portale/documents/20121/44682/28feb22_Syllabus-competenze-digitali-pa_v2.pdf
→ https://www.agid.gov.it/sites/agid/files/2024-06/piano_triennale_per_linformatica_nella_pa_2024-2026.pdf
→ <https://www.syllabus.gov.it/portale/web/syllabus/direttiva>

workforce, as well as institutions and organizations tasked with designing training courses aligned with the syllabus.

295. **The Syllabus platform, launched as a digital learning hub, enables employees to assess their skills, enroll in courses, and track progress through a centralized system.** It was created not only for digital skills but also to include other competencies, ensuring a broader skill development approach. The platform is interoperable with Learning Management Systems (LMS) and provides an *open badge system*²⁵⁰. Additionally, the syllabus allows institutions benchmarking against other institutions, and evaluating their staff's digital competences, facilitating planning.
296. **The overarching goal of the syllabus is “to ensure that all public employees are able to actively operate in a safe, knowledgeable, collaborative, and results-oriented manner within an increasingly digital public administration”.** The program is designed to improve the skills of public employees through a broad range of training courses that are offered free of charge and updated regularly. It focuses on digital skills, ecological transition, and administrative innovation. Public administration agencies are required to register their employees and ensure they participate in the training programs. The goal of the program is to train at least 30 percent of the personnel by the end of 2023, 55 percent by 2024, and 75 percent by 2025²⁵¹.
297. **The Syllabus is based on DigComp and is structured into five key competence areas (figure below).** The "Digital Skills for PA" syllabus is consistent with the DigComp framework - Dimension 1 and 2 (Table 8). The syllabus does not define “digital profiles” for various tasks or jobs within public administration (e.g. clerks, managerial level, those in IT professions).



FIGURE 20: Syllabus for Digital skills – the Italian digital competency framework



250. The open badge system is an internationally recognized electronic certification framework that allows individuals to earn, display, and share verifiable badges that represent their skills, achievements, and learning experiences.

251. <https://www.syllabus.gov.it/portale/web/syllabus/direttiva>

298. **The levels of proficiency are consistent with the DigComp Dimension 3.** The syllabus outlines three levels of proficiency for each competency: basic, intermediate and advanced. Each level is associated with specific knowledge and skills necessary to perform tasks in a digital environment. The levels are defined along two dimensions:

- *Cognitive learning objectives*, which is based on the Bloom's Taxonomy framework²⁵²
- *The complexity of the task*, which justifies the presence of basic concepts even for intermediate or advanced proficiency levels.

TABLE 8: Comparison between the Italian Syllabus for Digital Competencies for Public Administration and the EU DigComp 2.2.²⁵³

Italian Syllabus for Digital Competencies for Public Administration	EU DigComp 2.2 Competence Areas
1. Computer data, information and documents	1. Information and data literacy
1.1 Manage data, information and digital content	1.3 Managing data, information, and digital content
1.2 Produce, evaluate, and manage electronic documents	1.2 Evaluating data, information, and digital content
1.3 Getting to know Open Data	<i>Partly covered under DigComp 2.2</i>
2. Communication and sharing	2. Communication and collaboration
2.1 Communicating and sharing within the administration	2.1 Interacting through digital technologies
	2.4 Collaborating through digital technologies
2.2 Communicating and sharing with citizens, businesses, and other PAs	2.2 Sharing information and content through digital technologies
	2.3 Engaging in citizenship through digital technologies
3. Security	4. Safety
3.1 Protect devices	4.1 Protecting devices
3.2 Protecting personal data and privacy	4.2 Protecting personal data and privacy
4. Online services	2. Communication and collaboration / 5. Problem solving
4.1 Getting to know digital identity	2.6 Managing digital identity
4.2 Delivering services online	5.2 Identifying needs and technological responses
5. Digital transformation	5. Problem solving
5.1 Know the goals of digital transformation	
5.2 Learn about emerging technology for digital transformation	5.4 Identifying digital competence gaps

252. <https://tips.uark.edu/using-blooms-taxonomy/#gsc.tab=0>

253. <https://publications.jrc.ec.europa.eu/repository/handle/JRC128415>

299. **The learning outcomes are consistent with DigComp 2.2 Dimension 4 or equivalent. Each competency is divided into expected learning outcomes (LO) at three levels of proficiency.** The syllabus focuses on two components:

- Knowledge: understood as the information and set of notions that the public sector employee has in relation to a specific topic related to the digital aspects of his or her work
- Skill: understood as the ability to perform certain activities using digital technology



BOX 7: Example of proficiency level extracted from the Italian syllabus

1.2. Produce, evaluate and manage electronic documents

- *Advanced level: 1.2.3.3 Understand policies that grant interested parties access to electronic documents.*

2.1. Communicating and sharing within the administration

- *Basic level: 2.1.1.3 Know how to use elementary document sharing tools (e.g., shared folders) and recognize the benefits they can bring.*

3.1. Protect devices

- *Intermediate level: Know how to recognize common types of malware such as the Trojan Horse Virus, and cyber-attacks such as Denial of Service (DoS) and Distributed Denial of Service (DDoS).*

300. **The Syllabus platform, supported by e-learning modules and AI-driven assessments, enables civil servants to assess and develop essential digital skills** for daily public administration tasks, develop data management and cybersecurity awareness, and understand legal and regulatory frameworks governing digital public services. The platform offers a broad range of training courses which are free of charge, updated regularly, and tailored to the needs of public employees. It includes a step-by-step registration process, individual access with digital identification, and a catalog of educational content that allows employees to earn digital badges upon course completion. The training is divided into several key areas: digital transformation, data management, communication, cybersecurity, and online services. Courses are designed to be flexible so employees to complete them at their own pace. The training process includes a platform for assessment and delivery that enables employees to self-evaluate and receive targeted training based on specific skills gaps. The Syllabus serves as a reference for developing training programs tailored to the needs of different public administrations and ensures that these programs align with national digital transformation goals. There are comprehensive guidelines and video tutorials available to help administrations and employees navigate the registration process and access the training resources.

301. **Each public employee is required to complete at least 24 hours of training per year, including general skills related to digital, ecological, and administrative transitions, as well as specific skills tailored to the needs of their respective workplace.** The training can be delivered in various formats, including online courses available on the syllabus platform. The "Piano triennale per l'informatica nella Pubblica Amministrazione Edizione 2024-2026/ The three-year plan for IT in Public Administration Edition 2024-2026" includes explicit references to the framework: *"With reference to the digital skills of the public administration, the National Strategy for digital skills supports the strengthening and development of the digital skills of the workforce and the e-leadership skills of organizational leaders and project managers, under the coordination of the Department of Public Function. The need for digital*

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*skills in public administration concerns the entire population of public employees: both managers, called to exercise their public function in a context essentially transformed by technology, and non-managerial personnel*²⁵⁴.

302. Examples of relevant digital training initiatives building on this framework include:

- ➔ The initiative "Syllabus for digital training", which grants all employees of participating administrations access to online training courses customized to individual training needs through the online platform of the Department of Public Administration. The initiative highlights the collective responsibility of public administrations to prioritize the upskilling and reskilling of public employees, according to Mission 1, Component 1, sub-investment 2.3.1 of the NRRP. The aim is to ensure that the number of public employees who complete the digital training offered free of charge on the syllabus platform continues to increase.
- ➔ The training proposals of the National School of Administration (SNA), which rely on both e-learning, blended, and in-person teaching formats. They include topics ranging from cybersecurity and cloud systems, operational technology for the organization, digitalization in the NRRP, the design of digital transformation and the management of innovation, up to the role of AI and data in decision-making systems supporting the PA." (AGID, 2023).

303. Employees' participation and performance in the training programs is monitored and evaluated as part of their overall job performance.

After employees successfully complete required courses they receive digital badges, which can be used to demonstrate acquired competencies.

304. Beyond the Syllabus, other relevant digital training initiatives are led by the Department for Digital Transformation²⁵⁵ (DTD), which is the specialized structure of the Italian Government that promotes and coordinates actions to define a unified strategy for the country's digital transformation and modernization through digital technologies. It oversees policies and initiatives to enhance digital skills, modernize public services, and integrate emerging technologies. The department focuses on digital inclusion, interoperability, and AI-driven innovation, playing a crucial role in equipping Italy's public sector and society with the necessary tools for a fully digital future. The DTD is digitalizing the public sector by focusing on seven key areas, with progress tracked in a soon-to-be-released Monitoring Report: (1) Digital infrastructures and connectivity, (2) Cloud migration, (3) Data and interoperability, (4) Online public services, (5) Cybersecurity, (6) Digitalization of central administrations, and (7) Basic digital skills. The approach is based on simplification and single platform use, territorial assistance teams, and stakeholder engagement, addressing identified challenges.

305. One of DTD's key initiatives is *Repubblica Digitale*, a national multi-stakeholder strategic initiative for the promotion of digital skills in the country.

The project promotes digital literacy and civic engagement by fostering collaboration between local and regional administrations, the public sector, and non-governmental organizations (NGOs). Its aim is to reduce the digital divide and promote education on the technologies of the future, supporting the country's development process. Since 2020, the initiative has expanded into a coalition of over 350 initiatives, implemented by small and medium enterprises (SMEs) and non-profits, working to bridge Italy's digital divide through education and public participation platforms such as ParteciPa²⁵⁶ and the Participation Hub.²⁵⁷ The initiatives²⁵⁸

254. https://www.agid.gov.it/sites/agid/files/2024-06/piano_triennale_per_linformatica_nella_pa_2024-2026.pdf.

255. <https://innovazione.gov.it/dipartimento/>.

256. The Italian Government's platform dedicated to public consultation and participation processes.

257. The Hub is a platform that promotes and catalyzes public participation policies carried out in Italy. It shares practices, paths and tools at national and international level. This space brings together promoters of public participation: public administrations, civil society organizations and funding bodies. The aim is to create partnerships to exchange experiences and lessons learned.

258. The complete list of initiatives is available on Repubblica Digitale's website, at <https://repubblicadigitale.gov.it/servizi/iniziativa-coalizione-nazionale>.

are free for citizens and are included in the four axes of intervention defined by the National Strategy for digital skills. Of all the initiatives, 26,3 percent target the public sector. The complex network of Repubblica Digitale is presented in the figure 22.

FIGURE 21: DTD's main challenges and approaches

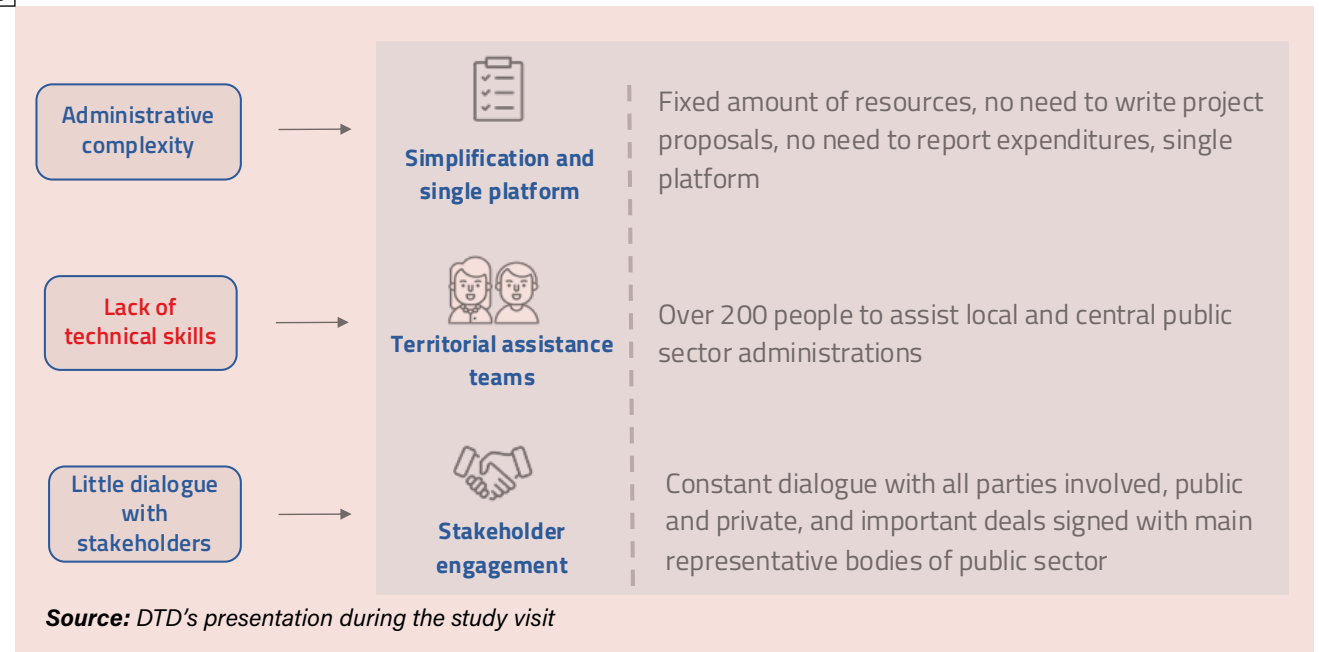
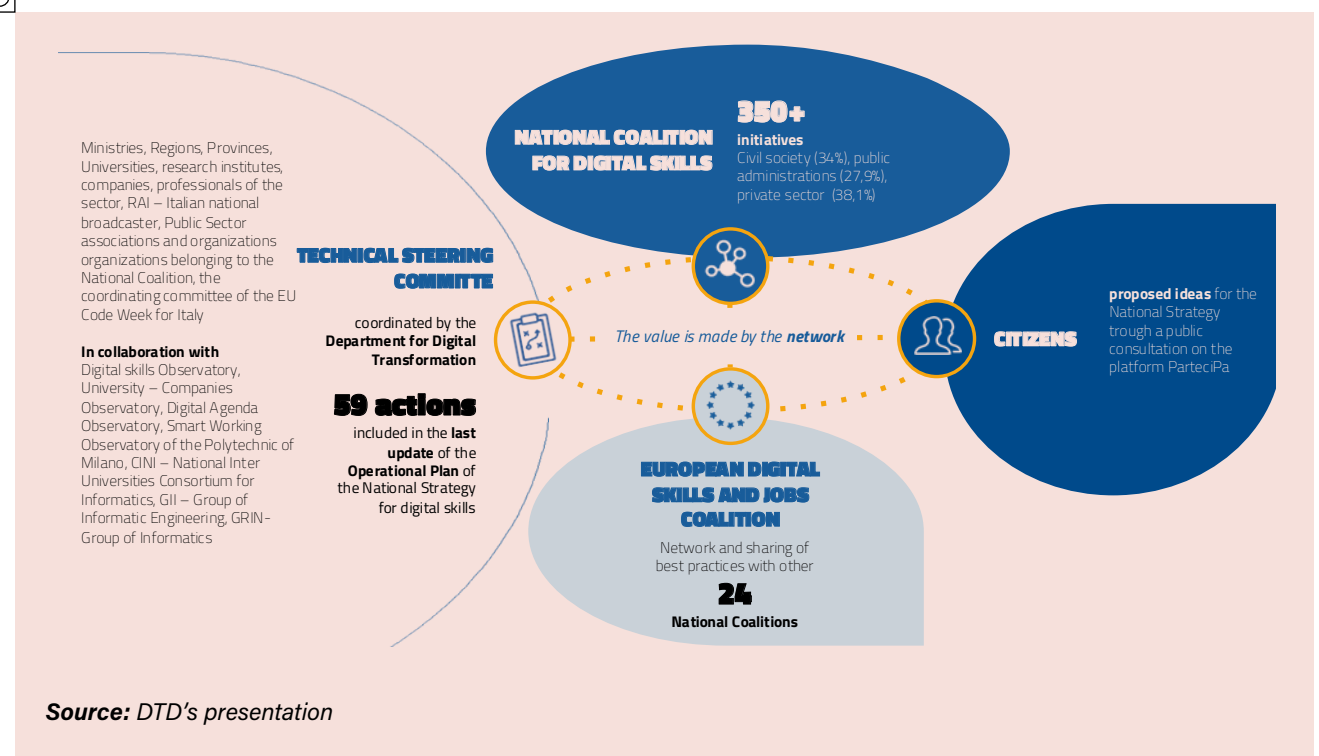


FIGURE 22: The network of Repubblica Digitale



306. **A Digital Civil Service Program focuses on ensuring that digitalization is inclusive and accessible to all, including by setting up a network of digital facilitators.** Through DTD's digital skills program public employees are trained to teach digital skills to citizens. The project has mobilized 700,000 volunteers and facilitators to assist citizens with digital transformation and literacy efforts. Volunteers and facilitators are integrated into a network of digital facilitation services that provide training and hands-on support at the local level. The department also fosters university partnerships that support digital training initiatives across multiple fields, ensuring a sustainable knowledge pipeline for public sector innovation. An impact evaluation of training programs is scheduled for Q4 2025, alongside ongoing surveys and feedback forms to gather citizen input.



FIGURE 23: The Agent Network: Facilitators and Volunteers



307. **Another major focus of the DTD is supporting municipalities and local administrations in their digital transformation efforts.** As such, the *Academy of digital municipalities* program aims to accompany municipalities towards the simplification and digitalization of processes and territories through a flexible training catalog organized in areas, topics of interest and specific courses. The program is based on co-design and needs approach rather than using a standard competence framework. Stakeholder engagement is a key success factor and is based on national partnerships with governmental bodies and universities. The program has simplified access to EU funds for municipalities, achieving a 75% success rate within 1.5 years. A self-assessment platform is currently under development to evaluate municipalities' digital transformation status, which will inform future courses. The Academy is available to all public administration employees through the recently launched Gov Cloud to support digital transformation.

308. **Another relevant digital framework is the one used by the managers' training program within the framework of Corso-Concorso, managed by the National School of Administration (SNA).** The *Corso-Concorso*, a 12-month structured training and testing program selects and trains managers of the central administrations (Presidency of the Council, Ministries, Agencies, major noneconomic public bodies). Candidates undergo an entry competition, followed by eight months of general training, which includes examinations and rankings that allow them to choose their preferred public administration assignment. A dedicated competency framework is used in the Corso-Concorso process (figure below).

309. **Managers' digital competencies are integrated under the broader "Promoting Change" competency that includes fostering a digital mindset.** This framework includes three levels (1-3) but does not specifically assess digital competencies for managers. The school's focus remains on in-person learning, as physical interaction is seen as a key benefit of leadership training. However, there is a growing effort to modernize training delivery and expand accessibility through digital platforms. Evaluation is done by measuring outputs rather than impact.



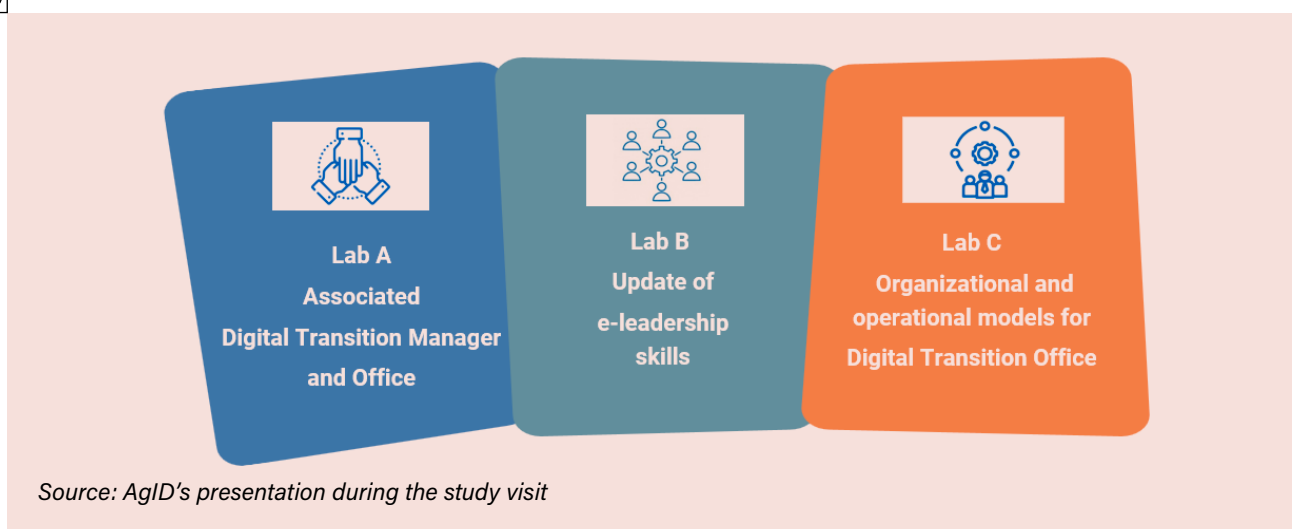
FIGURE 24: Competency Framework used by SNA to recruit and train Italian managers

Cognitive Area	Management Area	Realisation Area	Relational Area	Self management Area
Problem solving	Process management	Responsible decision-making	Management of internal and external relations	Emotional resilience
Strategic vision	Co-worker development	Result-oriented	Negotiation	Self- development
Systems thinking	Group leadership		Orientation to the quality of the service	Organizational awareness
	Promoting change			

310. **From the perspective of specific roles for digital transition, Italy has set up a dedicated profile - Digital Transition Managers (DTM)²⁵⁹, which need to be filled by each institution.** The DTMs are supported by a specific internal Digital Transition Office (DTO). These professionals coordinate ICT development, cybersecurity, data management, promote training on digital skills, and service innovation, working closely with AgID, the DTD, the National Cybersecurity Agency, and local governments. Non-governmental administrations (especially local and small sized ones) can join to identify a common MTD and/or to create an associated DTO. While the DTMs report directly to the political leaders, they are supported and coordinated by AgID, and their roles and required competencies are regulated by law. AgID promotes tools and initiatives to encourage updating of skills and capacity-building of DTMs, including collaboration platform ReTeDigitale, labs, and the development and use of common resources, which connects over 1,200 DTMs across Italian administrations. An example of output designed in cooperation with participants of Lab A "Associated Digital Transition Manager and Office" (figure below), is the Vademecum on the Associated Digital Transition Manager and Office²⁶⁰ publication. This is a tool supporting the implementation of the *Three-Year Plan for IT*, which includes a pathway for identification of MTDs and agreement formats for identification of associated DTMs and associated DTOs.



FIGURE 25: AgID Labs for DTMs practitioners



259. As established by Article 17 of the Italian Digital Administration Code Law.

260. The *Vademecum on the Associated Digital Transition Manager and Office* can be consulted here: <https://www.agid.gov.it/it/agenzia/piano-triennale/strumenti/strumento-6> (Version 1.0 of 06/25/2024)

Key takeaways from the study visit organized in Italy are reflected in a separate background report.

Spain - Digital Competencies of Public Employees: Reference Framework and the Ikanos model

311. **Spain has consistently prioritized digital transformation in its public administration over the past decade.** Key initiatives include the National Plan for Digital Skills (2021) under the Digital Spain 2025 Agenda, which aims to enhance digital skills across the public sector, education, and the workforce while addressing the gender digital divide. The Plan for the Digitalization of Spain's Public Administration (2021–2025), with a €2.6 billion budget, and the Digital Spain 2026 Agenda further support digital transformation. Spain emphasizes intergovernmental collaboration to ensure consistent digital service quality and aligns with EU digital strategies, leveraging funding from the Spanish Recovery and Resilience Plan.
312. **At the heart of the digital transformation, Spain has invested in structuring digital competency frameworks and developing training programs.** Two relevant frameworks are applied: the *Digital Competencies of Public Employees: Reference Framework from Spain*, which is the general model applicable for the country's general public administration and *Ikanos*, the digital competency framework applied in the Basque country.

Digital Competencies of Public Employees: Reference Framework from Spain

313. **The *Digital Competencies of Public Employees: Reference Framework from Spain* establishes a comprehensive model designed to equip public employees with essential digital skills²⁶¹.** Together with DigComp 2.2., this framework is instrumental for achieving the goals outlined in the Digital Spain 2025 and the Public Administration Digitalization Plan²⁶². Organized into six competency areas — digital literacy, communication and collaboration, content creation, security, problem-solving, and digital transformation — this framework ensures public employees are well-prepared for the demands of digital public administration. It integrates levels of proficiency, from basic to advanced, to accommodate varied expertise, and it aligns with European standards, emphasizing areas such as data analysis, AI, and digital security to foster innovation and efficiency in public services.
314. **The development of the *Digital Competencies of Public Employees: Reference Framework in Spain* relied on an impressive co-design and consultation effort.** The development of the framework was initiated by the National Institute of Public Administration (INAP) as part of Spain's broader digital transformation strategy, in collaboration with various regional public administration schools and institutions. A working group, formed in 2021, created the framework, with inputs from multiple public administration agencies, ensured that it functions as a cohesive, inter-administrative reference point that aligns with both European standards (such as DigComp) and OECD guidelines. The process

261. The review is based on official information from relevant websites and data shared during the study visit. The websites consulted include:

→ <https://www.inap.es/documents/10136/1976576/Marco+de+competencias+digitales+english/0a0f2094-cac7-f828-5b7a-9f2b13723b49>

→ <https://actividadesformativasfedap.inap.es/?a%C3%B1oAnt=2024&a%C3%B1oActual=2024&AreaFormativaID=17&TipoPlanID=0&Actividad=&TipologiaID=1&AmbitoAdministrativoID=7&MetodologiaID=2&CifPromotor=&NombrePromotor=#/>

→ <https://www.inap.es/documents/10136/1976576/Resultados+autodiagn%C3%B3stico+CCDD/3a567831-7956-b303-794a-f6fca2e714ed>

262. <https://www.inap.es/documents/10136/1976576/Marco+de+competencias+digitales+english/0a0f2094-cac7-f828-5b7a-9f2b13723b49>

involved a wide range of stakeholders.²⁶³ These stakeholders collaborated in drafting and refining the framework, and ensuring it is applicable across Spain's public administration systems.

315. **The Framework was updated in December 2023 to include basic level competencies related to the use of generative AI tools.** Several improvements were introduced in November 2022 to emphasize the importance of having widely accessible digital public services and to raise awareness about this issue among public servants in the field. In December 2023, a proposal was made to modify the framework so to incorporate the novelties brought about by the advance of generative artificial intelligence (GAI). Version 3 includes important adaptations that align the set of competencies with the challenges posed by new technologies.
316. **The framework does not cover specific IT profiles nor ICT-dependent jobs,** but it is a relevant source for mapping digital skills associated to tasks related to the digital transformation of public administration.
317. **The key objectives of the Framework encompass the following:**
- ➔ Enhance digital competencies by boosting efficiency and effectiveness in the delivery of digital public services.
 - ➔ Integrate basic AI-related competencies to ensure public employees are aware of for emerging technological challenges and opportunities.
 - ➔ Facilitate ongoing digital transformation within public administration systems.
 - ➔ Ensure public employees can apply ethical principles in the use of AI, focusing on privacy, transparency, and fairness.
 - ➔ Offer a common reference framework for all public administration systems in Spain.
318. **The framework includes 17 competencies divided into 6 areas, aligned with the DigComp model (Table 9).** The Framework emphasized distinctively the area of digital transformation and innovation.

263. Key stakeholders included: the School of Public Administration of Castilla y León (ECLAP), the School of Regional Administration of Castilla La Mancha (EAR), the Balearic School of Public Administration (Escuela Balear de Administración Pública), the Murcia School of Training and Innovation of Public Administration, the Riojan School of Public Administration, the Escola d'Administració Pública de Catalunya, the Spanish Federation of Municipalities and Provinces, the Andalusian Institute of Public Administration, the Asturian Institute of Public Administration (IAAP), the Canary Islands Institute of Public Administration (IAAP), the Valencian Institute of Public Administration (IVAP) Basque, the General Directorate of Civil Service, Ministry of Economy, Finance and Employment (Community of Madrid), the Agency for the Digital Administration of the Community of Madrid.

TABLE 9: Comparison between the Spanish digital competency framework model and DigComp 2.2.²⁶⁴

Digital Competencies of Public Employees: Reference Framework	DigComp 2.2 (2022)
1. Digital literacy, information, and data:	1. Information and data literacy
1.1 Literacy in digital environments	
1.2 Navigation, search and filtering of information, data and digital content	1.1. Browsing, searching and filtering data, information and digital content
1.3 Evaluation of information, data and digital content	1.2. Evaluating data, information and digital content
1.4 Storage and retrieval of information, data and digital content	1.3. Managing data, information and digital content
1.5 Data analysis and exploitation	
2. Communication and collaboration	2. Communication and collaboration
2.1 Communication and collaboration within my administration and with other public administration systems	2.1. Interacting through digital technology
	2.2. Sharing information and content through digital technology
2.2 Communication and collaboration with citizens, companies and other private organizations	2.3. Engaging with the local community, businesses and organizations through digital technology
	2.4. Collaborating through digital technology
	2.5. Netiquette
2.3 Digital identity	2.6. Managing digital identity
3. Creation of digital content	3. Digital content creation
3.1 Digital content development	3.1. Developing digital content
	3.2. Integrating and fleshing out existing digital content
3.2 Copyright and licenses	3.3. Copyright and licenses
	3.4. Programming
4. Security	4. Safety
4.1 Device protection	4.1. Protecting devices
4.2 Personal data protection and digital identity	4.2. Protecting personal data and privacy
4.3 Health and environmental protection	4.3. Protecting health and well-being
4.3 Health and environmental protection	4.4. Protecting the environment
5. Problem solving	5. Problem solving
5.1 Identification of technological needs and resolution of technical problems	5.1. Solving technical problems
	5.2. Identifying needs and technology-based responses
	5.3. Using digital technology creatively
5.2 Identifying gaps in digital competence and self-learning	5.4. Identifying digital competence gaps
6. Digital transformation and innovation	
6.1 Digital transformation objectives and mechanisms	5.2. Identifying needs and technology-based responses
6.2 Innovation in public services	5.3. Using digital technology creatively

264. <https://publications.jrc.ec.europa.eu/repository/handle/JRC128415>

319. **The Framework operates with three proficiency levels.** Each competency is defined across three levels of complexity—basic, intermediate, and advanced—and includes examples of relevant skills and abilities to guide structured training and skill acquisition. Relevant examples of descriptor across selected competencies are included in Box 8.

 **BOX 8:** Selected examples of competency description across proficiency levels from the Spanish digital competency framework

Competency 1.3: Evaluation of information, data and digital content

Descriptors corresponding to a Basic (A) proficiency level:

- *I know how to use the web portals of different agencies and can locate other resources for reliable information related to my work.*
- *I know how to use web portals to download information and subscribe to newsletters or mailing lists relevant to my work.*

Competency 2.3: Digital identity

Descriptors corresponding to an Intermediate (B) proficiency level:

- *I understand the concept of an electronic signature, I know that it is legally valid, and I use it to sign documents when necessary.*
- *I know and use the authentication and authorization services for public employees in my public administration.*

Competency 3.1: Digital content development

Descriptors corresponding to an Advanced (C) proficiency level:

- *I can analyze the parameters of image, audio or video files, such as size, resolution, duration, quality, etc.*
- *I am able to automate tasks by creating macros in office suite applications.*

320. **The Framework is the basis for variety of training programs organized by Spain's INAP.** These programs²⁶⁵ are aligned with the framework's six competency areas, offering courses on topics such as digital literacy, communication and collaboration tools, digital content creation, cybersecurity, and problem-solving using digital tools. Public employees can participate in these training programs at different proficiency levels (basic, intermediate, and advanced). Nevertheless, other public authorities that are providing digital skills training to public servants (e.g. defense ministry) use the DigCOMP 2.2 as the framework for training.

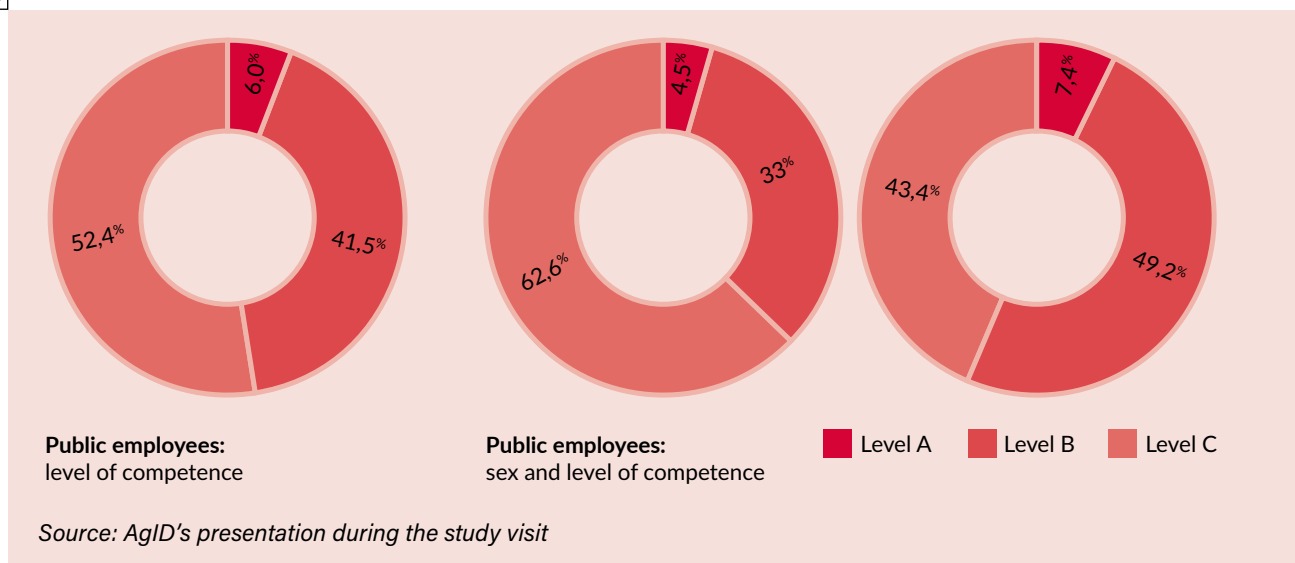
321. **A comprehensive assessment of digital competencies of public administration employees was conducted based on the Framework²⁶⁶.** INAP supported the Spanish Government to develop a diagnostic framework that evaluates public employees' digital competencies based on their roles, geographic locations, and institutional needs. This assessment covered 75,000 public employees, with

265. <https://www.inap.es/aprendizaje>

266. <https://www.inap.es/documents/10136/1976576/Resultados+autodiagn%C3%B3stico+CCDD/3a567831-7956-b303-794a-f6fca2e714ed>

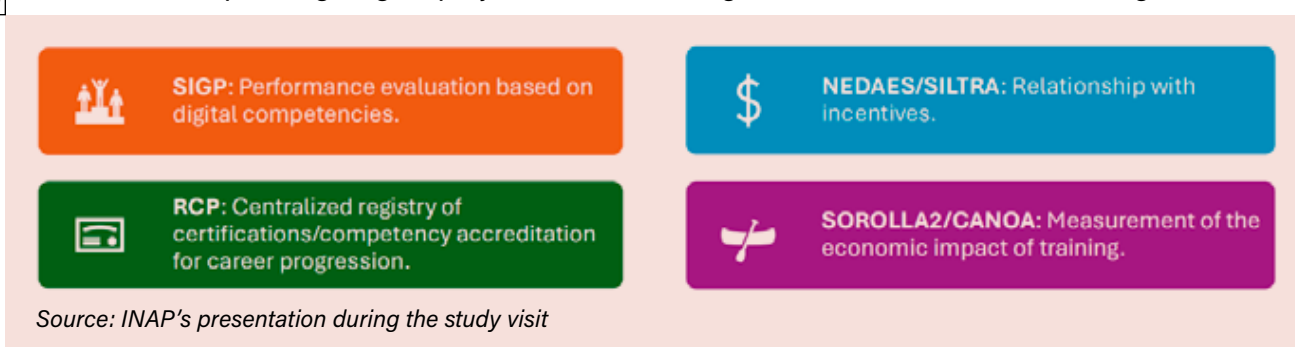
13,164 individuals participating in training and certification programs. The goal is not just to measure digital literacy levels but also to identify skill gaps and design training interventions that align with the demands of public service.

FIGURE 26: Diagnosis of the digital skills of public employees in the Spanish General State Administration



322. New initiatives to assess and develop digital skills are covered under the AgeDigital project. This online platform, currently under construction, aims to measure the impact of training on performance, while integrating it with other HR management tools. A new competency-based model will be developed and used for this purpose. A dedicated platform is meant to be used in the assessment of digital skills and then for framing recommend tailored training programs. The platform is also designed to generate post training evaluations, impact dashboards, while also including conversational AI through four modules: Assessment Module, Content, Certification, and Statistics. The platform will provide a centralized registry of certifications and competency recognition for career progression and measure the economic impact of training. Additionally, the platform will allow for better talent management, since will integrate performance evaluation.

FIGURE 27: Spain: AgeDigital project modules - Integration with HR and other Management Tools



323. Another targeted effort is focused on cybersecurity professional skills. In Spain, the National Institute of Cybersecurity (INCIBE) has conducted a comprehensive analysis of the country's cybersecurity talent landscape to assess skill shortages and propose solutions. According to industry data, the most sought-after cybersecurity skills include²⁶⁷:

→ Cloud computing security (36%)

267. Data shared by INCIBE during the study visit organized by TAIEX with Bank support as part of the TSI project.

- Security engineering (28%)
- Risk assessment and management (27%)
- Application security (25%)
- Governance, risk management, and compliance (24%)
- Artificial intelligence and machine learning in cybersecurity (24%)

324. **To bridge this gap, INCIBE has launched multiple training and professional development programs, ensuring Spain builds a skilled cybersecurity workforce.** INCIBE has established several initiatives to attract, train, and certify cybersecurity professionals²⁶⁸:

- Cybersecurity Training Pipeline – Programs target individuals from primary education to university and unemployed workers seeking reskilling opportunities, ultimately directing them into SMEs, industry, R&D, startups, and public administration roles.
- Cybersecurity Summer Bootcamp – A specialized training program aimed at enhancing technical skills, hands-on cybersecurity experience, and industry exposure.
- MujeresCiber – A gender-focused initiative co-organized with the OAS (Organization of American States), the U.S. Department of State, and the Government of Canada. Over five editions, it has encouraged young women to pursue careers in cybersecurity through workshops, competitions, and expert panels.
- CyberCamp – A flagship cybersecurity education event with a €2.27 million budget, organizing conferences, expert panels, competitions, training workshops, and networking events.
- University Cybersecurity Chairs – Partnerships with universities to integrate advanced cybersecurity training into academic curricula.
- Cibercooperantes Program – A nationwide network of 1,000+ cybersecurity volunteers, delivering over 1,000 talks and reaching 49,000+ students, parents, and educators to raise cyber awareness.

325. **Professional certification and career pathways in cybersecurity are mapped to attract and retain qualified professionals.** For example, INCIBE's MESI Project has mapped the most relevant IT security certifications. Additionally, INCIBE encourages aspiring professionals to test their skills in Capture the Flag (CTF) challenges, attend hacker competitions, and engage in community-driven cybersecurity knowledge sharing.

268. <https://www.incibe.es/en/events/summer-bootcamp>

- <https://www.incibe.es/en/node/36851>
- <https://www.incibe.es/eventos/cybercamp>
- <https://www.incibe.es/en/incibe/press-room/incibe-inaugurates-9th-edition-spanish-cybersecurity-research-conference-0>
- <https://www.incibe.es/ciudadania/cibercooperantes>

Basque Country - Ikanos SAT, Professional Digital Profiles

326. In 2012, the Government of the Basque Country initiated the *Ikanos project*²⁶⁹ to develop an educational infrastructure that addresses the digital competence needs of citizens, enterprises and civil servants. Using DigComp as a reference, the government developed a digital competency model and targeted programs designed to drive the region's digital transformation. This effort led to the development of *Professional Digital Profiles*. The Ikanos project is managed by the Directorate of Entrepreneurship, Innovation, and Information Society within the Basque Government's Department of Economic Development and Infrastructure.

327. According to the Ikanos method, DigComp competencies for any given occupation are divided into three categories, based on their relevance:

- Transversal: Common digital skills needed across all ICT-based work in the sector.
- Core: Essential digital skills needed to satisfy job requirements.
- Complementary: Helpful digital skills that enhance performance but are not crucial.

328. **Professional Digital Profiles (PDP) were developed by mapping digital skills from DigComp to the job responsibilities.** As a process, the main activities of the job are listed, considering different experience levels and critical tasks, then the activities that have digital components are linked to DigComp competencies and proficiency levels. This involves collaboration between digital transformation experts and human resources departments. The focus aims to be on practical, functional digital activities rather than formal administrative roles. Not all DigComp competencies are used in every job profile, as some may not be necessary. The process relies on interviews for gathering information about the digital aspects of job tasks. This information is reflected on an information form titled, "Aspects of the Job's Digital Competence." Once experts have gathered the necessary information, they share the details with one another to facilitate the creation of new PDPs. Four PDPs were defined: Administrative Staff, Machine Operator, Sales Representative, and Entrepreneur.

329. Additionally, Ikanos introduced "sub-competencies" to make DigComp more targeted. A sub-competency highlights specific work tasks and related digital skills that complement a DigComp competency within a digital profile.

330. The Professional Digital Profiles (PDPs), along with Ikanos Self-Assessment Tests (SAT), are aimed at several target groups:

- Public administration: one of the PDPs targets people working in public administration. The title of the profile is "Professional Digital Profile: Public Administration Administrator".
- Professionals: The self-assessment tests have been used by professionals working in various sectors.
- Companies and organizations: Ikanos offers customized digital skills auditing services for businesses and organizations. They can use the tools to assess their employees' knowledge and skills.

269. Information in this section was collected during the study visit organized by TAIEx with Bank support under the TSI project. Relevant information was also collected from the following websites:

- <https://test.ikanos.eus/index.php/566697?newtest=Y&lang=es>
- <https://ikanos.eus/wp-content/uploads/2018/03/Perfil.Profesional.ikanos.Administrativo.pdf>
- <https://ikanos.eus/recursos/documentos-pdp-2/>
- <https://www.ikanos.eus/wp-content/uploads/2018/03/Perfil.personal.Ikanos.pdf>
- <https://op.europa.eu/en/publication-detail/-/publication/de6190cb-c4b2-11ea-b3a4-01aa75ed71a1/language-en>
- <https://op.europa.eu/en/publication-detail/-/publication/7a30c607-2304-11eb-b57e-01aa75ed71a1/language-en>
- <https://ikanos.eus/en/ikanos-model/evidenciar/bait/>

331. **The professional digital profile for public administration Administrator reflects the key duties and responsibilities of a typical civil service job**, and then maps digital skills needed for key tasks across the DigComp competency areas.

BOX 9: Duties and responsibilities for the Public Administration Administrator, Ikanos model

- Accounting management (budgets, accounting closings, invoicing, purchases)
- Management of personnel and human resources (payroll, social security)
- Administrative support to other departments
- Administrative procedures related to projects (applications, grants, subsidies, aid) authorizations and sanctions (fines, defaults)
- Administrative support in communicating with other public administration systems
- Management of administrative information and related data (archive, update, facilitation)

TABLE 10: Professional Digital Profile: Public Administration Administrator²⁷⁰

Area	Competence	basic			intermediate			advanced			
	* central competence										
	** complementary competence	1	2	3	4	5	6	7	8	9	10
	*** transversal competence										
Information	1.1 Browse, search and filter information			**							
	1.2 Evaluate the information										
	1.3 Store and retrieve information							*			
Communication	2.1 Interact through technology			*							
	2.2 Share information and content			*							
	2.3 Citizen participation online					*					
	2.4 Collaborate through digital channels			**							
	2.5 Netiquette			*							
	2.6 Manage the digital identity										
Creation of content	3.1 Content development								*		
	3.2 Integration and reworking of content			**							
	3.3 Copyright and licenses										
	3.4 Programming			**							
Security	4.1 Protection of devices										
	4.2 Protection of personal data										
	4.3 Protection of health			***							
	4.4 Protection of the environment			***							
Problem-solving	5.1 Solve technical problems			***							
	5.2 Identify needs and responsibilities			**							
	5.3 Innovation and creative use of technology										
	5.4 Identify gaps in digital competence			***							

270. <https://ikanos.eus/wp-content/uploads/2018/03/Perfil.Profesional.ikanos.Administrativo.pdf>

TABLE 11: Examples of learning outcomes across the three levels of proficiency are included in the occupation of Public Administration Administrator²⁷¹

Core Digital Competencies: essential for employment	Complementary Digital Competencies: required in all sectors	Transversal Digital Competences: required in any type of work
1.1 Store and save information - BASIC - INTERMEDIATE → Save information in different formats and within different types of storage systems → Follow the protocol required for the storage of documents and data → Classify all documents, products, correspondence, and procedures in an efficient manner to facilitate retrieval as needed → Share the methods and classification process of documents and data with others to facilitate retrieval → Process information and data and document each procedure → Develop a strategy for rigorous and efficient storage of information and data 1.2 Interact through technology - INTERMEDIATE - BASIC → Interact through digital devices and applications (mainly using electronic mail). → Manage digital communication → Archive messages → Know how to use the different functions of the communication tool (electronic mail) that is used in the organization 1.3 Share information and content - BASIC → Facilitate information sharing between different departments within the organization → Actively participate in the communication process implemented within the organization → Follow up on tasks that require collaboration with various stakeholders within the organization	3.1 Browse, search and filter information - BASIC → Search online for information relevant to your work → Describe the objective for gathering information in a clear manner → Establish the relevance of the information found via various resources including web pages and search engines → Establish web alerts to monitor the most relevant sources of information. 3.2 Collaborate through digital channels - BASIC → Understand your role in collective work processes → Apply norms for the use of collective spaces (example: digital folders for document sharing) → Develop a strategy to improve collective work processes → Contribute to the fluidity of workflows within the organization → Help share information, data, and documents among different departments → Understand and apply the protocols of the organization when sharing documents, data, and information 3.3 Integration and reworking of content - BASIC → Modify and combine existing resources to create new content 3.4 Programming - BASIC → Understand how to modify routine software and application functions	2.1 Protection of health - BASIC → Take appropriate precautions when using technology → Understand the adverse effects of prolonged computer use → Maintain a proper posture when sitting in front of the computer → Pay attention to environmental factors at the workstation, such as having sufficient light and adequate contrast between the screen and its surroundings → Take measures to protect eye and ear health, such as reducing the time you spend looking at the screen and turning down the volume on your headphones 2.2 Solve technical problems - BASIC → Solve simple problems that arise from the use of technology → Ask for assistance when the technology does not work and you do not know how to solve the problem → When you run into a problem, know how to describe the issue and digital device in question

271. <https://ikanos.eus/wp-content/uploads/2018/03/Perfil.Profesional.ikanos.Administrativo.pdf>

1.4 Citizen participation - INTERMEDIATE

- Interact with different public administration departments
- Facilitate access to information and documents on the organization's web portals and sites
- Follow up on requests received by the public administration
- Follow up on alerts related to different information received by the public administration (bulletins, information on social security)
- Manage online bank payment portals

1.5 Etiquette - BASIC

- Be familiar with the rules of conduct in all online and virtual interactions, including communication via email
- Be aware of digital communication standards in the workplace
- Know how to apply the rules of etiquette pertaining to email communication in the workplace

3.1 Content development - ADVANCED

- Create digital content in different formats, including accounting documents, project management documents, text documents, and spreadsheets
- Edit and improve one's own work or a colleague's work
- Know how to use administrative and accounting tools and programs
- Capable of navigating thru a variety of content creation tools
- Understand how to create documents in different environments, and how to use macros.

3.5 Identification of technological needs and responses - BASIC

- Select the appropriate tool needed for a particular work process
- Propose the use of new tools, justifying their effectiveness and added value

2.3 Identification of gaps in digital skills - BASIC

- Understand the need to improve and update one's own digital competence
- Keep up with new developments, both in terms of new tools and new practices
- Evaluate these developments to identify opportunities within your work environment
- Be aware of your own digital literacy and reflect on how to improve it in order to improve your performance

I	Introduction	II	The EU policy framework	III	National strategies, policies and institutional arrangements	IV	Job analysis	V	International experiences	VI	Foresight	VII	Conclusions
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332. Assessing employees' digital competencies plays an important role in the Ikanos model for organizational development. This can be achieved at the individual level through the Ikanos digital skills self-assessment test (SAT). At the organizational level, Ikanos offers analytical tools to analyze all SAT responses by individuals, enabling segmentation and comparison based on organization, location, department, profile, and age. Following the assessment, the identified competency gaps can guide the formulation of targeted training programs. These training initiatives should focus on enhancing specific digital skills required by employees.

333. A new digital competence certification system called BAIT was designed. This model was extensively tested and introduced in 2018. The system validates digital competencies for public employees, providing an official recognition system for digital skills that support career development and professional advancement. Upon completion of the test, which takes about 20 minutes, users receive a Personal Digital Profile that graphically displays their strengths and weaknesses in various areas. This self-assessment tool has been used by over 60,000 individuals as of 2020.

5.3

Key takeaways from EU good practices

334. A diverse range of approaches to defining and using digital competencies were analyzed. Different digital competency models were identified, shaped by public administration context and the specific characteristics of the HRM system. These offer valuable insights for Romania's digital competence development efforts. The 11 cases analyzed (two highlighted in this chapter and the rest reflected in Annex 7) fall into three main categories:

- I. Digital competence framework models for the public administration, which have three types of focus:
 - Focus on individuals' competences (Italy, Spain, Basque country, UK and UNESCO et al.)
 - Focus on organizational capacity (Denmark)
 - A hybrid approach, combining both individual and organizational perspectives (e.g., Finland, where the digital competencies are embedded within a broader framework of a digitalization plan)
- II. Specific frameworks for IT professionals applicable to public administration (e.g., SFIA for IT professionals in occupations)
- III. Standalone training programs with no associated framework to organize the content of the training (e.g. France, Slovenia, Portugal).

335. The digital competency models primarily target general digital competencies, but specific initiatives focus on specific task categories and specialized ICT skills for the public administration. The selected case studies primarily focus on defining digital skills and competencies that public administration employees use in their daily work, defining competencies needed to meet the demands of **ICT-enhanced tasks** in public administration (e.g. Italy, Spain, the Basque country, Finland). Additionally, to bridge the growing skills gap created by the digital transition and digitalization of public administration, some cases emphasize the competencies needed for **ICT-dependent tasks**, with the most forward-looking framework coming from UNESCO et al. and Finland. Beyond individual competencies, Denmark's model highlights the broader capacity of organizations to navigate and lead digital transformation efforts, reinforcing the knowledge, skills and attitudes necessary to manage change and lead digital transformation in public administration. Finally, the SFIA and the UK frameworks provide structured guidance on advanced-level digital skills for IT professionals, helping define the competences required for **ICT-intensive** tasks in public administration. These varied approaches illustrate the need for both foundational and specialized skills to support a modern technology driven public sector.

336. Due to differences in digital skills expected within the general workforce and differences in public administration models, the needs for defining digital competency frameworks for the public administration vary across European countries. Among the cases reviewed, five EU countries have developed digital skills frameworks specifically tailored to public administration. While there is a widespread recognition of the need for digital transformation in government services, some countries

are in the early stages of developing and formalizing the competencies required for civil servants to perform their duties effectively in a digital environment, while other countries might be more focused on leading digital transformation at institutional level. This gap can also highlight an opportunity for countries to develop more targeted frameworks that address the unique digital challenges and requirements of public administration.

337. **Italy pioneered a structured digital competence syllabus for the public administration.** Italy was among the first EU countries to use a structured framework for defining digital skills through the "Nuove competenze per le Pubbliche Amministrazioni" program. Based on the EU's DigComp framework, the syllabus defines a set of baseline digital skills for all public administration employees, in addition to highlighting emerging areas of digital transformation. To ensure effective implementation, the framework is accompanied by a well-designed training program designed to equip civil servants with adequate digital competencies.
338. **Spain's digital competence framework for public employees incorporates basic use of emerging technologies such as generative AI.** The most recent 2023 update introduced new skills related to the use of AI, data management, and cybersecurity, reflecting the latest technological advancements and their implications for public administration.
339. **The UK's digital competence framework focuses on IT professionals in public administration.** The UK's "Government Digital and Data Profession Capability Framework" is a specialized model that primarily targets IT professionals rather than the broader civil servants. It is designed to equip these professionals with the technical skills necessary to support digital transformation across government services. For Romania, this framework offers guidance in defining and cross-checking the requirements for IT professionals in the Romanian public administration, ensuring its alignment with international good practices
340. **Finland's digital competence model serves as strategic guidance rather than a prescriptive framework.** Finland's "Modeling competence requirements for digitalization in Public Administration" provides a high-level guidance for government departments in shaping digitalization strategies, rather than providing a detailed, prescriptive framework. While the Finnish model draws from the DigComp in its definition of digital skills, its primary focus is on broader digital transformation rather than specific digital competence for individual employees. The model remains generalized and offers a "planning tool" for institutional digitalization strategies. Although not systematically monitored, it is accompanied by supporting tools and training units that assist in guiding digital transformation within the Finland's public administration.
341. **Denmark's digital skills model prioritizes organizational transformation over individual competencies.** The Danish "Model of Digital Skills by the Government Digital Academy" is tailored to the public sector, with primary focus on organizational needs rather than individual competencies. Similar to the Finnish model, it takes a broader approach, addressing digital transformation at the organizational level, including leadership development, change management, and restructuring. As the model does not focus on the individual digital skills of civil servants, for the purpose of this analysis, the Danish example can inform a better planning of organizational-level digital development work in Romania.
342. **Beyond these examples, in other EU countries the Bank team noted an abundance of digital training programs, but without an underlying structured competency framework.** Digital training programs in public administration vary in content, delivery methods, and target audiences. Many countries have implemented extensive digital training programs and courses for public sector employees, offering valuable insights into themes and topics offered, and delivery methods used to enhance digital competencies (i.e. the use of digital tools). A key distinction is their target audience,

with some programs designed for all public employees while others focus on senior or specialized roles. Understanding these variations provides a clearer picture of how different themes and topics can be implemented for different types of employees, ensuring that digital skills development efforts are effectively structured and strategically implemented.

343. **Certification requirements for digital competencies depend on HRM system typology and vary broadly based on public administration models.** Certification systems for digital competencies in the public administration depend on each country's governance and HRM system. Some countries, such as Denmark and Finland, do not require public administration employees to receive a certification whereas others, like Italy and France, mandate it for completing formal training programs. These requirements are broadly aligned with the policies of each country, which significantly influence the nature and design of competence frameworks, including whether training programs emphasize certification. These systems seem broadly aligned with the two administrative models predominant in EU countries²⁷²: (i) the type of normative systems (e.g., Napoleonic, Germanic, and civil law-based countries) which are centralized, hierarchical, rule-oriented and emphasize legal conformity. They typically require certification to formally validate competencies; (ii) the type of operational systems, (e.g., Anglo-Saxon and Scandinavian countries prioritize flexibility, performance, and decentralized decision-making). They focus less on certification and more on practical application and performance-based assessment, reflecting their focus on adaptability and managerial autonomy. For countries with a normative tradition, such as those in Central, Southern, and Eastern Europe, certification/validation of digital skills plays an important role in ensuring standardization and alignment with established rules. In contrast, operational systems rely more on adaptive competence-based models with less emphasis on formal certification.
344. **Aligning training programs with structured competence frameworks enhances consistency and effectiveness.** Without a clear competency framework, departments may prioritize different competencies leading to inconsistent skill development and an uneven distribution of skill levels. A lack of alignment also complicates training assessment, making it difficult to compare effectiveness of training programs across different agencies, resulting in critical skills gaps. Combined, these challenges could lead to inefficient resource allocation for training, with duplicated or misdirected efforts.
345. **The review provides the evidence that there is an increased focus on adoption and adaptation of DigComp.** DigComp provides a common foundation for digital competence frameworks while allowing for national adaptations. Spain, Italy, and Portugal have adapted DigComp to their specific national and regional contexts, using it as a baseline to develop frameworks that address the particular needs of their public sectors. This trend highlights the value of having a common European reference point, while also highlighting the importance of tailoring such frameworks to local administrative structures and digital transformation goals. The adoption of DigComp as a reference framework for public administration offer multiple several advantages. It establishes of a common language for digital competencies across Europe. enabling cross-border collaboration and benchmarking. The framework's flexibility allows countries to adapt it to their specific administrative needs, while its comprehensive structure ensures coverage of a broad range of digital competencies.
346. **Also, EU support is consistently leveraged for developing, introducing and updating digital skills initiatives in the public administration, especially as part of NRRPs.** NRRP-funded initiatives are driving the development of digital competence frameworks in public administration. Some countries initially reviewed for this study, including Greece, are currently developing or refining their digital skills frameworks for public administration through their NRRP. This reflects a growing recognition of the critical role that digital competencies play in modernizing public services and enhancing governmental efficiency. NRRP initiatives are accelerating digital skills development in public administration. For

272. Marcinkowski, L., A. Butnaru and A. Rabrenović (2024), "Salary systems in public administration and their reforms: Guidance for SIGMA partners", SIGMA Papers, No. 71, OECD Publishing, Paris, <https://doi.org/10.1787/8f08a005-en>.

example, Italy's "Nuove competenze per le Pubbliche Amministrazioni" program aims to provide digital training to a large portion of public employees by 2025.

347. **Digital competence frameworks vary in scope, from general skills to specialized IT job profiles.** Digital frameworks in public administration fall into two broad categories: general digital skills applicable to a wide range of roles (Italy, Spain), and specialized frameworks defining specific job profiles (UK's DDaT framework, SFIA). Digital competence frameworks cover a wide range of competencies required in public administration, divided into three main categories: **ICT-enhanced tasks**, **ICT-intensive tasks**, and **ICT-dependent tasks**. Frameworks like those used in Italy and Spain emphasize ICT-enhanced tasks, which can also be described as basic digital skills relevant for all public servants. On the other hand, frameworks that define specific job profiles, such as the UK's DDaT framework and SFIA, describe specialized IT skills needed to perform ICT-intensive tasks. Both types of frameworks also address ICT-dependent tasks to varying degrees, acknowledging the increasing significance of digital skills in roles and tasks that can be described as **non-ICT professionals** (i.e. roles outside the ICT sector that increasingly benefit from digital skills. Non-ICT professionals do not typically possess any specialized ICT knowledge, although they require digital competence to adapt to digital transformation throughout industries and sectors²⁷³).
348. **General digital competency frameworks ensure broad digital literacy across public administration.** Frameworks that focus on general digital competencies applicable across a variety of roles provide a broad set of digital skills that are relevant to most public servants. These frameworks emphasize ICT-enhanced tasks and some ICT-dependent tasks and can be applied across different roles and within different departments. Closely aligned with the DigComp EU framework, they reinforce the need for digital literacy and basic digital skills for all public employees. Consequently, they support broad-based training programs that are adaptable to rapid technological changes, ensuring that all public servants are equipped with essential digital skills.
349. **In Romania, the design of the future digital competence framework should cover general skills and also include relevant examples of specific digital skills and propose a set of profiles, potentially following the Ikanos model.** To effectively manage and lead digital transformation efforts in public administration, Romania's digital competence framework should address both general and ICT-specific digital skills. In addition to defining essential digital competencies for general civil service roles, and more specialized and advanced competencies for ICT-intensive tasks, the framework should incorporate organizational capacities to navigate and lead digital transformation, drawing insights from the Ikanos model, but also from Finland and Denmark. This holistic approach would ensure that Romania's public administration is equipped to navigate technological change and effectively adapt to the digital age.
350. **A national digital training platform is essential for ensuring continuous learning opportunities for civil servants.** Italy's *Syllabus* platform serves as an effective model, offering online courses tailored to individual training needs. Building on this model, a similar platform in Romania should allow institutions to track employee progress and benchmark against other public bodies in a privacy preserving manner. AI-driven self-assessment tools would help public employees identify their digital skills gaps and enroll in targeted courses. Such a system would enable structured, on-demand learning, ensuring that public servants can develop competencies relevant to digital transformation, cybersecurity, and online service delivery, but also to contribute and lead digital transformation. The initiative could build upon NACS' recent initiative and existing INA's training system, as described in section 3.4 of this report.
351. **To enhance digital governance, Romania should introduce Digital Transformation/Transition Managers (DTMs) in each public institution, following Italy's example.** DTMs would be responsible for coordinating complex ICT projects, promoting digital upskilling, cybersecurity measures, and the

273. https://digital-skills-jobs.europa.eu/system/files/2024-11/DSJP_SQUAD%20Assessment_vision%20paper_0.pdf

integration of digital services and driving change. These professionals should receive specialized training and be supported by a central coordinating body, such as ADR, to ensure alignment with broader digital transformation goals. Italy's experience shows that a dedicated role for digital leadership can significantly improve coordination between government agencies, local administrations, and the private sector. Establishing a peer network, similar to Italy's *ReTeDigitale* platform, would facilitate the exchange of good practices and enhance digital innovation in the public sector.

352. A clear yet flexible certification/validation system would be useful to attest the digital competencies of Romanian public employees and support career development. Given Romania's normative public administration tradition, a digital competence framework that includes a certification process for digital competencies is seen as essential to ensure standardization and alignment with established rules, providing formal validation of competencies within a structured, rules-based system. However, certain prerequisites should be ensured to allow for a meaningful certification/validation process of the digital skills. Spain's *AgeDigital* project and the Basque Country's *BAIT* certification model provide valuable lessons in assessing and accrediting digital skills. Romania should develop a self-assessment tool that enables civil servants to evaluate their digital competencies and receive official certification upon completing structured training programs. At the same time, it is important to avoid introducing digital competencies merely as an additional formal requirement in the annual performance appraisal process. Instead, as evidenced by international good practices, the digital competency framework should be used to inform recruitment processes, guide staff development strategies, and promote continuous upskilling, thereby ensuring that the public administration workforce is equipped to contribute effectively to the digital transformation. For a digital competency certification system to be meaningful, relevant, and supportive of the public administration objectives, several key prerequisites should be taken into account:

- first, the certification/validation/recognition process should build upon a better understanding of the various education and training pathways that develop digital skills, ensuring that existing competencies are recognized regardless of how they were obtained;
- second, practical and accessible self-assessment tools should be developed to enable civil servants to assess their proficiency levels and identify skill gaps to inform targeted learning and career development.
- clear guidelines should be produced to define the certification/recognition process, including eligibility criteria, validation mechanisms, and alignment with job profiles and functional requirements.

353. A robust governance structure is key to maintaining an effective digital competence framework. To ensure its long-term relevance and effectiveness, Romania's digital competence framework would be supported by a robust governance structure with systematic updates. Building on international experience, collaboration between NACS and INA should be strengthened, and ADR should play a key role in defining the digital skills plan and upskilling mechanisms. Key stakeholders should be consulted, drawing from international good practices such as the UK's DDaT Capability Framework Design Council, which mobilizes experts and government representatives to update the framework and ensure it aligns with evolving digital government needs. Regular consultations with civil servants and external experts should be standardized, utilizing online platforms to gather feedback and suggestions from a broad range of stakeholders. Reviews and updates, informed by the latest trends and good practices, would ensure that the framework remains dynamic and relevant.

354. Finally, Romania should adopt a comprehensive vision for digital transformation that is grounded in clear institutional mandates and collaborative frameworks, building on the models from Italy and Spain. Drawing on the experience of Spain and Italy, where digital transformation is guided by a well-defined regulatory and strategic framework (in Italy - the Three-Year Plan for IT in Public

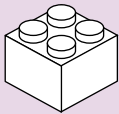
I	Introduction	II	The EU policy framework	III	National strategies, policies and institutional arrangements	IV	Job analysis	V	International experiences	VI	Foresight	VII	Conclusions
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Administration, which sets out specific goals, action lines, and performance indicators²⁷⁴ and in Spain – the Digital Spain 2025 Agenda²⁷⁵), Romania could establish a similar strategic and structured approach. To support implementation, it is essential to create mechanisms for interinstitutional collaboration and knowledge sharing, including through the establishment of Communities of Practice (CoPs). For example, the Community of Practice on Digital Transformation developed in the Italian administration fosters peer learning and knowledge-sharing among digital transition managers. Such platforms can facilitate peer learning, promote the dissemination of good practices, and support continuous improvement across the public administration.

274. More details are also included in the dedicated Background report following the study visit in Italy, developed by the World Bank under the TSI 2024 project.

275. https://portal.mineco.gob.es/RecursosArticulo/mineco/ministerio/ficheros/210204_Digital_Spain_2025.pdf

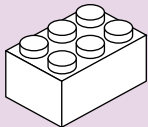
VI. Foresight: fit-for-future digital roles in the public administration



154 Scope of the review and methodological approach



155 Baseline and aspirational scenarios: digital public administration in 2032



165 Key takeaways from the foresight exercise

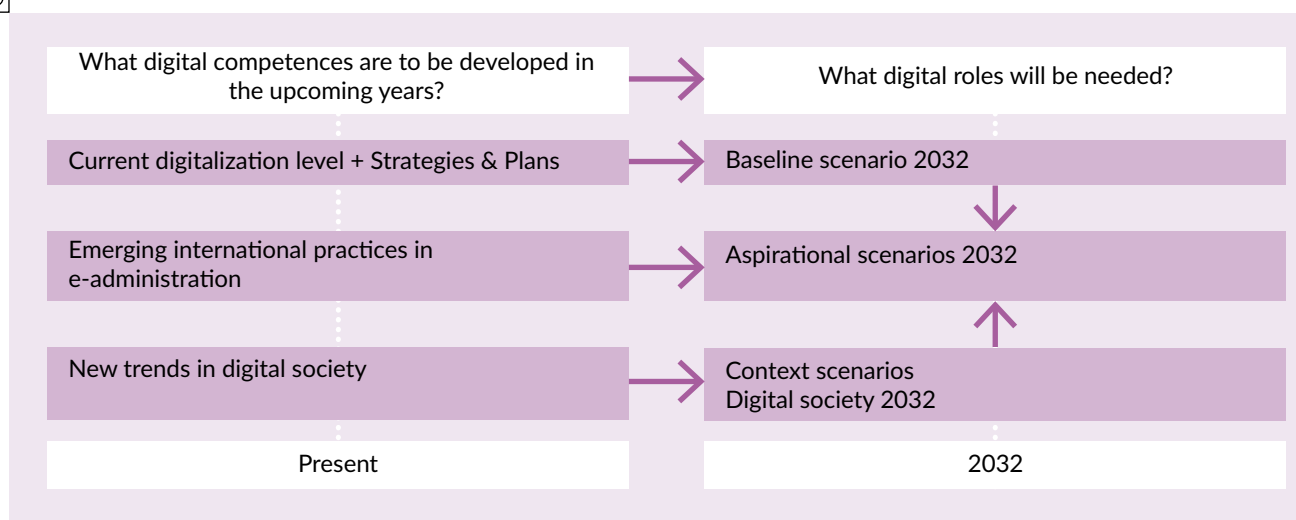
6.1

Scope of the review and methodological approach

355. **The Bank team conducted a foresight exercise to further support the design of a robust and adaptable digital competency framework that aligns with the long-term strategic priorities of the public administration in Romania.** The foresight process was aimed at ensuring that the proposed framework will remain future-ready, enabling civil servants to navigate digital transformation, deliver citizen-centric services, and address complex policy challenges with agility and innovation. The process aimed to inform the definition of specific digital roles that are needed in the future, but also to allow the formulation of recommendations regarding the general digital competencies of public administration employees.
356. **The foresight methodology utilized horizon scanning and scenarios (both explorative and normative) as essential tools in strategic planning.** They are usually meant to help organizations and policymakers navigate uncertainty by exploring various probable and/or desirable futures. This prospective exercise focuses on the year **2032**, a timeframe suited for significant structural transformation in public administration, allowing for the development and maturity of complex digital systems.
357. **In terms of process, the scenario-building process was based on an iterative consultation process.** It built on inputs developed by a specialized foresight team from *Institutul de Prospectiva* and was progressively refined through three online working sessions and a final in-person workshop. The figure below provides a concise overview of the scenario-building steps, followed by a detailed explanation of the characteristics and objectives of each scenario type.
358. **Four consultations sessions were organized to develop and update the scenarios. The detailed foresight process is described in Annex 9.** The first three sessions were conducted with input from Prospectiva Institute and international experts from the World Bank and the Joint Research Centre (JRC). The final consultation workshop provided the opportunity to discuss and enrich the scenarios with local experts from the public administration and the private sector in Romania.



FIGURE 28: Overview of the scenario-building process



6.2

Baseline and aspirational scenarios: digital public administration in 2032

359. **The development of the baseline and aspirational scenarios relied on a horizon scanning and the development of a set of context scenarios for the Romanian digital society in 2032.** The horizon scanning exercise aimed to identify key drivers of change and emerging trends shaping the digital society by 2032. This analysis spanned six dimensions — technological, social, economic, environmental, political, and value-driven shifts. To support structured discussions during the first online workshop, these topics were grouped into six broader categories, which provided the foundation for developing scenarios for the digital society in 2032. The categories included: artificial intelligence, covering developments like AI-as-a-Service and the global AI race; robots, wearables, and human-machine interfaces, addressing the rise of socially adaptive robots and human-technology integration; computing, connectivity, and security, highlighting issues such as semiconductor independence and satellite-based internet; social media, focusing on its geopolitical impact and algorithm-driven filter bubbles; digital environments and infrastructures, encompassing biometric authentication and the Internet of Senses; and behaviors, attitudes, and values, discussing growing mistrust in government and the spread of misinformation. The horizon scanning inputs are reflected in **Annex 9**.
360. **The foresight process identified key trends shaping Romania's digital future, leading to the development of six context scenarios that outline potential shifts by 2032.** These scenarios reflect both opportunities and risks associated with digital transformation, highlighting how emerging technologies might reshape daily life, governance, and industry. Each scenario presents a different image of the future, reflecting different trajectory outcomes based on technological adoption, public trust, and regulatory responses.
361. **The context scenarios for digital society in 2032 reflect the dimensions described below.** They integrate high-impact, high-probability trends – or drivers of change – identified in the initial horizon scanning phase. While these drivers describe the evolution of the European and global contexts, their advancement has been partially adjusted to reflect specific conditions in Romania. Each context scenario is summarized below in present tense (aiming to present the future as a “tangible” reality):
- ➔ **Intuitive digital technologies:** The digital skills gap in Romania is partially offset by intuitive and widely accessible digital technologies. AI assistants in Romanian, connected home devices, and biometric authentication make digital interactions easier for users with limited technical skills. However, reliance on AI-driven services makes human support difficult to access, frustrating many users. While businesses incentivize digital adoption, mistrust in AI and digital financial transactions keeps a portion of the population disengaged from digital services.
 - ➔ **The rise of AI assistants:** AI-powered virtual assistants become a mainstream tool for work, personal organization, and creative tasks. While these technologies enhance productivity and streamline knowledge-based work, over-reliance on AI reduces human interaction and learning. White-collar professionals and large businesses integrate AI into daily operations, but SMEs struggle to keep pace, leading to widening digital disparities in the economy.

- ➔ **Smarter environments:** An increasing number of IoT-connected devices — from wearables to smart homes and workplaces — shape daily life. AI-driven health monitoring and biometric authentication become standard, but access to these technologies remains unequal, particularly in healthcare. Security concerns grow, as IoT-powered industries and infrastructure face cyber threats targeting power grids and industrial facilities.
- ➔ **IoT as the new wave of modernization:** IoT technologies drive efficiency in industries, agriculture, and retail, improving automation and resource management. Smart farming solutions become more accessible, but they standardize farming practices, reducing diversity in agricultural methods. Retail integrates AI-driven inventory tracking and biometric payments, enhancing customer experience but raising concerns about data security and surveillance risks.
- ➔ **The privacy challenge:** The mass adoption of smart sensors, voice recognition, and biometric tracking results in constant monitoring of individuals. Privacy becomes increasingly difficult to maintain, with personal data constantly collected and analyzed. Public pressure for stricter data protection laws and ethical AI regulations grows, but meaningful enforcement remains a challenge at the national and EU levels.
- ➔ **The struggle for truth in a digital maze:** The proliferation of AI-generated content, deep fakes, and algorithm-driven social media accelerates the decline of objective truth. Filter bubbles deepen ideological divides, while traditional media struggles to maintain credibility. Many Romanians withdraw from mainstream social media, favoring decentralized platforms or limiting their digital presence to avoid misinformation and algorithmic manipulation.

362. **Uncertainties surrounding key digital transformations in society were also analyzed, to help distill relevant scenarios for 2032.** Among key uncertainties, the adoption of haptic augmented reality (AR) is reshaping social interactions, work environments, and entertainment, with immersive AI systems enabling touch-based digital experiences. Access can be expected to remain unequal, creating a new digital divide between urban and rural areas due to the high cost of haptic wearables and AI-driven interfaces. Meanwhile, blockchain and decentralized autonomous organizations (DAOs) are transforming finance, governance, and non-profit operations by reducing bureaucracy and increasing transparency. However, regulatory gaps, cybersecurity risks, and financial manipulation concerns pose significant challenges to widespread adoption. At the same time, public trust in government can be expected to continue to erode, fueled by privacy concerns and skepticism toward AI-powered digital governance. Civil society groups can also be expected to advocate for stronger digital rights and regulatory transparency. These uncertainties highlight critical policy and societal challenges.

363. **The Baseline Scenarios “Romanian Digital Administration in 2032” provides a ‘current paradigm’ case:** It takes the current Romanian strategic documents in the field of digital transformation as a starting point. It assumes that the key goals set in these documents are generally met by 2032. The guiding question is the following: **Assuming Romania’s current digitalization paradigm (and associated digital roles) turn out mostly as planned, what is the gap between this best-case baseline and the digital society scenarios for 2032?**

364. **The baseline scenarios for Romania’s digital administration in 2032 reflect incremental progress in digital public services, interoperability, cybersecurity, and sector-specific digitalization,** primarily driven by regulatory compliance, EU reforms, and growing public demand for digital services. Four main baseline scenarios were developed, as summarized below in present tense:

I. Expanding digital access for citizens and businesses:

- ➔ Romania has made significant progress in digitalizing public services, particularly in e-payments and digital identity systems. While eID adoption has been slow due to public hesitation, the ROeID system has been simplified, making it more accessible and widely recognized across the

EU. The EUDI Wallet was successfully piloted, but its full implementation faces interoperability challenges and low adoption incentives, prompting targeted government campaigns to encourage usage.

- Core public service platforms such as ghiseul.ro, SPV, and e-factura have been enhanced, streamlining digital interactions and enabling 85% of administrative procedures for individuals and 75% for businesses to be completed online. To ensure inclusivity, physical service hubs provide in-person assistance for those with limited digital skills, while legislative updates have aligned official communications with the digital transition.

II. Digital intra-administration:

- eSignature has become universally adopted within central public administration, significantly reducing paperwork and improving efficiency. While Enterprise Content Management (ECM) adoption remains inconsistent across institutions, a secure AI-powered cloud solution has emerged as a core tool for civil servants. This system is continuously trained and refined based on user interactions, enabling smarter automation, enhanced document drafting, and real-time communication streamlining. It supports everything from internal correspondence to policy document generation, reducing administrative overhead and improving collaboration.
- The digitalization of HR processes within government agencies has also advanced. Platforms like e-ANFP and SIMRU (unified HR management) are now fully operational, though local administrations are still in the process of full integration. A major milestone has been the integration of digital roles into recruitment, evaluation, and promotion frameworks, ensuring that civil servants possess the necessary skills to adapt to the evolving digital landscape.

III. Infrastructure, cybersecurity, and data management:

- Romania's governmental cloud is fully operational, supporting key public services, though migration is still incomplete. Some voices advocate for restructuring or even replacing the current cloud model due to concerns about scalability and market distortions in the infrastructure sector.
- Cybersecurity threats have intensified, with major breaches reported and smaller incidents becoming more frequent, fueling public concerns about data privacy. Efforts to enhance security include tighter 5G regulations, though these are becoming outdated. Meanwhile, private-sector awareness of cybersecurity has increased, and a national digital innovation hub dedicated to cybersecurity has been hailed as a success.
- Blockchain technology has been introduced in trust-sensitive areas like diploma verification, increasing transparency and reducing fraud.
- The Government's interoperability hub has facilitated significant progress in data integration, though adoption has slowed. The open data portal continues to expand, but data quality and usability remain inconsistent across government agencies. Security concerns limit real-time access to sensitive data, restricting predictive analytics capabilities. As a result, government decision-making still relies largely on aggregated historical data, with only a few agencies — mainly in public order — leveraging real-time insights. AI remains cautiously approached in public administration, with concerns over ethical and legal implications slowing adoption.

IV. Sector-specific digitalization efforts:

- Healthcare: the Digital Health Insurance Platform is operational, integrating e-prescriptions, scheduling, digital payments, and real-time patient records. While the standards of information from the European Health Data Space have been adopted, the infrastructure and obligations for

collecting data from the private actors is still not in place. Hence, the system serves very well for the management of public health insurance, but it is not empowering citizens with access to their entire health data and can provide only partial pictures for doctors. AI applications are increasingly used in diagnostics and administrative tasks, integrated as help or first opinion, rather than fully trusted resources. Telemedicine has started expanding on several lines, including primary care, mental health services, chronic disease management and emergency care.

- Education: digital education is now a mandatory subject nationwide, but digital tools are not fully integrated into teaching methodologies. Low digital literacy among teachers — particularly in primary schools and rural areas — remains a barrier. Digital teacher training programs and updated assessment standards are in place, but results have been slow to materialize. Advanced learning methods such as microlearning, gamification, and social learning remain on the fringes of mainstream education. Although school infrastructure has improved, many rural institutions still lack adequate digital equipment.

365. Building on the baseline scenarios, five aspirational scenarios were developed to set the vision for the digital transformation of the Romanian public administration, beyond the baseline. They examine a range of potential paths/options that could contribute, individually or in various combinations, to a more ambitious and impactful digital transformation in the public administration. Aspirational scenarios emerge from Romania's current policy discourse and strategic documents, but they also reflect elements of the context scenario, incorporating anticipated societal developments by 2032, as well as digital trends and paradigm shifts observed in public administrations in the EU and worldwide.

366. A list of key digital roles follows the baseline and aspirational scenarios, outlining the expertise civil servants need to bring them to life. These roles do not distinguish between in-house and outsourced expertise, as that remains to be explored as part of the design phase of the TSI project.

Aspirational scenario 1: Digital native ecosystem

367. By 2032, Romania's public administration will have evolved into a digital-native ecosystem, replacing traditional bureaucracy with proactive, automated, and intelligent public services. Instead of merely digitizing old processes, the government has redesigned service delivery to eliminate unnecessary paperwork and streamline citizen interactions. At the core of this transformation is the Digital Lake, a network of interconnected sectoral data repositories that integrate information from government agencies, public services, and citizen interactions, creating a seamless, real-time data ecosystem. AI-driven tools and expert data curators ensure data integrity, reconciling historical records while maintaining transparency.

368. This interoperable system allows life events — such as births, marriages, and business registrations or exists — to automatically trigger digital actions across government agencies, eliminating redundant paperwork and ensuring that citizens and businesses never have to submit the same data twice. The transformation has been guided by strong institutional leadership, with a *coordination council* of public and private sector experts overseeing a phased, strategic implementation that balances technological advancements with security and sustainability.

369. To ensure inclusivity, Romania has introduced assisted digital hubs, providing in-person support for citizens with limited digital skills or access. Additionally, outreach teams engage rural and remote communities, while partnerships with banks, telecom providers, and NGOs help expand digital literacy efforts. For those who prefer non-digital services, alternatives such as voice-based interactions, paper-to-digital support, and authorized proxies ensure that all citizens can engage with the digital administration according to their needs.

370. **Key requirements for the first aspirational scenario include:** the National Digital Identity System, the data lake and standardized APIs, Cloud-based and decentralized infrastructure, use of high performance computing, automated service triggers, existence of a One-Stop Government Portal, systems ensuring predictive analytics and decision support, relevant legal framework (Digital-by-Default Legislation, legal recognition of AI-driven decisions), Zero-trust security model (End-to-end encryption, multi-factor authentication, and decentralized identity verification), use of fraud detection AI.

371. **Specialized IT roles and new digital roles will be needed under this scenario, as reflected in Box 10. The leadership and data management roles combine strategic oversight and technical expertise to drive Romania's digital transformation.** While Digital Transformation Officers and Digital Service Owners focus on modernizing public services, Chief Data Officers and AI engineers ensure data governance, interoperability, and automation. Knowledge Base Curators and Government Data Integration Specialists support structured data management, while the Mediator between digital and non-digital data facilitates the transition for users unfamiliar with digital processes.

372. **The technical and service delivery roles reflect the shift toward secure, citizen-centered digital administration.** *Cloud computing specialists, Cybersecurity experts, and AI ethics officers* manage infrastructure, security, and compliance, ensuring a resilient and ethical digital ecosystem. Meanwhile, *Digital service architects, Automation engineers, and UI/UX designers* enhance digital accessibility. To support inclusion, *Citizen engagement specialists, Digital inclusion officers, and Hybrid services coordinators* bridge gaps for non-digital users, with the *Digital Ombudsman* ensuring citizen rights in digital governance.

BOX 10: Key digital roles for a Digital native ecosystem

1. Leadership

- Digital transformation officer
- Chief data officer
- Digital service owners
- Project managers

2. Data management

- Government data Integration specialists
- Knowledge base curators
- Data analysts
- AI engineers
- Mediator between digital and non-digital data

3. Service design and upgrade

- Digital transformation officers
- Digital service architects
- Automation & AI workflow engineer
- UI/UX designer for AI interfaces

4. Infrastructure

- Cloud computing specialists
- High performance computing experts
- Telecommunication /network experts

5. Cybersecurity & Compliance

- AI ethics & privacy officers
- Cybersecurity & data protection specialists

6. Citizen participation & Digital inclusion

- Citizen engagement specialist
- Digital inclusion officers
- Hybrid services coordinators
- Digital Ombudsman for citizen advocacy

Aspirational scenario 2: Virtual assistants for public services

373. **Virtual assistants enhance public service efficiency by providing real-time answers, multilingual support, and step-by-step guidance for administrative processes** such as ID renewal, tax payments, and healthcare access. They automate routine tasks, assisting citizens in filling out forms, scheduling appointments, and tracking application statuses, reducing paperwork and wait times.

Beyond automation, they offer personalized assistance, sending proactive alerts on tax deadlines, benefits eligibility, and policy updates. Anonymized data from these interactions helps improve public administration services, ensuring more responsive and user-centric digital governance

374. **Requirements for this scenario include advanced AI and Natural Language Processing (NLP) to enable context-aware interactions and provide accurate, user-friendly responses.** Seamless data integration and interoperability with government databases, including tax authorities, health insurance, and social services, will ensure real-time information retrieval and efficient service delivery. Cybersecurity and GDPR-compliant data privacy measures are essential to protect citizen information, maintaining trust and ensuring secure digital interactions.
375. **A set of highly technical roles are needed, such as AI & System Development and Data Management & Optimization roles,** requiring expertise in machine learning, NLP, data structuring, and system integration to ensure AI-driven public services function effectively. AI Engineers, Conversational AI Designers, and Data Integration Specialists focus on system performance, automation, and interoperability.
376. **Meanwhile, Cybersecurity, User Experience, and Policy roles operate at the intersection of technology, policy planning, and strategic leadership.** *AI ethics officers* and *cybersecurity specialists* ensure regulatory compliance and risk mitigation, while *Citizen engagement specialists*, *UI/UX designers*, and *Accessibility experts* shape user-friendly and inclusive public services. At the strategic level, *AI policy leads* and *Digital Transformation Managers* drive long-term AI governance, ensuring alignment with national digital policies and public sector innovation goals.
377. **Key roles are reflected Box 11.**

BOX 11: Key digital roles for Services based on virtual assistants

1. AI & system development

- AI & NLP engineer
- Conversational AI designer
- AI performance analyst

2. Data management & optimization

- Government data integration specialist
- Knowledge base curator

3. Cybersecurity & compliance

- AI ethics & privacy officer
- Cybersecurity & data protection specialist

4. User experience & public engagement

- Citizen engagement Specialist
- UI/UX designer for AI interfaces
- Multilingual & accessibility support expert

5. Policy & Strategy Development

- AI policy & strategy lead
- Public sector Digital Transformation Manager

Aspirational scenario 3: Predictive governance

378. **Predictive governance in Romania leverages AI, advanced analytics, and interconnected digital twins to enhance public administration.** Nested digital twins allow municipalities to reuse and build upon shared data. A new approach is adopted in land use planning, zoning, and construction permits using 3D GIS mapping, while IoT-driven models optimize infrastructure management, predictive maintenance, and transit planning. In the energy sector, AI-driven twins monitor power grids and smart substations, balancing supply and demand with GIS-based forecasting while preventing blackouts.

379. AI-powered predictive analytics also transform waste management, disaster resilience, and public finance. Real-time satellite data and AI simulations anticipate natural disasters, enhancing early warning systems, while dynamic fiscal forecasting optimizes resource allocation and budget planning. In social policy, predictive models refine pension planning and social assistance targeting, ensuring financial sustainability and reducing fraud, making governance more efficient, resilient, and proactive. Predictive governance in Romania transforms public administration by harnessing AI, advanced analytics, and interconnected digital twins.

380. Requirements for predictive governance in Romania include: a robust technological infrastructure, including a centralized data platform, 5G and edge computing, nested digital twin models, 3D GIS mapping, satellite and drone monitoring, IoT sensor networks, high-performance computing (HPC), cloud infrastructure, AI-driven analytics, and advanced visualization dashboards. Ensuring data governance and security demands standardized data interoperability, GDPR-compliant data protection, a strong cybersecurity framework, and strategic digital partnerships to maintain trust and resilience in AI-driven public administration.

381. Building a predictive and data-driven public administration requires a mix of technical, strategic, operational, and citizen-focused roles, ensuring digital transformation goes beyond IT infrastructure. Leadership and strategy roles such as *Digital transformation officers* and *Chief Data Officers* drive modernization, while *Smart city managers* and *Cybersecurity officers* ensure sustainability and security. Technical specialists, including *AI engineers*, *IoT experts*, and *GIS analysts*, provide the digital backbone.

382. Not all roles are for highly specialized digital experts, but some incorporate specific digital skills, as shown in Box 12. Operations and implementation experts focus on urban planning, infrastructure management, and climate resilience, while citizen engagement and policy specialists ensure that digital services are inclusive, legally compliant, and ethically governed. This mix of expertise ensures that digital transformation is not just about technology but about better governance, improved services, and increased public trust.

BOX 12: Key digital roles for predictive governance

1. Leadership & strategy roles

- Digital transformation officer
- Chief data officer
- Smart city program manager
- Cybersecurity & data protection officer

2. Technical & Development Roles

- Geospatial data scientist
- GIS analyst & digital cartographer
- AI & machine learning engineer
- IoT & sensor network engineer
- Cloud & edge computing specialist

3. Operations & implementation roles

- Smart infrastructure & urban digital twin engineer

- Energy grid & smart grid analyst
- Disaster resilience & climate data analyst
- Public transportation & traffic analyst
- Policy simulation & impact assessment experts

4. Citizen services & public engagement roles

- E-Government & digital services manager
- Open data & transparency officer
- Citizen engagement & smart city coordinator

5. Policy, compliance, & legal roles

- Digital twin & GIS policy advisor
- Legal & regulatory expert for smart infrastructure
- Ethical AI & digital rights specialist
- Digital partnerships manager

Aspirational scenario 4: Blockchain based repositories

383. By 2032, blockchain serves as a secondary verification system in public administration, enhancing authenticity, transparency, and fraud prevention. Official records, such as diplomas, property deeds,

and birth certificates, are cryptographically secured on blockchain for verification, complementing digital repositories. Public procurement contracts leverage blockchain for auditability and security, while social benefits systems use it to prevent double claims and ensure eligibility verification, though disbursements remain within traditional financial systems. This gradual integration strengthens trust and efficiency without fully replacing existing administrative frameworks.

384. **The integration of blockchain in public administration requires a government-managed, permissioned blockchain network to securely store records and facilitate transactions.** Seamless integration with existing databases — including tax administration, land registries, and social security — ensures interoperability with Romania's e-Government platforms such as Ghiseul.ro and SEAP. Smart contracts will automate procurement, taxation, and social benefits distribution, incorporating predefined legal compliance mechanisms. Decentralized Digital Identity (DID) systems will enhance citizen authentication, while APIs for banks, businesses, and government agencies will allow external integration. A multi-tiered access control system will balance privacy and transparency, ensuring secure and auditable digital transactions.
385. **The integration of blockchain in public administration requires a mix of strategic, technical, operational, and citizen-focused roles (Box 13).** Strategic leaders ensure adequate policy alignment and the compliance framework, while technical experts develop and secure the infrastructure. Operational specialists manage procurement, taxation, and benefits, ensuring seamless adoption. Cybersecurity professionals mitigate fraud risks, and public engagement officers build awareness and trust in blockchain services.
386. **Some key roles are related to policy and compliance.** While several of these roles are highly technical (such as Health Data System Architect, E-Health Platform Developer, and AI & Predictive Analytics Specialist), others focus more on policy, compliance, and stakeholder engagement. Roles like Digital Transformation Officer and Regulatory Compliance Specialist require a blend of technical understanding and strategic oversight, ensuring that digital health initiatives align with national policies and regulations.
387. **Roles which are not ICT-intensive but are still digitally-focused are essential for ensuring user adoption, user access facilitation and ethical governance.** Public-facing roles such as *Citizen support & Digital literacy officer* and *Healthcare provider onboarding specialist* are less technical, emphasizing communication, training, and inclusion to ensure adoption and accessibility. Similarly, *Policy & Research data analysts* focus on data-driven decision-making rather than system architecture.



BOX 13: Key digital roles for blockchain based repositories

1. Strategic & regulatory roles

- Chief blockchain officer (CBO)
- Blockchain policy & compliance officer
- Public sector DAO coordinator

2. Technical & development roles

- Blockchain architect
- Smart contract developer
- Digital identity & security specialist
- Data & blockchain auditor

3. Administrative & operational roles

- Digital procurement manager
- Blockchain taxation & compliance officer
- Social benefits & pension smart contract administrator

4. Cybersecurity & risk management roles

- Blockchain security analyst
- Fraud detection & anti-corruption officer

5. Citizen engagement & training roles

- Blockchain public education & outreach specialist
- Public service digital transformation officer

Aspirational scenario 5: Romanian Health Data Space

388. **A dedicated sectoral initiative was analyzed as a stand-alone scenario to showcase the digital transformation of public services.** The healthcare sector was targeted, building on the *European Health Data Space (EHDS)* initiative (see section 2.2 for details).

389. **The Romanian Health Data Space (RHDS) ensures secure, centralized access to citizens' complete medical history, integrating records from public and private healthcare providers,** as well as certified wearables. Patients receive automated reminders for check-ups and treatments, supporting preventive care. While the system is primarily accessed via a user-friendly mobile app, telephone assistance and in-clinic support make digital healthcare accessible to those with limited digital skills. With patient consent, doctors can access real-time medical records, improving diagnostic accuracy, treatment personalization, and coordination between healthcare providers. An example of such efforts being pursued in Ireland are included in Box 14.

390. **Beyond patient care, RHDS provides aggregated, anonymized health data to optimize public health strategies, resource allocation, and healthcare infrastructure planning.** Researchers benefit from access to large-scale, anonymized datasets, fostering medical innovation, AI-driven research, and evidence-based policy development to enhance Romania's healthcare system.

BOX 14: Ireland: Efforts to develop a health data space

Example: Towards a health data space in Ireland²⁷⁶

Ireland is proactively implementing the European Health Data Space through its HealthData@IE project. This initiative aims to:

- Enhance data accessibility: Allow citizens to access and control their electronic health records seamlessly.
- Support healthcare providers: Ensure that healthcare professionals have timely access to patient information, improving care coordination.
- Promote research and policy development: Provide a trustworthy setup for the secondary use of health data in research and policymaking.

391. **The RHDS requirements include a robust regulatory and technical framework to ensure secure, standardized, and efficient healthcare data management.** It will align with *European Health Data Space (EHDS) standards*, particularly for e-prescriptions and medical records. A hybrid storage model will combine secure government cloud infrastructure for critical data with local storage for non-essential records, ensuring flexibility and compliance. Advanced security measures, including data encryption, multi-factor authentication, and GDPR adherence, are essential to safeguard sensitive health information. AI and big data integration will support predictive healthcare, early disease detection, and data-driven policy improvements. A clear regulatory framework will define roles, rights, and responsibilities for key stakeholders. Citizens will have the right to access, control, and share their health data securely, with transparent consent management policies. Healthcare providers will be required to upload and maintain accurate patient records, with legal safeguards ensuring access only with patient consent. Policymakers and researchers will rely on de-identified, ethically managed datasets to drive evidence-based decision-making, AI-driven research, and responsible pharmaceutical collaborations while protecting patient privacy.

276. <https://eithealth.eu/wp-content/uploads/2023/11/Implementing-the-European-Health-Data-Space-in-Ireland-EIT-Health-report-1.pdf>.

BOX 15: Key digital roles for the RHDS

1. System architecture & development

- Digital transformation officer
- Health data system architect
- E-Health platform developer
- Interoperability specialist

2. Data management & curation

- Health data curator
- Master data manager
- GDPR officer
- Anonymization & data privacy officer

3. Cybersecurity & compliance

- Health data security officer
- Regulatory compliance specialist
- Incident response & risk manager

4. Public engagement & support

- Citizen support & digital literacy officer
- Healthcare provider onboarding specialist
- Policy & Research data analyst

5. AI & Innovation Management

- Predictive analytics & AI specialist
- Digital health innovation manager

6.3

Key takeaways from the foresight exercise

392. **The aspirational scenarios provide a forward-looking framework for identifying specialized digital roles and the broader digital competencies required for public administration employees.** They highlight the evolving skill sets needed to navigate digital transformation, ensuring that both technical specialists and generalist civil servants can effectively contribute to a modern, data-driven government.
393. **In a digital-native ecosystem high-level strategic oversight and hands-on digital technical expertise are essential.** Leadership roles such as Digital Transformation Officers and Chief Data Officers are key to drive modernization, while AI engineers and data integration specialists ensure seamless interoperability. Service designers and UI/UX experts enhance accessibility, and digital inclusion officers support non-digital users.
394. **The integration of virtual assistants in public services demands highly technical roles, including AI engineers and NLP specialists,** to ensure smooth automation and personalized citizen interactions. However, there is also a strong need for user experience experts, cybersecurity professionals, and AI ethics officers to maintain trust, security, and regulatory compliance. Public engagement specialists and multilingual support experts play a key role in ensuring that AI-driven services remain inclusive, responsive, and accessible to all citizens.
395. **In predictive governance, the focus shifts to AI-driven analytics, digital twins, and IoT-based decision-making.** This requires specialists in geospatial data, GIS, cloud computing, and smart infrastructure management. However, beyond the technical backbone, strategic roles like Smart City Managers and Digital Transformation Officers are necessary to align technological advancements with policy objectives. Citizen engagement specialists ensure that predictive governance tools remain transparent and accountable, while policy simulation experts assess the long-term impact of data-driven decision-making.
396. **The adoption of blockchain-based repositories in public administration introduces new roles in blockchain architecture, smart contract development, and cybersecurity.** While these technical roles underpin system integrity and transparency, strategic and regulatory positions, such as Blockchain Policy Officers and Digital Procurement Managers, are needed to guide legal compliance and ensure interoperability with existing public sector systems. Additionally, citizen education and outreach roles play a crucial role in building trust and awareness of blockchain-enabled public services.
397. **Focusing on a particular sector, for digital health transformation, roles extend beyond traditional ICT functions, incorporating healthcare data specialists, AI-driven analytics experts, and privacy officers.** The RHDS requires regulatory compliance officers to oversee GDPR adherence, while public engagement officers facilitate digital literacy among patients and healthcare providers. AI and innovation management roles are crucial in developing predictive healthcare solutions, ensuring that digital transformation in health services is both patient-centered and data-driven. This scenario highlights the need for cross-disciplinary expertise, bridging health, policy, and technology.

398. **The foresight exercise provides a clear basis for categorizing digital roles into three broad groups, generally aligning with the classification presented in the methodology: ICT-intensive roles, ICT-enhanced roles, and ICT-dependent roles (Including leadership roles).** ICT-intensive roles, such as AI engineers, blockchain architects, and cybersecurity specialists, focus on developing, securing, and maintaining the technical backbone of digital governance. ICT-enhanced roles, including digital service architects, geospatial analysts, and predictive analytics specialists, integrate digital tools into sector-specific policy and service delivery. Leadership roles, such as digital transformation officers, chief data officers, and AI policy leads, oversee strategic planning, regulatory compliance, and digital adoption across public administration. This classification ensures that digital transformation is not solely a technological shift but a structured evolution that incorporates specialized expertise, sectoral applications, and high-level governance.

399. **Table 12 illustrates the key digital roles derived from the foresight exercise.**



TABLE 12: Key future-oriented digital roles derived from the foresight exercise

Specialized IT roles (technical expertise in AI, blockchain, data, and infrastructure)	Strategic and policy roles (leading and overseeing governance, compliance, and long-term digital transformation)	Service delivery & citizen-focused roles (bridging digital systems with public needs)
Ai & NLP engineer – develops and optimizes AI-driven virtual assistants and predictive analytics models. Chief data officer – Manages data governance, interoperability, and AI-driven analytics across public administration. Cloud & edge computing specialist – manages cloud infrastructure and decentralized computing systems. Cybersecurity & data protection specialist – ensures the security of digital systems, blockchain networks, and AI-powered services. IoT & sensor network engineer – develops and maintains IoT-enabled smart infrastructure for predictive governance. Blockchain architect – designs secure blockchain-based verification systems for public records and procurement. Geospatial data scientist & GIS analyst – develops digital twins and AI-driven geospatial analytics for urban planning. Health data system architect – designs and maintains the Romanian health data space (RHDS) and ensures interoperability. Smart contract developer – builds automated digital contracts for procurement, taxation, and benefits distribution. Digital identity & security specialist – Develops and secures eID, decentralized digital identity (DID) systems, and authentication mechanisms.	Digital transformation manager – leads the modernization of government services and infrastructure. AI policy & strategy lead – develops national AI policies and ensures ethical AI deployment in public services. Cybersecurity & data governance officer – oversees regulatory compliance, risk management, and GDPR enforcement. Smart city program manager – guides the implementation of predictive governance and digital infrastructure. Blockchain policy & compliance officer – ensures blockchain systems align with legal frameworks and data protection regulations. Public sector digital transformation manager – aligns digital innovation with government priorities and strategic objectives. Digital twin & GLS policy advisor – provides regulatory oversight for geospatial analytics and smart city planning. Legal & regulatory expert for digital services – ensures compliance with emerging digital regulations and e-Government frameworks.	Citizen engagement specialist – ensures digital services are accessible, inclusive, and aligned with public expectations. Digital inclusion officer – designs and delivers digital literacy programs to bridge the digital divide. Hybrid services coordinator – manages the integration of digital and in-person service delivery for non-digital users. Digital ombudsman for citizen advocacy – safeguards citizen rights in digital governance and AI decision-making. Healthcare provider onboarding specialist – supports medical professionals in integrating digital health systems. Multilingual & accessibility support expert – ensures digital services are accessible to diverse linguistic and special-needs populations. Open data & transparency officer – promotes open government initiatives and public data accessibility. Blockchain public education & outreach specialist – educates citizens and businesses on blockchain applications in public administration.

400. **The list of key digital roles outlined in the baseline and aspirational scenarios highlights the specialized expertise required to implement Romania's digital transformation.** These roles demand the attraction of highly skilled professionals – **internal or external to public administration** – and the development of operational strategies to ensure their effective integration into public administration.

I Introduction	II The EU policy framework	III National strategies, policies and institutional arrangements	IV Job analysis	V International experiences	VI Foresight	VII Conclusions
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Whether these roles are fulfilled in-house or through external expertise remains an open question, to be addressed in the design phase of the TSI project.

401. **Additionally, the successful implementation of these roles requires foundational digital skills across the entire civil service**, ensuring that all public employees can effectively engage with digital tools, data-driven decision-making, and AI-powered systems, regardless of their specific function.
402. **These foresight scenarios prove the need for a strategic approach to digital transformation, which requires an overarching digital transformation plan, that should also cover digital skills.** The foresight scenarios involving advanced technologies raise important questions about Romania's strategic direction on digital transformation — even in the absence of an officially adopted strategy. While emerging technologies offer significant potential for innovation and service delivery, their adoption is complex and resource-intensive. The GoR will likely need to prioritize specific technologies based on strategic relevance, feasibility, and expected impact, as well as ensure that corresponding digital competencies are attracted and developed systematically across the civil service. In this context, it will be essential to integrate a national digital skills plan within the broader digital transformation agenda. This includes clarifying institutional responsibilities, financing mechanisms, and how capacity-building efforts will be sequenced and tailored to different segments of the public administration. The planning process can build upon the draft Strategy on Digital Transformation that ADR already developed. Without such integration, there is a risk that digital skills development will proceed in parallel to, rather than in support of, the GoR's transformation objectives. To support this, Output 3 under this TSI project will also explore options for a phased implementation of the digital competency framework and of the specialized ICT roles.

VII. Conclusions: informing the design process

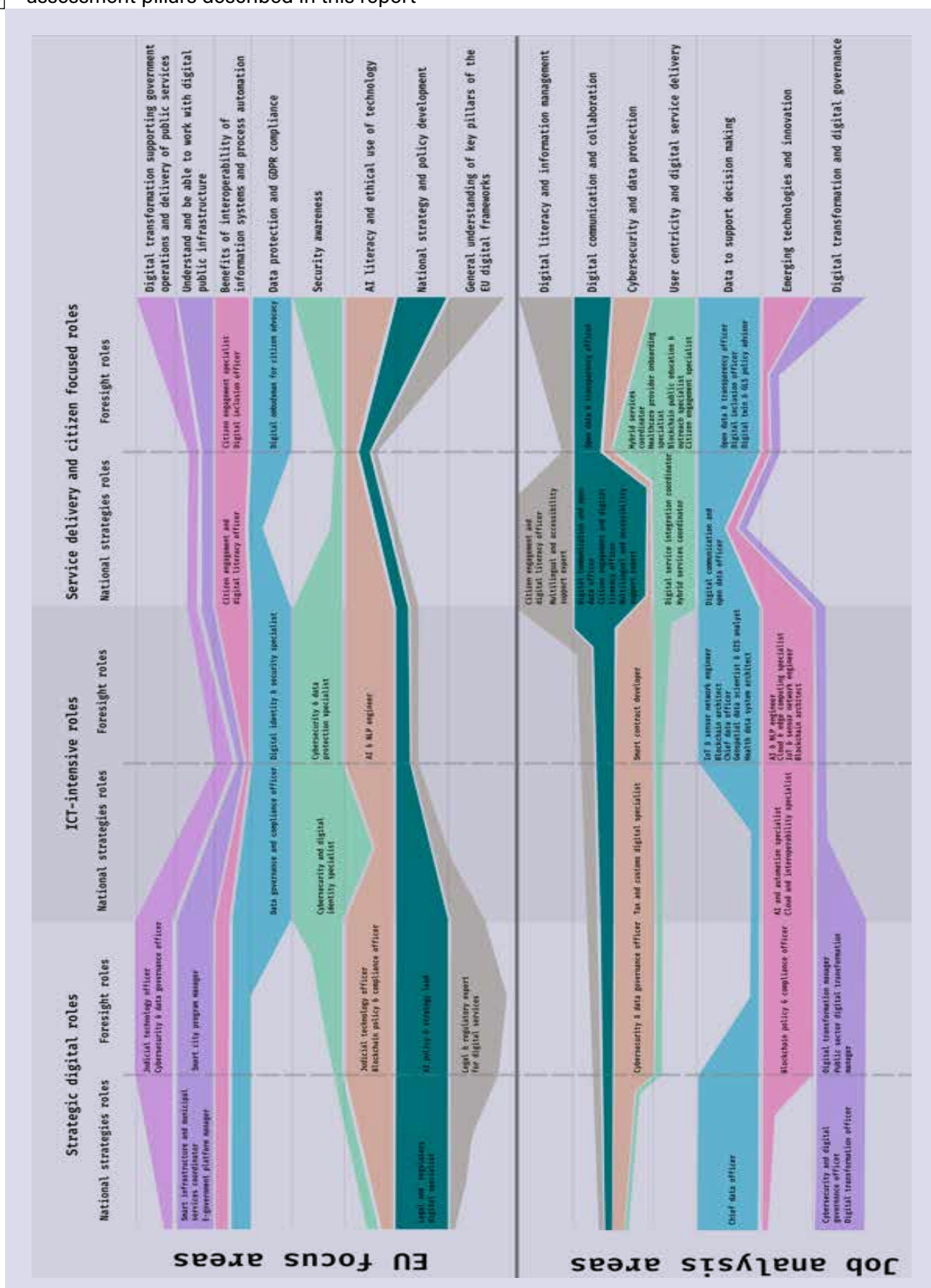
403. **The report highlights the need for Romania's public administration to establish a structured and comprehensive digital competency framework that aligns with both national and EU digital transformation policies.** While digitalization efforts are progressing, the lack of a clear, standardized approach to digital skills development has led to inconsistencies, skill gaps, and fragmentation across public institutions. Addressing these challenges requires a strategic, role-based, and future-oriented framework that integrates good practices from international models while considering Romania's unique context.
404. **The job analysis conducted in this report highlights a significant misalignment between digital competency needs and existing job descriptions and career pathways in Romania's public administration.** Although digital transformation is a national priority, current job classification and job descriptions do not explicitly include digital skills expectations, creating barriers to hiring, retaining, and developing a digitally proficient workforce. This gap limits the ability of public institutions to adapt to new technological demands, implement EU digital regulations, and modernize administrative processes effectively. One of the key findings is that most public administration roles lack clearly defined digital competency expectations, even though the need for digital proficiency is growing across all levels. In particular, non-ICT roles — such as policy officers and service delivery professionals — require greater familiarity with cybersecurity, data management, interoperability, and digital service delivery, yet these skills remain unstructured and unrecognized in recruitment and professional development processes. Without explicit digital competency requirements, civil servants have little incentive to upskill, and institutions struggle to build a workforce capable of sustaining digital transformation efforts.
405. **Significant gaps in foundational digital competencies were documented.** The various assessments conducted for this report, including the one coordinated by ADR on digital maturity in central public administration indicate critical deficiencies in basic digital literacy, cybersecurity awareness, information management, and digital communication. Also, the current job descriptions reveal lack of clear classification of digital skills and extensive reliance on Microsoft Office proficiency. The latter is the most frequently referenced digital skill; in addition, general IT literacy, email communication, and internet usage are commonly referenced but often vaguely formulated. Foundational digital competencies in a broader set of areas are essential for managing everyday administrative tasks and enabling broader digital transformation efforts. Without addressing these gaps, Romania's public sector risks inefficiency, vulnerability to cyber threats, and the inability to fully implement modern digital governance strategies.
406. **The review of the strategic framework at EU and national level shows a critical need for wider set of foundational digital skills, as well as of more advanced and specialized digital skills.** Beyond foundational competencies, the evolving EU and international strategic contexts necessitate extensive upskilling of public administration employees. The EU's Digital Decade 2030 sets ambitious goals, requiring public servants to develop expertise in AI ethics, cybersecurity, data governance, interoperability, and digital service delivery. The increasing regulatory demands of EU legislation, such as the AI Act, Digital Services Act, and NIS2 Directive, highlight the urgency of equipping civil servants with specialized skills to ensure compliance and efficient implementation of digital policies.

407. **To address these challenges, a structured digital competency framework should encompass the necessary skills for civil servants to operate effectively in a digital environment.** Job descriptions should be updated to reflect digitalization needs, ensuring that recruitment and training are linked to digital skills. Civil service and contractual job classifications should be revised to reflect the increasing importance of digital skills across all administrative roles.
408. **General digital competencies should be differentiated based on the main types of roles in the public administration.** General digital literacy, cybersecurity awareness, and data management are essential for all civil servants, while specific roles require advanced expertise. On top of that, some jobs necessitate certain selections of competencies and proficiency levels. For example, policymakers need regulatory digital skills to translate EU policies into national strategies. Service delivery professionals require competencies in user-centered service design, cyber risk management, and interoperability standards to ensure seamless cross-border public services. IT specialists must develop technical skills in cybersecurity, AI, and cloud computing to maintain secure digital infrastructure, while digital leaders need strategic foresight and change management skills to drive institutional transformation.
409. **Beyond technical expertise, a digital mindset is critical for successful digital transformation. Civil servants must cultivate adaptability, openness to innovation, and a user-centric approach** to ensure digital services meet public needs. Policymakers should proactively anticipate regulatory challenges, service designers must embrace citizen-centered design, and digital leaders should foster experimentation with emerging technologies. Aligning Romania's framework with DigComp, the European e-Competence Framework (e-CF), and UNESCO's AI and Digital Transformation Competency Framework would provide a solid foundation for structured competency development, ensuring the public sector remains resilient and future-ready.
410. **The e-CF and ECSF frameworks provide a solid foundation for defining the ICT roles in public administration by offering structured role profiles, competency descriptions, and proficiency levels.** Standardizing job classifications using e-CF/ECSF would reduce inconsistencies, clarify ICT responsibilities, and support workforce planning. While focus groups suggested consolidating ICT positions under a general title such as "ICT Specialist," differentiation of specialized roles remains necessary to ensure clear job expectations and career progression.
411. **Moving forward, the design phase will refine ICT role classifications by integrating general digital competencies, e-CF/ECSF role profiles, and ESCO-defined skills, while also categorizing ICT responsibilities based on system complexity and institutional needs.** The assessment revealed significant gaps in ICT competencies across public institutions, with internal resources covering only 30-40% of required skills, particularly in specialized fields such as system architecture, cybersecurity, and AI. The reliance on external service providers is often ad hoc and lacks a strategic framework for integrating in-house expertise with outsourced support. The definition of future ICT roles will need to reflect current needs and the objectives of the policy framework. The actual adaptation to current resource availability in IT departments will require also targeted recommendations on how to approach resource allocation, outsourcing, flexibility of contracts. In that sense, highly specialized ICT roles could be classified as contract-based positions. Additionally, establishing clear career pathways, competitive salaries, and interdisciplinary teams — including business analysts, change management specialists, and legal experts — will be crucial for retaining ICT talent and ensuring the effective implementation of Romania's digital transformation agenda.
412. **Countries such as Italy and Spain have implemented structured digital competency frameworks, offering valuable insights into good practices.** The Spanish framework was tested on the job descriptions analyzed and allowed the identification of implicit digital skills that are needed for certain jobs. These frameworks will be used also during the design process. The ability to customize and iterate upon international good practices will be crucial in achieving long-term success.

413. **The phased implementation of digital skills into the HRM system is also important for sustainable integration.** A phased approach is necessary to ensure a manageable and sustainable transition towards enhanced digital competencies. Initially, Romania should prioritize foundational digital skills training for all civil servants while progressively introducing specialized competencies through targeted pilot programs. This includes defining clear competencies for distinct roles such as policymakers, service delivery professionals, IT specialists, and digital leadership positions (e.g., Digital Transformation Officers and Chief Data Officers). By gradually expanding digital skills development, Romania could build a scalable and adaptable framework.
414. **Institutional coordination and governance arrangements should be updated and strengthened.** The current fragmentation of digital skills development initiatives necessitates stronger institutional coordination. Clearly defining the roles and responsibilities of ADR, NACS (National Agency for Civil Servants), and INA (National Institute of Administration) is crucial. ADR could oversee specialized competency planning, NACS could integrate digital competencies into broader civil service frameworks, and INA could manage structured training initiatives. Enhancing inter-institutional collaboration would ensure consistency and effectiveness in digital skills development.
415. **Embedding competency-based training programs within human resource strategies is essential for equipping civil servants with up-to-date digital skills.** Bridging this gap requires strong institutional coordination, with ADR, NACS, and INA playing key roles in defining competency standards, updating recruitment policies, and institutionalizing digital training pathways. By harmonizing national strategies with workforce development, Romania can ensure that its public administration is not only digitally literate but also strategically positioned to lead and sustain digital transformation efforts in the long term.
416. **A structured yet flexible approach to the certification and recognition of digital skills is essential and should be closely linked to a renewed approach to training.** Establishing structured, accessible training programs is key to aligning digital competencies with professional requirements. Romania could consider developing a national digital training platform — drawing inspiration from initiatives such as Italy's *Syllabus* platform — to offer modular, continuous training tailored to competency needs. In parallel, a clear but adaptable certification system would help validate the digital competencies of public employees and support career development, while ensuring consistency with Romania's rules-based public administration tradition. International experience, including Spain's *AgeDigital* project and the Basque Country's *BAIT* model, demonstrates the value of combining self-assessment tools with structured learning pathways. To be effective, certification should recognize digital skills acquired through various learning channels, be supported by practical self-assessment tools, and rely on clear guidelines defining eligibility, validation mechanisms, and alignment with job profiles. The certification process should primarily inform recruitment and staff development strategies, without adding unnecessary formal requirements in the performance appraisal process.
417. **Based on the assessment phase, an overview map was developed to synthesize the findings from the mapping of the general digital competencies and specialized ICT roles needed in the public administration.** The figure below includes the high-level summary of the competency mapping exercise, providing a structured comparison between EU-level digital policy focus areas and the job analysis findings from the national context, with the intersection areas of the various assessment pillars. It is organized across three role clusters - strategic digital roles, ICT-intensive roles, and service delivery and citizen-focused roles - each differentiated by national strategy relevance and foresight orientation. While the map offers a useful reference, it is intentionally high-level and generalized. Its purpose is not to prescribe fixed role descriptions but to serve as an input for the design phase, where more tailored competency profiles and functional role definitions will be developed taking into account also the implementation context.



FIGURE 29: Summary map of digital competencies and roles at the intersection of the main assessment pillars described in this report



418. **Preparing for the future, new digital roles should already be prioritized and prepared.** Looking ahead to 2032, the digitalization of the public administration will require significant shifts in workforce capabilities. The emergence of new roles which are expected to become core for daily operations (such as AI policy advisors, cybersecurity strategists, digital ethics officers, hybrid services coordinator and GovTech specialists) signals a transformation in public sector expertise. Romania should anticipate these changes by developing a dynamic, modular competency framework that evolves alongside technological advancements. Investing in digital leadership training will ensure that senior officials and policymakers can drive digital transformation efforts effectively.
419. **Romania's digital transformation efforts cannot succeed without a highly skilled public administration.** The report underscores the need for a structured digital competency framework that integrates EU requirements, international good practices, and national institutional needs. Addressing digital skills gaps, investing in specialized training, and embedding digital competencies into civil service career paths are essential for ensuring long-term sustainability and digital resilience. A phased, institutionalized approach to digital competency development will be key to achieving these goals. Digital skills should become a core component of public sector recruitment and training. Additionally, Romania's public sector should move beyond compliance-driven digitalization and adopt a strategic vision for digital governance that leverages data, AI, cybersecurity, and interoperability to build a modern, efficient, and trusted public administration.
420. **Moving forward, the design phase under the TSI project will build upon the assessment by integrating the key findings along the following dimensions:** (i) the design of the general competency framework; (ii) the design of specific ICT roles; (iii) recommendations for introduction of the digital competencies into the legislative framework; (iv) recommendations for the institutionalization and operationalization of digital competencies in HR processes and updating of institutional roles.
421. **The design process of the general digital competency framework will be based on the assessment phase and will be done in collaboration with the HR and ICT working groups that were set-up.** The development of the digital competency framework will be guided by EU and international good practices, national needs, job-specific requirements, and forward-looking digital scenarios for the public administration.
- I. **Classification and definition of competency areas in alignment with frameworks that were assessed as relevant:** DigComp, UNESCO's AI and Digital Transformation Competency Framework, ADR's digital maturity model, the Spanish digital competency framework for public employees.
 - II. **Delimitation of integration areas with the general competency framework** in the Romanian public administration – digital skills can be mapped across most of the competencies already defined. This will facilitate later applicability in HR processes.
 - III. **Delimitation of clusters of competence** building on:
 - Foundational digital skills resulting from the bottom-up analysis
 - Digital competency areas highlighted in other relevant international frameworks (for example the model from Denmark which also defined competencies at organizational level will be considered for structuring of new roles that can advance digital processes)
 - Requirements of regulatory compliance stemming from key EU legislation, including GDPR, the AI Act, NIS2, the Interoperable Europe Act.
 - IV. **Definition of proficiency levels**, with examples.
 - V. **Delimitation**, for each competence, of the expected level of knowledge at hiring and during the first year on the job.

VI. Exemplification of relevant specific digital skills for selected functional domains (such as HR, policy planning), to reflect complementarity with the general digital competencies

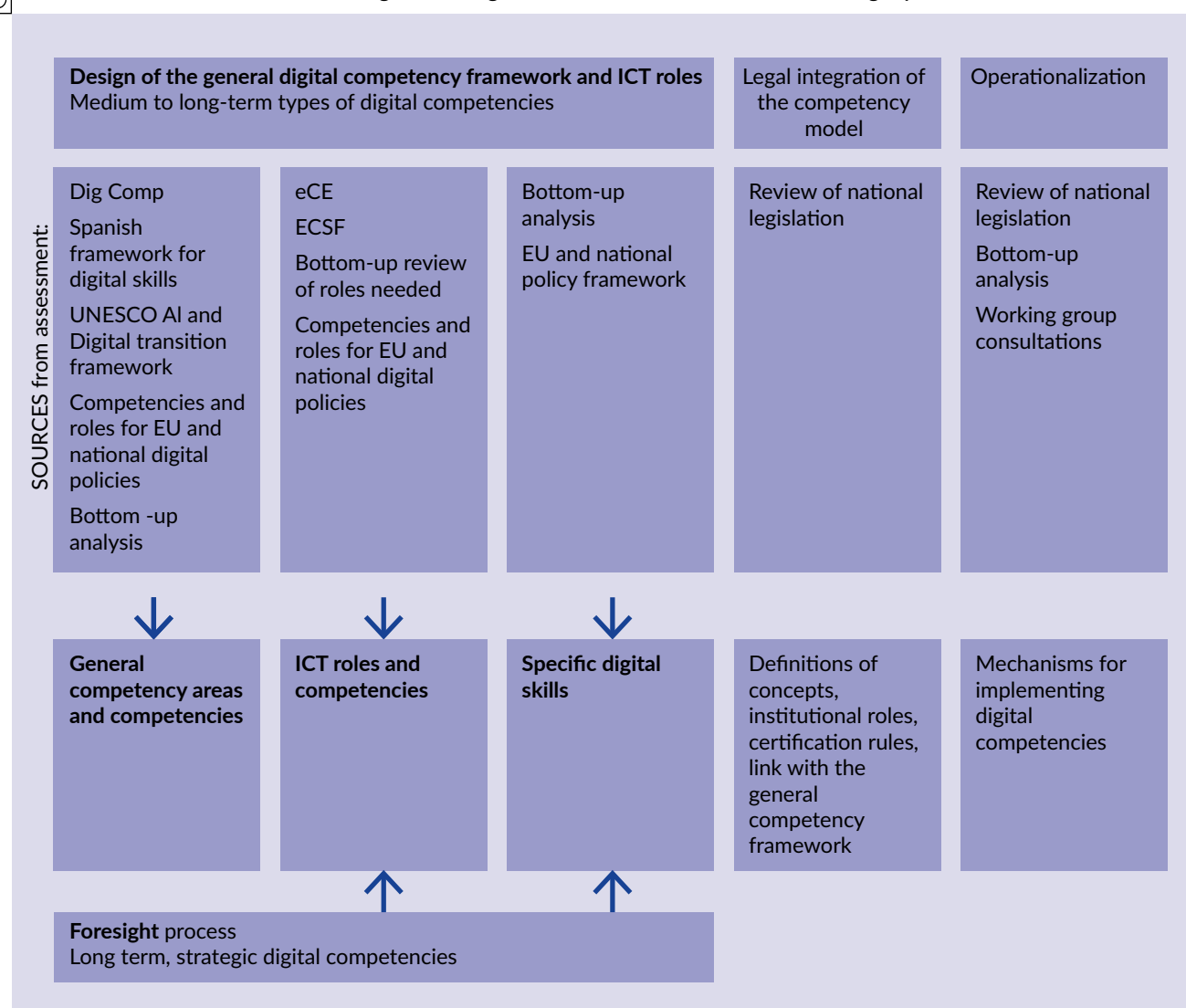
VII. Definition of role-specific digital competencies for new roles, such as digital transformation managers/officers, digital public service facilitators, hybrid public services managers, to align with selected roles from the foresight scenarios.

VIII. For better targeting, **construction of a set of three generic digital competency profiles** tailored to specific roles: policymakers, service delivery professionals, and digital transformation leaders.

422. **The design of the ICT specific roles will rely on eCF and ECSF frameworks.** Relevant competency areas were already identified, and a set of core roles will be built in alignment with digital needs resulting from the top-down, bottom-up assessment and foresight exercise phase. The definition of ICT roles will also integrate the level of responsibility for some jobs in dependence with the complexity of the ICT system managed. The analysis will showcase medium-term and long-term role needs, taking into account the considerable baseline gap in terms of ICT resources in the central public administration in Romania.



FIGURE 30: Forward-looking: building on the assessment for the design phase



423. **Recommendations for legal adoption will be framed to ensure HRM policy integration**, so that digital competencies become a core requirement in civil service management. This workstream will build upon the review of the current legal framework, as captured in this report. Recommendations will be clear and context specific, to inform legislative amendments, allowing to integrate digital competencies and requirements for general competencies, as well as to formally recognize digital competencies as a requirement for recruitment and promotion. A core area will target standardization mechanisms, to facilitate equivalency between digital competency certifications and recognized training programs, given current challenges highlighted in the review of the current legal framework and in the focus groups.
424. **Recommendations for the implementation of the digital competencies are expected to facilitate future application in HR processes, clarify institutional roles and facilitate public-private collaboration on digital upskilling.** The roles of NACS, INA and ADR will be proposed to be further clarified, so that: (i) NACS would lead the integration of digital competencies into public administration HRM policies and INA would be positioned to make digital skills programs a core area of its training mandate. ADR should lead the development of a digital skills plan in alignment with wider digital reforms, collaborating with NACS and INA. Institutional mechanisms for managing specialized ICT roles and their deployment should also be overseen by ADR, to facilitate adequate allocation of highly specialized expertise, on a needs basis and based on clear system-dependent criteria. Details and options will be framed in Output 3 under the TSI project.
425. **The design phase of the general digital competency framework and the development of recommendations for introduction and implementation (Outputs 2 and 3 under this TSI) will leverage the key findings from this report.** By integrating EU policy frameworks, addressing national gaps, leveraging international experiences, and aligning with foresight-driven digital transformation needs, the framework will equip Romania's public administration with the necessary digital skills for future governance. Legal integration, HR adoption, and institutionalization will be essential to ensure sustainability and long-term impact.
426. **Future recommendations will outline phased options for implementing the digital competency framework, in alignment with the current HRM priorities and institutional capacities.** Future recommendations under this project will need to include a phased implementation plan for the digital competency framework and the specialized ICT roles. The plans will need to consider the institutional capacity of HR units and line managers to absorb and apply the proposed digital competency models that will be proposed in Output 2. While the need for a national digital skills plan for the public administration has been identified as a key coordination mechanism, this alone will not resolve the challenges posed by Romania's fragmented HRM and digital governance landscape. Therefore, beyond looking into methodological aspects, Output 3 will also explore implementation options that work within existing constraints. This will help ensure the digital competency framework will be realistically implementable in the current administrative and institutional context.

Annexes

Annex 1. Digital skills model extracted from the Digital maturity conceptual framework, ADR 2023

Component	Sub-component	Item analyzed
Digital data, information and documents	Managing digital data, information and documents	1. The ability to distinguish between data and information
		2. How the internet can be used to search for data and information
		3. The ways in which information, data and digital content can be organized so that it can be stored and managed in an efficient and functional way
		4. The main public databases that can be used support institutional tasks
		5. Ways to assess the reliability / veracity of information and data collected on the Internet
		6. Use the main public data sources (e.g. Eurostat, OECD, NSI Tempo) to collect data and information useful for in-depth analysis and comparison, including to support decision- making processes
		7. The potential of data analysis tools (e.g. Excel, SPSS, etc.) in decision making
	Creating and evaluating digital documents	8. Understanding what an electronic document means
		9. Functions of a document management system
		10. Document formats whose technical characteristics guarantee the accessibility of documents published on the websites of public institutions
		11. Understanding what an electronic seal means
		12. Understanding what an advanced electronic signature means
		13. Understanding what a qualified electronic signature means
		14. How electronic content acquires legal value
		15. The difference in legal value between an advanced qualified electronic signature and an electronic seal
		16. Conditions to be fulfilled for the use of electronic signature in other Member States of the European Union
		17. Meaning of time marks and other temporal references which may be relied on as against third parties
		18. Mandatory minimum requirements (according to the legislation in force) for the electronic archiving process
	Open data management	19. Understand what open data means, including the difference between open data and public data
		20. The usefulness of open data for businesses, citizens and civil society
		21. Open data default and its limits
		22. The meaning of Linked open data
		23. Main actions to be by public institutions to publish open data
		24. Open data quality assessment
		25. Use of proposed national and international meta-data models

Component	Sub-component	Item analyzed
Communication and sharing	Communication and sharing within your own institution	26. Using e-mail as a communication tool within my institution
		27. Using basic document sharing tools (file sharing) and the benefits can bring
		28. Using the intranet as a communication and sharing tool within their institution and its main features
		29. What are the different types of advanced communication tools (e.g. instant messaging applications and audio-video conferencing) and their main features
		30. Main features of advanced online sharing (i.e. tools that allow multiple users to edit a document in the same
		31. How to use advanced communication tools (e.g instant messaging applications and audio video conferencing)
		32. Use advanced online tools for sharing information and documents online (i.e. tools that allow multiple users to edit a document at the same time), assessing their advantages and risks
		33. Principles guiding the choice of a digital communication tool according to the characteristics of the message, the nature, complexity and degree of
		34. Main tools for digital communication between public administration institutions
		35. Using digital communication tools between public administration institutions
		36. Benefits of interoperability of information systems of public authorities and institutions
		37. Ways identified by the legislation for valid electronic submission of applications and declarations to public administration institutions
		38. Basic electronic tools for mass communication and dissemination of information to citizens and businesses (e.g. institutional websites, news)
		39. Use of digital tools to communicate with beneficiaries of public services (e.g. online discussion forums, instant messaging, audio video conferencing, social media platforms)
		40. Use appropriate communication styles and language registers according to the electronic communication tool used
Providing digital services	Communication and sharing with citizens, businesses and other public institutions	41. Conditions to be met for documents transmitted by electronic means to citizens and businesses to have legal value
		42. Choice and use of digital tools for communicating with citizens and businesses, depending on the nature, complexity and formality of the content
	Citizens' digital identity	43. The concept of citizens' digital identity
		44. Main features of citizens' digital identity
		45. Legal implications of citizens' use of their digital identity
	Providing public services electronically	46. Responsibilities of public institutions with regard to the online publication of forms necessary for the provision of public services
		47. The right of citizens to make payments using IT methods and online payment platforms (e.g. ghiseul.ro)
		48. Mobile-first principle
		49. Digital-by default principle
		50. The 'Once-only' principle and its consequences for online service provision
		51. The different levels of sophistication in providing an online service, from the basic level (publishing information and forms) to the most advanced level (fully digital service delivery)

Component	Sub-component	Item analyzed
Digital transformation	Knowledge of emerging technologies for the digital transformation of public administration	52. Understanding what Cloud computing technology means
		53. Understanding what Big data and Data analytics technology means
		54. Understanding what Artificial Intelligence Technologies mean
		55. Understanding IoT - Internet of Things
		56. Understanding Blockchain Technology
		57. Benefits of using cloud computing in the public sector
		58. Benefits of using Big data and data analytics in the public sector
		59. Benefits of using artificial intelligence in the public sector
		60. The benefits of IoT - Internet of Things for the public sector
		61. Advantages of using Blockchain in the public sector
		62. Main application areas of cloud computing
		63. Main application areas of Big data and Data analytics
		64. Main application areas of artificial intelligence
		65. Main application areas of IoT - Internet of Things
		66. Main application areas of Blockchain
Safety and security	Protecting devices/work equipment against cyber attacks	67. Risks and threats in digital environments
		68. Basic security measures I need to adopt to protect my own devices / equipment (e.g. Antivirus, Antispam, Antimalware)
		69. How passwords used on your own devices are defined and managed
		70. Main risks for your device if it is subject to cyber attacks
		71. Existence of cyber security measures for public institutions
		72. Characteristics of the main types of cyber attacks, Viruses, Trojans, Denial of Service (DoS), Distributed Denial of Service (DDoS)
		73. The countermeasures I can take to prevent and defend myself against cyber-attacks on my work equipment
		74. Signs that may indicate that the device I'm working on is under cyber attack
	Protecting personal data and maintaining the confidentiality of data of beneficiaries of public services	75. Concepts of confidentiality, data integrity of public service beneficiaries
		76. General principles set out in the General Data Protection Regulation (REGULATION (EU) 2016/679)
		77. Obligations relating to protection of personal data in the context of the activities of a public administration
		78. Different types of personal data
		79. Protecting the personal data of beneficiaries of public services in digital environments (e.g. complex passwords, accessing secure web pages, etc.)
		80. Assess the risks to the personal data beneficiaries of public services in the digital environment and apply appropriate countermeasures (e.g. identifying phishing attempts and notifying the responsible bodies)

Annex 2. E-Competence Framework (e-CF) and European Cybersecurity Skills Framework (ECSF)

The European e-Competence Framework (e-CF) standardizes a common terminology for competencies, skills, and proficiency levels for ICT professionals. The e-CF is developed and maintained by the European Committee for Standardization technical body CEN/TC 428 - ICT Professionalism and Digital Competences. The list of current e-CF standards is in the annex. The most important e-CF standards are EN 16234 (ICT competencies and skills), EN 16458 (ICT role profiles), and EN 11748 (ICT knowledge and skills), that is complementary and compatible to both EN 16234 and EN 16458.

The European Cybersecurity Skills Framework (ECSF) focuses on cybersecurity roles and skills. The ECSF is developed and maintained by the European Union Agency for Cybersecurity - ENISA. The ECSF is built on and complements the e-CF for specific cybersecurity roles.

The e-CF and ECSF are structured in 4 dimensions.

- Both e-CF and ECSF competences are organized according to five ICT business areas (dimensions 1) and 41 e-competencies (dimension 2).
- The proficiency levels (dimension 3) that apply to each competence are related to the European Qualifications Framework (EQF). The e-CF has 5 proficiency levels e-1 to e-5 that correspond to level 3-8 of the EQF. The ECSF only uses level e-3 to e-5.
- Dimension 4 is related to knowledge and skills.

Both e-CF and ECSF are aligned with European Skills, Competencies, and Occupations (ESCO):

- The e-CF is an important source for developing ESCO and, in particular, has been used by the Sectoral Reference Group ICT service activities²⁷⁷.
- For the latest ESCO update, v1.2, the European Commission's ESCO team and the European Union Agency for Cybersecurity (ENISA) collaborated to align the European Cybersecurity Skills Framework (ECSF) with the ESCO classification²⁷⁸.

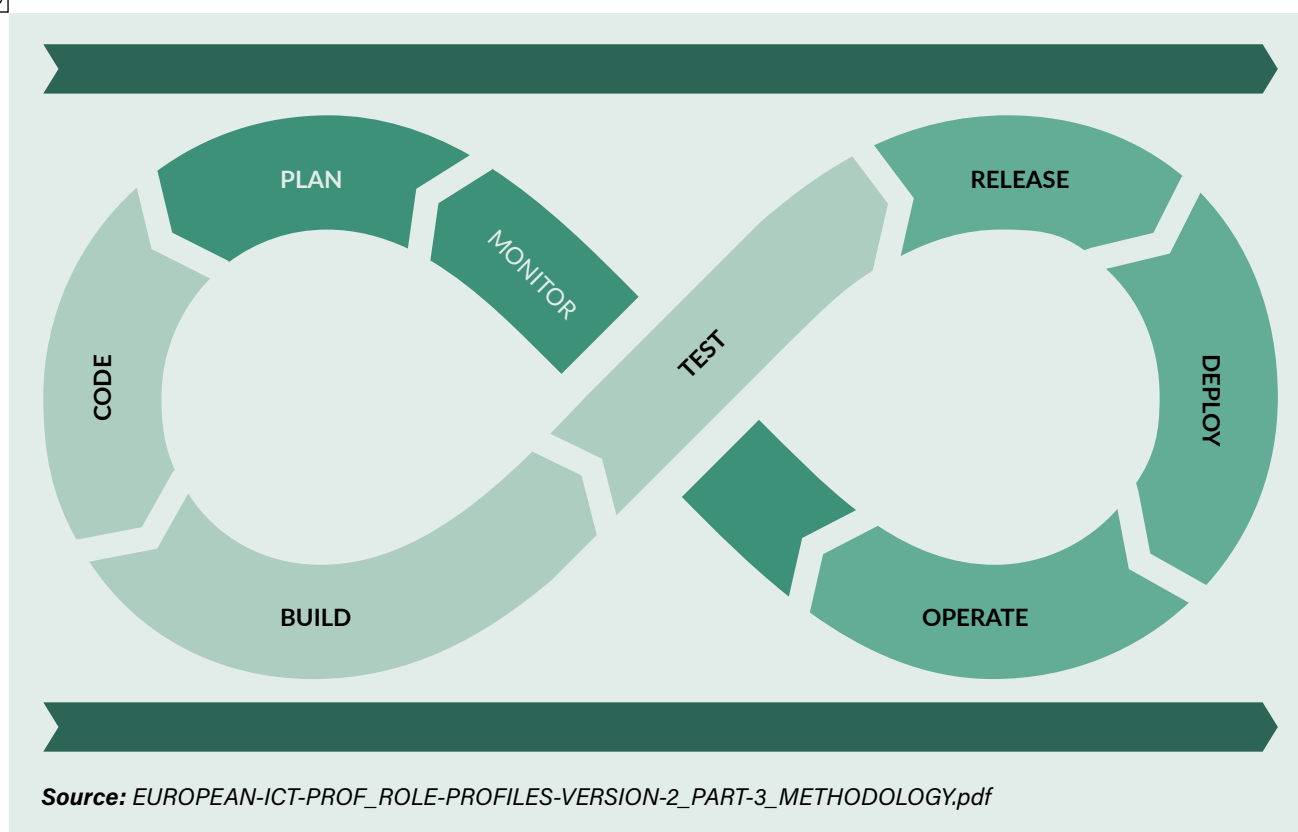
The e-CF structure is mapped to an Agile/DevOps lifecycle and the 30 e-CF ICT Professional Role Profiles structured by seven families corresponding to five main business processes (e-CF Dimension 1).

277. esco.ec.europa.eu/en/about-esco/escopedia/escopedia/european-e-competence-framework-e-cf

278. esco.ec.europa.eu/en/about-esco/publications/publication/crosswalk-between-esco-and-european-cybersecurity-skills



FIGURE 31: The e-CF structure for an Agile/DevOps lifecycle



The e-CF (EN 16458) identifies 30 ICT Professional Role Profiles (major titles). The e-CF role profile includes profile title, summary statement, mission, deliverables (accountable, responsible, contributor), main tasks, e-competency (from e-cF) and proficiency level.



TABLE 13: The 30 e-CF ICT Professional Roles

Role – profile title	Summary description
1. Account Manager	Senior focal point for client sales and customer satisfaction
2. Business Analyst	Analyses Information System for improving business performance.
3. Business Information Manager	Proposes plans and manages functional and technical evolutions of the Information System within the relevant business domain.
4. Chief Information Officer (CIO)	Develops and maintains Information Systems compliant to business and organization's needs.
5. Database Administrator (DBA)	Designs and implements or monitors and maintains databases.
6. Developer	Builds/codes ICT solutions and specifies ICT products according to the customer needs.
7. Digital Media Specialist	Creates websites and multimedia applications combining the power of digital technology with effective use of graphics, audio, photographic and video images.
8. Enterprise Architect	Designs and maintains the Enterprise Architecture.
9. ICT Consultant	Supports understanding of how new ICT technologies add value to a business.
10. ICT Operations Manager	Manages operations, people and further resources for the ICT activity.

Role – profile title	Summary description
11. ICT Security Manager	Manages the information security policy.
12. ICT Security Specialist	Ensures the implementation of the organizations security policy.
13. ICT Trainer	Educates and trains ICT professionals and practitioners to reach predefined standards of ICT technical /business competence.
14. Network Specialist	Ensures the alignment of the network, including telecommunication and/or computer infrastructure to meet the organisation's communication needs.
15. Project Manager	Manages project to achieve optimal performance that conforms to original specifications.
16. Quality Assurance Manager	Guarantees that Information Systems are delivered according to organisation policies (quality, risks, Service Level Agreement).
17. Service Desk Agent	Provides first line telephone or e-mail support to clients with technical issues.
18. Service Manager	Plans, implements and manages solution provision.
19. Systems Administrator	Administers ICT System components to meet service requirements.
20. Systems Analyst	Analyses requirements and specifies software and systems.
21. Systems Architect	Plans and is accountable for the implementation and integration of software and/or ICT systems
22. Technical Specialist	Maintains and repairs hardware and software on client premises.
23. Test Specialist	Designs and performs testing.
24. Solution Designer Role	Provides the translation of business requirements into end-to end ICT solutions.
25. Digital Transformation Leader	Provides leadership for the implementation of the digital transformation strategy of the organisation.
26. Devops Expert Role	Implements processes and tools to successfully deploy DevOps techniques across the entire solution development lifecycle.
27. Data Scientist Role	Leads the process of applying data analytics. Delivers insights from data by optimising the analytics process and presenting visual data representations.
28. Data Specialist Role	Ensures the implementation of the organisations data management policy.
29. Scrum Master Role	Leads and coaches an agile team.
30. Product Owner Role	Represents the voice of the customer in an agile

Source: Roles and summary description extracted from EUROPEAN ICT PROFESSIONAL ROLE PROFILES VERSION 2 CEN ICT Skills Workshop CEN WORKSHOP AGREEMENT (CWA) PART 1: THE 30 ICT PROFILES

The ECSF defines additional 12 ICT Cybersecurity Professional Role Profiles and for each profile are details about title, alternative titles, summary statement, mission, deliverables, tasks, knowledge, skills, e-competencies and related proficiency level²⁷⁹. There are some overlaps between e-CF roles and ECSF roles (examples: Information Security Manager in e-CF and Chief Information Security Officer (CISO) in ECSF, Information Security Specialist in e-CF corresponds to more detailed roles in ECSF such as Cyber Threat Intelligence Specialist, Cybersecurity Researcher).

279. See <https://www.enisa.europa.eu/topics/education/european-cybersecurity-skills-framework/ecs-f-1.xlsx>

TABLE 14: The 12 ECSF ICT Professional Role for cybersecurity

Role – profile title	Summary statement
Chief Information Security Officer (CISO)	Manages an organization's cybersecurity strategy and its implementation to ensure that digital systems, services and assets are adequately secure and protected.
Cyber Incident Responder	Monitor the organization's cybersecurity state, handle incidents during cyber-attacks and assure the continued operations of ICT systems.
Cyber Legal, Policy & Compliance Officer	Manages compliance with cybersecurity-related standards, legal and regulatory frameworks based on the organization's strategy and legal requirements.
Cyber Threat Intelligence Specialist	Collect, process, analyze data and information to produce actionable intelligence reports and disseminate them to target stakeholders.
Cybersecurity Architect	Plans and designs security-by-design solutions (infrastructures, systems, assets, software, hardware and services) and cybersecurity controls.
Cybersecurity Auditor	Perform cybersecurity audits on the organization's ecosystem. Ensuring compliance with statutory, regulatory, policy information, security requirements, industry standards and good practices.
Cybersecurity Educator	Improves cybersecurity knowledge, skills and competencies of humans.
Cybersecurity Implementer	Develop, deploy and operate cybersecurity solutions (systems, assets, software, controls and services) on infrastructures and products.
Cybersecurity Researcher	Research the cybersecurity domain and incorporate results in cybersecurity solutions.
Cybersecurity Risk Manager	Manage the organization's cybersecurity-related risks aligned to the organization's strategy. Develop, maintain and communicate the risk management processes and reports.
Digital Forensics Investigator	Ensure the cybercriminal investigation reveals all digital evidence to prove the malicious activity.
Penetration Tester	Assess the effectiveness of security controls, reveals and utilize cybersecurity vulnerabilities, assessing their criticality if exploited by threat actors.

Source: <https://www.enisa.europa.eu/topics/education/european-cybersecurity-skills-framework/ecs-f-1.xlsx>

Annex 3. Analysis e-CF competencies in relation to the Rules for organization and functioning of the Ministry of Finance

This analysis mapped e-CF competencies, that can be seen as main functions (responsibilities) for an ICT Unit, and responsibilities included in Rules for Organization and Functioning of the National Center for Fiscal Information (CNIF) of Ministry of Finance ²⁸⁰– abbreviation below ROF CNIF.

Conclusions:

- The ROF CNIF includes 39 general responsibilities (“atribuții specifice”). Responsibilities 1-38 can be mapped with e-CF competences as presented in the table below. The last one (responsibility 39) is very general (performs any other tasks requested by the MoF management, within the field of competence and activity of CNIF, and in accordance with the legislation in force). Many of the 38 general responsibilities are mapped to more e-CF competencies.
- No gaps were identified in the e-CF versus CNIF ROF, meaning responsibilities are included in the CNIF ROF and not present in the e-CF.



TABLE 15: Analysis of e-CF competencies versus ROF MoF

e-CF Business area	e-CF competency	ROF CNIF
PLAN	A.1. Information Systems and Business Strategy Alignment	Responsibilities 1, 16, 35, 36, 37
	A.2. Service Level Management	This is not explicitly included in ROF whether CNIF provides IT services to other PA institutions – responsibility 11
	A.3. Business Plan Development	Responsibilities 2, 3
	A.4. Product / Service Planning	Responsibilities 17,18, 19, 20
	A.5. Architecture Design	Responsibilities 6,7,8,9,10
	A.6. Application Design	Responsibility 5, 22
	A.7. Technology Trend Monitoring	Responsibilities 38
	A.8. Sustainability Management	NOT INCLUDED IN ROF CNIF
	A.9. Innovating	Responsibilities 16,36 – even if it is not explicitly written
	A.10. User Experience	Responsibility 4
BUILD	B.1. Application Development	And CNIF has more ICT development departments/units Responsibility 4
	B.2. Component Integration	And CNIF has more ICT development departments/units Responsibility 4
	B.3. Testing	And CNIF has more ICT development departments/units Responsibility 4
	B.4. Solution Deployment	And CNIF has more ICT development departments/units Responsibility 4
		And CNIF has more ICT development departments/units

280. mfinante.gov.ro/static/10/Mfp/rof2024/4_21_CNIF.pdf

e-CF Business area	e-CF competency	ROF CNIF
BUILD	B.5. Documentation Production	Responsibility 4 And CNIF has more ICT development departments/units
	B.6. ICT Systems Engineering	Responsibility 7 and Infrastructure Management Department
RUN	C.1. User Support	Responsibility 5 and Helpdesk service and quality of ICT services
	C.2. Change Support	Responsibility 15
	C.3. Service Delivery	Responsibility 14
	C.4. Problem Management	Responsibility 5 and 7 and specific responsibilities
	C.5. Systems Management	Responsibility 5 and 7 and specific responsibilities
ENABLE	D.1. Information Security Strategy Development	Responsibility 13
	D.2. ICT Quality Strategy Development	Responsibility 14, 25
	D.3. Education and Training Provision	Responsibilities 30,31,32
	D.4. Purchasing	Responsibility 21
	D.5. Sales Development	NOT INCLUDED IN ROF CNIF
	D.6. Digital Marketing	NOT INCLUDED IN ROF CNIF
	D.7. Data Science and Analytics	Responsibility 4 <i>And partial Datawarehouse Department</i>
	D.8. Contract Management	Responsibilities 21
	D.9. Personnel Development	Responsibilities 24
	D.10. Information and Knowledge Management	NOT EXPLICITLY INCLUDED IN ROF CNIF
	D.11. Needs Identification	Responsibility 5 And CNIF has more ICT development departments/units
MANAGE	E.1. Forecast Development	NOT EXPLICITLY INCLUDED IN ROF CNIF - general responsibilities. Unit IT strategy, methodological coordination and inter-institutional cooperation service may be in charge for this
	E.2. Project and Portfolio Management	NOT EXPLICITLY INCLUDED IN ROF CNIF - general responsibilities. Unit IT strategy, methodological coordination and inter-institutional cooperation service may be in charge for this
	E.3. Risk Management	NOT EXPLICITLY INCLUDED IN ROF CNIF (as a general responsibility or specific; there may be different concepts in Romanian ICT culture)
	E.4. Relationship Management	Responsibilities 28, 30, 33, 34, 35,37 Unit IT strategy, methodological coordination and inter-institutional cooperation service
	E.5. Process Improvement	Responsibilities 15,16
	E.6. ICT Quality Management	Responsibilities 14
	E.7. Business Change Management	NOT EXPLICITLY INCLUDED IN ROF CNIF
	E.8. Information Security Management	Responsibility 13
	E.9. Information Systems Governance	Responsibility 11 is very general. Responsibility 12 is related to governance. Other responsibilities 23, 25, 26, 27, 28, 29

Source: Authors

Annex 4. Proposed categories of ICT systems structured on system complexity

Summary table of the characteristics of the proposed categories (which are important for defining levels of responsibility and breaking down certain e-CF role profiles/models into roles.

 **TABLE 16:** Proposed categories of ICT systems structured on system complexity

ICT system category (for ICT and payroll roles)		ICN	Possible damage	Level (national, local)	Maximum interruption duration	Business Continuity Plan (BCP) / Backup and Recovery Policies and Measures Recovery (BR) Note: BCP includes BR	Minimum number of internal users and / or	Minimum number of citizens for G2C	Minimum number of legal entities for G2B and/or G2G
S0	Critical ICT systems	YES	Very Large	National (and exceptionally local)	1-2 hours only in exceptional periods (e.g. immediately after an earthquake, fire or other disaster)	Comprehensive and detailed BCPs that are audited annually (independent auditor) and tested quarterly/semi-annually (or earlier for highly critical components).	These are not relevant for critical ICT systems		
S1	Very large ICT systems	YES	Very Large - Medium	National (and exceptionally local)	1-2 calendar days/ year	Detailed BCPs that are audited and tested annually (independent auditor).	10,000	1,000,000	100,000
S2	Large-scale ICT systems	NOT	Large – Medium	National and local	1-2 working days/ year	Simple BCPs that include detailed BR measures/ policies. BCPs are independently audited at least once every 2 years (preferably annually) and periodically tested at least once every 2 years (recommended annually).	500	250,000	10,000
S3	Mid-level ICT systems	NOT	Small-Medium	National and local	maximum 5 working days/year	BR measures/policies that are independently audited at least once every 2 years (preferably annually) and tested at least once every 2 years (recommended annually).	100	50,000	1,000
S4	Small ICT systems	NOT	Small-Medium	National and local	maximum 10 working days/year	Simple backup and recovery (BR) policies that are tested at least once every 2/3 years (annually recommended)	1-100	Fewer G2C and / or G2B users only above	

NCI - National Critical Infrastructure, according to GEO 98/2010, is an element, a system, or a component thereof, located on the national territory, which is essential for maintaining the vital functions of society, health, safety, security, good social standards and a significant economic disruption of people's inability to maintain those functions, as well as the project of a strategic objective of national interest of the construction is imperatively necessary to save the national interest).

Damage Categories

- Very High: financial (economic) and/or reputation and/or trust and other collateral damage (health, security and cybersecurity, etc.) with major impact
- High: financial and/or reputation and/or trust
- Medium: financial and/or reputation (and/or exceptional trust)
- Small: financial and/or reputation

Annex 5. Digital transformation – example of focus group exercise

What is digital transformation?

In the public sector context, Digital Transformation represents a process through which the PA adopts digital technologies to increase the efficiency, transparency, and accessibility of services offered to citizens. This involves using digital solutions to modernize internal processes, optimize interactions with citizens, and adapt to the new requirements of an increasingly digitalized society.

Digital transformation does not only mean the acquisition of new ICT (infrastructure, systems, business applications, etc.), but it is a broader process that involves changing the way the PA operates and makes decisions. In other words, Digital Transformation involves using ICT to increase efficiency, transparency and quality of business processes and public services.

Is Digital Transformation synonymous with Information and Communications Technology (ICT)?

Digital transformation is a holistic process that goes beyond point-by-point technological implementations (ICT), aiming at fundamental changes in the way public institutions operate, interact, and achieve their strategic objectives.

The table below illustrates the differences between implementing ICT (digitalization) and Digital Transformation projects.

TABLE 17: ICT (digitalization) vs Digital transformation

Aspect/ Characteristic	ICT (digitalization) projects	Digital Transformation projects
Strategy	Focus on one-off/punctual technological implementation.	Focus on an integrated strategy that aligns the organizational objectives with the opportunities offered by ICT.
Purpose	Implementation of technological solutions for existing business processes.	Fundamental transformation of business processes and organizational culture and strategies.
Role of organizational leadership	Technical and operational.	Strategic, holistic and oriented towards fundamental changes in the way the organization operates.
Level of impact	Technical.	Strategic and cultural.
Changing organizational culture	Not a primary objective.	Promoting a culture oriented towards innovation and collaboration.
Modernizing business processes	Automating existing business processes (flows) without significant changes.	Optimizing and reinventing business processes (flows) to make them more efficient and user centered.
Involving end users	Limited to testing or technical feedback. Focus on technical functionalities of IT systems (applications).	Co-creating solutions together with users to meet their real needs. Simplifying interactions through user-centered design and increased accessibility.
Developing human skills/competencies	Training limited to the use of implemented ICT (tools, systems, etc.).	Re-skilling programs and increasing digital literacy for employees at all levels.

Aspect/ Characteristic	ICT (digitalization) projects	Digital Transformation projects
Data-driven decisions	Data collection without integration into strategic decision-making.	Using data for informed decision-making and improving organizational performance.
Inter-institutional collaboration	Limited to technical integration between IT systems.	Developing strategic partnerships and integrating business processes (flows) between institutions or departments.
Change management	Not a priority in traditional ICT projects or limited to increasing system utilization.	Active planning for the transition to new processes, reducing resistance to change and effective communication.
Impact monitoring	Technical evaluation of the performance of implemented ICT (systems, application, etc.)	Analysis of the impact on operational efficiency, user satisfaction and strategic objectives.

Source: Authors

What are the success factors for Digital Transformation projects/initiatives?

- Clear vision: It is essential to have a shared vision of digital transformation goals across the organization.
- Strong leadership: Leaders must support and promote change.
- Employee engagement: Employees must be actively involved in the transformation process.
- Cross-departmental/interdepartmental collaboration: Digital transformation is a team effort that requires collaboration between all departments.
- Continuous assessment: It is essential to assess progress and adjust the strategy regularly.

What are the main risks in the Digital Transformation projects/initiatives?

- Resistance to change: Employees may be reluctant to adopt new technologies.
- Lack of digital competencies/skills: It is necessary to invest in developing the digital competencies (and related skills) of employees.
- Cybersecurity: Protecting the integrity and confidentiality of data, especially data with restricted use and personal data, is a significant priority.
- High costs: Implementing new systems can be expensive in the short term. However, in the medium and long term, the benefits of digital transformation outweigh the costs.

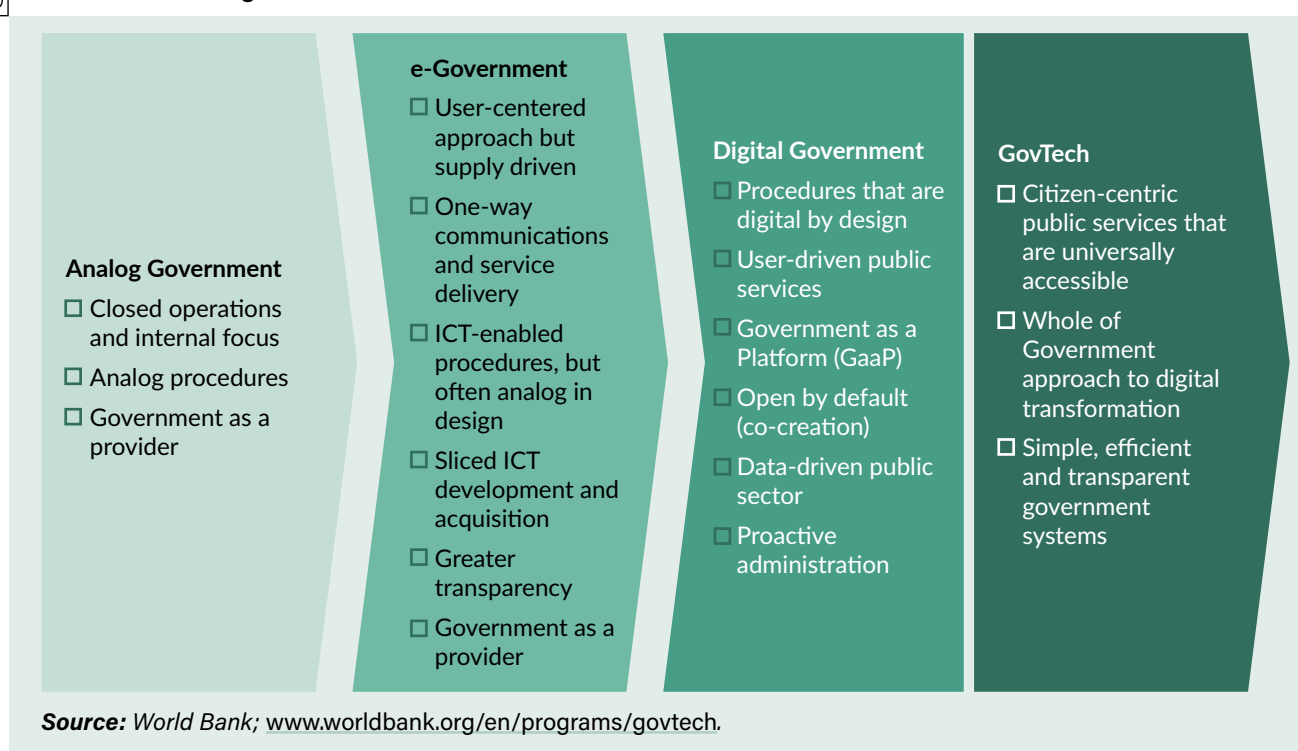
Annex 6. Digital Transformation and GovTech

According to the World Bank and OECD4, digital transformation of the public sector can be seen as a continuum, and GovTech is the latest generation of these reforms. The GovTech is a whole-of-government approach to public sector modernization and promotes simple, efficient and transparent government with the citizen at the center of reforms.

International concepts for digital transformation and GovTech, and the need for high speed for their implementation support the proposal to adapt e-CF and ESCF for Romania versus building a framework that will require much more time.



FIGURE 32: Digital Transformation and GovTech



Annex 7. International case studies

1. Finland – Modeling Competence Requirements for Digitalization in Public Administration

Short description

The Finnish Ministry of Finance updated an existing general model of competencies in public administration to include skills needed to undergo a successful digital transformation. The new model consists of three areas: general competencies for work (non-digital), basic digital competencies for work (all staff), and specific competencies needed for digital transformation (small sub-section of staff).

The objective of the model is to provide a common language, or “thought model,” to assist public administration systems in developing the necessary knowledge, skills and attitudes to facilitate digital transformation within their organizations. Each area contains definitions of high-level competencies with applicable examples and links to source materials. The model does not include assessment tools but provides opportunities for reflection that can be pursued by members of the organization.

Year

The initial reference for basic competence requirements for the public sector was developed in 2017; A 2020 update added a component of digitalization and digital transformation to the original model. The last update was made in 2022.

Target groups

The model is designed for a wide range of public sector employees, including general civil servants, IT professionals, and people in leadership roles within public administration. It is provided centrally but its implementation should be carried out independently by each institution.

Key objectives

The primary objectives of the model are to enhance digital competence and accelerate digital transformation in public administration, and to ensure that the public sector adopts a human-centered approach to digitalization.

Title of the Framework /Syllabus

The framework is titled, “Modeling Competence Requirements for Digitalization in Public Administration.”

Latest version

The latest version of the framework was published in 2021.

Areas of competence

Competencies needed in the workplace (Focus on: personal meta-skills)

- Accountability and transparency
- Self-regulation and self-management
- Continuous learning, growth mindset
- Critical thinking and problem-solving skills
- Foresight, innovation and the capacity for change
- Communication and social skills
- Global perspective and empathy
- Ability to take initiative and manage own work

Basic digital competencies for working in public administration (Focus on: personal digital competence)

- Skilled in using digital devices and tools
- Able to use apps and digital public services in a responsible manner
- Knows how to process and share critical information (higher level of proficiency compared to the first competency)
- Observes digital security good practices
- Fulfills prerequisites for multi-location (remote) work
- Understands the principle of technology as a human-centered service (including human-centered design such as AI)

Specific competencies (Focus on: organization, institution)

- Developing digital services (defining customer needs, customer-centered experiences)
- Organization-driven planning and implementation of data analytics (data models, data sources, interoperability with other services)
- Following digital security protocols
- Process-oriented methods (e.g. LEAN).
- Recognizing and mapping technical expertise within an organization (e.g. needs analysis, technical specifications, skills in procurements)
- Impact assessment of digital implementation, change management (a higher proficiency level of Area 1: Accountability and transparency)
- Digital communication skills (a higher proficiency level of Area 1: Communication and interaction skills)
- Partner management and management of digital ecosystems
- Overseeing the legal aspects of digital activities
- Managing operations in a way that supports digitalization

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Levels of proficiency

The model aims to broadly describe the minimum requirements for all public sector workers, as well as describe management-level and expert-level requirements for a small sub-group.

Examples /learning outcomes

The competence model includes the following examples:

- **Basic competencies:** Employees can fluently use digital devices and applications, securely process information, and ensure data protection in their day-to-day work.
- **Specialized Competencies:** Professionals can identify customer needs, develop user-centric digital services, and integrate data analytics into decision-making processes.
- **Leadership Skills:** Managers can foster a culture of continuous learning, encourage innovative thinking, and leverage digitalization to achieve organizational goals.

Link to DigComp

The “Basic Digital Competences for Work in Public Administration” section of the framework draws on the DigComp. It incorporates aspects such as digital literacy, problem-solving, and information processing.

Categories that focus on information and communication technology (ICT)

- **ICT-enhanced jobs:** The framework describes these skills in Area 2 of the section titled “Basic Digital Competence for Work in PA.”
- **ICT-intensive jobs:** It does not define the skills of IT professions.
- **ICT-dependent jobs:** It helps describe tasks related to the digital transformation of public administration, especially from the perspective of people in leadership roles.

Profiling

The model does not define “digital profiles” for various tasks or jobs within public administration (e.g. clerks, managerial level, those in IT professions).

Assessment and certification

There are no assessments, evaluations or certifications linked to the model, as it only offers broad, high-level guidance for training.

Stakeholders

The development of the model involved multiple stakeholders, including:

- **The Ministry of Finance:** Experts from the Public Information and Communication Technology and Public Administration departments
- **Public administration colleagues:** About 30 colleagues from different departments collaborated on the development of the model
- **External sources:** The model also referenced various reports and studies, such as the Digitalization Handbook on Business Management (Ilmarinen and Koskela, 2015), and findings from the Skills Forum

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Development process

The model was developed in several stages:

- The first version was developed in 2016, guided by a survey of several agencies and the “Digitalization Handbook on Business Management.”
- A detailed review was conducted in 2020, leading to adjustments and additions to the model. This update was part of digitalization development work conducted as part of the human resources management (HRM) reform program. The document is available on the [Valtiolla.fi](https://valtiolla.fi) platform.
- The model is continually being improved based on feedback and suggestions, indicating the Finnish government's commitment to keeping up with digital needs.

Challenges

Describing the various competencies without overlap was difficult. Although there is no single “right” model, and competencies could be outlined and grouped in many ways, developing a comprehensive, manageable and versatile framework required a strategic assessment of necessary skills. For instance, the skills needed for digitalization were extensive, encompassing everything from basic digital literacy to highly specialized technical skills. One of the main challenges of the project was ensuring the model could be used practically during discussions, particularly by management teams. This issue was resolved through the creation of support materials including digital coaching cards.

Links

- https://cdn.valtiokonttori.fi/wordpress/sites/8/2021/07/Ajatusmalli_ValtiollaFi_juttuun.pdf
- [Digital competence in public administration - Valtiolla.fi](https://valtiolla.fi)
- https://cdn.valtiokonttori.fi/wordpress/sites/8/2022/02/Digivalmennuskortit_saavutettava.pdf
- https://cdn.valtiokonttori.fi/wordpress/sites/8/2022/05/Printtiversiosta-pystyPP_ruotsiksi_ValtiollaFi.pptx
- <https://palkeet.fi/en/home/>
- <https://palkeet.fi/en/palkeet-en/>

2. Denmark - The Model of Digital Skills by the Government Digital Academy

Short description

The Danish Government Digital Academy was founded to equip civil servants with the competencies and resources needed to navigate and manage the rapidly evolving digital landscape of public administration.

The Agency for Digital Government developed and operated the Government Digital Academy, which specialized in providing digital training for senior managers and employees of ministries and government agencies. The academy offered a range of courses tailored to the needs of public sector employees with minimal or no formal education in IT or digital administration. Notable courses included “Government Officials within the Digital Public Sector” and “Cybersecurity and Information Security.”

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The Digital Academy, which closed at the end of 2024, offered courses based on the Model of Digital Skills (see section 2.3), outlining essential digital skills for employees of government agencies. This model is designed to provide a universal framework for effective digital government, improving coordination and understanding across ministries and agencies.

Year

The Model of Digital Skills framework was launched in 2022.

Target groups

The target groups of the model include:

- Civil servants and public sector employees. The model is designed to equip government employees, particularly those working in ministries and public agencies, with the necessary digital skills to manage digital services effectively.
- Top managers and leaders. The model also targets managers within the public sector, focusing on areas such as strategy formulation, governance, and project management.
- Specialized professionals. Beyond general civil servants, the model addresses professionals working in digitally-focused roles, such as data management, cybersecurity, IT development, and digital project management.

Key objectives

The main objective of the model is to establish a comprehensive framework for effective digital governance, thereby improving coordination and understanding among ministries and government agencies.

Links to strategic frameworks (relevance)

One particularly effective feature of this model is its strategic orientation and focus on the practical competencies needed to drive digital transformation across government entities.

Title of the Framework /Syllabus

The title of the framework is “Model of Digital Skills by the Government Digital Academy”

Areas of competence

Strategy and business development

I. Strategy formulation:

- Formulate strategies and action plans
- Determine financial implications

II. Legislation and technology:

- Consolidate the link between legislation and digitalization
- Understand the potential of new and existing technologies

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→ Understand basic IT frameworks, solutions and digital public architecture

III. Identification of potential and need:

- Involve users and stakeholders by continually identifying and testing needs
- Determine the digital potential of core public functions
- Map and model business processes
- Integrate business and IT

Projects for further development

I. Specification of requirements:

- Formulate user stories, acceptance criteria and requirement specification
- Use, evaluate and implement different forms of tenders and contracts
- Assess implications for administrative law

II. Development and optimization:

- Implement government IT projects
- Ensure the quality of digital solutions
- Apply relevant development and operational methods
- Further develop and optimize operations

III. Organizational implementation:

- Oversee changes within management
- Ensure continuous operation

Data and security

I. Cybersecurity and information security:

- Follow good practices for data security
- Follow General Data Protection Regulation (GDPR) requirements
- Comply with ISO 27001

II. Use of data:

- Use data to develop core public functions
- Create an overview of data and data flows

III. Data ethics and administration:

- Understand ethical issues and assess legal issues when working with data

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Governance and cooperation

I. Supplier cooperation and management:

- Manage and collaborate with suppliers
- Understand the IT market and assess its offerings

II. Financial management:

- Manage IT costs
- Manage project finances
- Ensure returns on investment

III. Governance and portfolio management:

- Map and analyze the systems landscape
- Manage IT portfolios through their life cycle
- Ensure adequate governance, IT organization and skills

Examples /learning outcomes

Strategy formulation, or the ability to formulate a cohesive business strategy and action plan, was identified as a potential learning outcome. Necessary skills include the ability to develop organization-wide strategies related to IT and digitization that bridge competencies, functions and departments, including:

- I.** Formulating and communicating strategies, including setting clear business goals and ambitions
- II.** Anticipating organizational needs, including understanding workflows, areas of responsibility and resources affected by digital strategy
- III.** Formulating and assessing sourcing strategies in connection with acquisitions
- IV.** Understanding internal and external interests and focus areas that drive digitization and influence the organizational agenda.
 - Determine financial implications and potentials

Also important is the ability to determine and assess the financial consequences and potential as a result of the chosen strategic direction. Required skills include:

- Identifying key costs and potential drivers
- Building economic models
- Simulating economic consequences and potentials that reflect changes in core tasks, work processes and resource features

Data and security skills, including following good practices for cybersecurity and information security, are one way in which government authorities protect themselves and their employees against cyberattacks. These skills include:

- Knowledge of cybersecurity and information security, as well as what defines safe digital behavior

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- The ability to support ongoing work to improve information security, including identifying, mitigating and managing security risks, so the state can complete digitization work with the appropriate level of security
- An understanding of the most significant threats related to the development of IT solutions
- Problem solving, monitoring activity and responding to incidents that the employees can balance between the need for a high level of security and user-friendliness skills to be able to include security in contracts

Act in accordance with GDPR requirements - Government employees must comply with applicable data regulation rules, including:

- Understanding personal data regulations and supplementary data protection legislation as well as their implications for everyday life in a digital world
- Handling data responsibly, such as determining why and how personal data should be processed
- Possessing the necessary skills to fulfill the roles of data processor and data controller

Acting in accordance with ISO 27001 -All public authorities must follow the principles of the ISO 27001 standard, which aims to ensure effective information security management. Required skills include:

- An understanding of the regulations in ISO 27001
- Compliance with the standard's regulations for requirements on risk management, documentation of processes, distribution of roles, and information security
- Establishing, implementing, maintaining and further developing management systems for information security
- Protecting information against unauthorized disclosure or access
- An understanding of the rules in the personal data regulation and supplementary data protection legislation as well as their practical application
- Protecting information against unauthorized modification, destruction or tampering

Categories that focus on information and communication technology (ICT)

- ICT-enhanced jobs: The model covers "baseline" digital competencies expected of all public sector employees and citizens.
- ICT-intensive jobs: While the model may touch on some IT professional skills within public administration, such as open data management, this does not seem to be its primary focus. In the context of Denmark, the framework focuses on how to manage outsourced IT projects, their procurement, etc.
- ICT-dependent jobs: The model appears to have a strong emphasis on ICT-dependent jobs and tasks, particularly those related to the digital transformation of public administration.

Training programs

The Digitalization Academy closed at the end of 2024. The courses available to public servants at the end of 2024 included:

- IT project management in the state
- Data management in the state

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- Civil servants in a digital public sector
- Digital business development in the state
- Agility in the state
- The state's IT project model
- Introduction to digital architecture in the state
- Technical IT security in the state
- The state's information security training

Currently, the model serves as a framework for training but is not tied to a formal assessment or certification process. It is primarily used to guide competency development rather than as a basis for certification.

Stakeholders

Experts from over 35 state authorities and public organizations helped develop the model, ensuring it meets the diverse digital competence needs of government bodies. Expert interviews ensured its practical relevance.

Development process

The model was created in 2018, following the establishment of Denmark's Government Digital Academy. It was formulated in collaboration with over 35 government authorities, in a lengthy process which assessed the specific digital skills required for diverse roles and functions within government. The objective of the model is to describe the essential digital functions necessary for contemporary government operations, and to establish a common language pertaining to digital competencies within the public sector.

Developed through a bottom-up approach with substantial input from various government entities, the model ensures an accurate representation of the varied needs and responsibilities of public servants in the digital age.

Challenges

Unlike other frameworks that may focus on individual digital skills, the Danish model focuses on the organization as a whole and emphasizes the collective skills necessary for government organizations to succeed in their digital transformation efforts.

Links

- <https://digst.dk/media/19945/model-for-digitale-kompetencer.pdf>
- [Government Digital Academy \(digst.dk\)](#)
- [The Swedish National Academy of Digitalisation \(digst.dk\)](#)
- [IT project management in the state \(digst.dk\)](#)
- [Course catalogue for employees \(digst.dk\)](#)
- [Course catalogue for managers \(digst.dk\)](#)

3. UK - Government Digital and Data Profession Capability Framework

Short description

Previously named “Digital, Data and Technology (DDaT) Profession Capability Framework”, the “Digital and Data Profession Capability Framework” outlines various digital and ICT roles across a range of government organizations, and the competencies required for each. It covers a wide variety of disciplines, including software development, data analysis, cybersecurity, user-centered design, and more. The framework is structured to support career progression and professional development, and to ensure a consistent understanding of roles across government departments.

The latest version of the DDaT Profession Capability Framework was published in 2022.

Target groups

- Public servants working in or aspiring to work in digital, data, and technology roles within the UK government.
- Human resources professionals and managers responsible for recruiting, developing, and managing DDaT talent in government agencies.
- Educational institutions and training providers that develop curricula and training programs aligned with the framework.

Key objectives

The framework is designed to enable workforce planning for digital, data, and technology roles, provide consistency in the description of duties and responsibilities, and standardize work-related language and terminology. It is meant to create a more consistent approach toward compensation and benefits, facilitate the creation and development of digital, data, and technology communities of practice, and create training and development for digital, data, and technology professionals.

Links to strategic frameworks (relevance)

The Digital and Data Profession Capability Framework is connected to key strategic frameworks, such as the UK Government Digital Strategy and the National Data Strategy (NDS). By defining the roles and skills required for digital transformation, it supports the implementation of government-wide digital initiatives aimed at improving public services and data-driven decision-making. In alignment with the NDS, the framework focuses on building expertise in data-related roles, ensuring that government agencies can effectively leverage data, uphold data ethics, and comply with regulations.

Additionally, the framework corresponds with individual government departments’ digital transformation strategies, offering a standardized approach to skill development and recruitment. It is integrated with the Civil Service Competency Framework, embedding digital skills within broader public sector professionalism, and aligned with national cybersecurity strategies, ensuring the public sector has the necessary capabilities to protect data and maintain public trust in digital services.

Latest version

The latest version of the framework was published on August 30, 2024.

Areas of competence

The framework is divided into several job families within the IT sector, each encompassing specific roles and associated competencies.

- Architecture roles (Business architect; Data architect; Enterprise architect; Network architect; Security architect; Solution architect; Technical architect)
- Data roles (Analytics engineer; Data analyst; Data engineer; Data ethicist; Data governance manager; Data scientist; Machine learning engineer; Performance analyst)
- IT operations roles (Application operations engineer; Business relationship manager; Change and release manager; Command and control center manager; End user computing engineer; IT service manager; Incident manager; Infrastructure engineer; Infrastructure operations engineer; Problem manager; Service desk manager; Service transition manager)
- Product and delivery roles (Business analyst; Delivery manager; Digital portfolio manager; Product manager; Program delivery manager; Service owner)
- Quality assurance testing (QAT) roles (Quality assurance testing (QAT) analyst; Test engineer; Test manager)
- Software development roles (Development operations (DevOps) engineer; Frontend developer; Software developer)
- User-centered design roles (Accessibility specialist; Content designer; Content strategist; Graphic designer; Interaction designer; Service designer; Technical writer; User researcher)

Levels of proficiency

Each role level in this framework, such as junior developer or senior developer, includes a list of required skills, or competencies. Each competency is assigned one of four skill levels, reflecting the required level of proficiency: **Awareness** (basic knowledge and understanding), **Working** (practical application under guidance), **Practitioner** (independent application), and **Expert** (recognized authority, guiding others).

Skill level	What the level means
Awareness	You can: → describe the fundamentals of the skill → demonstrate basic knowledge of some of the skill's tools and techniques
Working	You can: → apply the skill with some support → adopt the most appropriate tools and techniques
Practitioner	You can: → apply the skill without support → determine and use the most appropriate tools and techniques → share knowledge and experience of the skill
Expert	You can: → lead and guide a team or organisation in the skill's best practice → teach the skill's advanced tools and techniques

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Examples /learning outcomes

Analytics engineer

There are five analytics engineer role levels, from “trainee analytics engineer” to “head of analytics engineering.” The descriptions below outline typical responsibilities and skills for one of these role levels, and can be used to identify the skills needed in this career.

Trainee analytics engineer

Job requirements:

- Attending training sessions and developing skills on the job
- Shadowing other analytics engineers
- Building an understanding of the organization
- Learning skills for managing data
- Learning to use different applications, tools, templates and good practices
- Handling simple queries from users and documenting their data requirements
- Contributing to data documentation and user training

Skills:

- I.** Juggling technical and non-technical responsibilities (Level: Awareness)
 - Translate technical concepts into non-technical language
 - Communicate effectively with internal and external stakeholders
- II.** Data analysis and synthesis (Level: Awareness)
 - Interpret data to find key insights
- III.** Data innovation (Level: Awareness)
 - Demonstrate an awareness of innovative digital tools around data use
- IV.** Data modelling, cleaning and enrichment (Level: Awareness)
 - Know the different types of data models and tools, understand when they can be used, understand industry-recognized data modelling patterns and standards
- V.** Metadata management (Level: Awareness)
 - Explain what metadata is, oversee the storage of metadata, follow the direction of others with regard to storage
- VI.** Problem resolution (data) (Level: Awareness)
 - Explain common database problems, data processes, data products and services

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VII. Testing (Level: Awareness)

- Correctly execute test scripts under supervision, understand the role of testing and how it works

VIII. Turning business problems into data design (Level: Awareness)

- Contribute to the design of data architecture under the direction of others

Link to DigComp

This framework is not fully compatible with DigComp as it has a different approach and a strong focus on IT roles and tasks.

Key areas of overlap include the following core digital skills:

- Addressing essential digital skills like information processing, communication, problem solving, and collaboration
- Emphasizing the importance of understanding digital technologies and their applications
- Assessing individuals' ability to use digital tools effectively and confidently

Categories that focus on information and communication technology (ICT):

- **ICT-enhanced jobs:** The framework does not cover a baseline for digital competency.
- **ICT-intensive jobs:** This framework is specifically designed for IT professions within public administration.
- **ICT-dependent jobs:** It does not describe tasks related to the digital transformation of public administration but rather tasks related to IT professionals in public administration.

Training programs

The Government Digital Service (GDS) Academy offered various digital courses tailored to public sector employees, which provided digital, data, and technology skills aligned with the DDaT framework. These services are no longer available as they have been replaced by different policies/programs. However, private training providers offer many digital and IT courses which align with the roles and competencies described in the DDaT framework.

Application in human resources

The DDaT capability framework website indicates the resources provided can be used by professionals working in a variety of roles to achieve a range of objectives. Examples include:

- I. Professionals in government jobs that focus on data and digital services
 - Identifying skills that they can develop
 - Assessing current skill levels in preparation for performance and development conversations
 - Learning about colleagues' responsibilities and skills

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II. Line managers and team leaders in government

- Identifying skill gaps within teams and opportunities for development
- Informing teams about development goals
- Forecasting organizational workforce needs, ensuring employees have the appropriate skills to achieve their objectives

III. Hiring managers in government

- Creating effective and consistent job advertisements
- Assessing the suitability of candidates during the interview process

IV. All employees

- Learning about the responsibilities of different digital and data roles within government
- Understanding what skills are needed at each role level

Stakeholders

The Government Digital Service (GDS) leads the development, maintenance, and governance of the framework. Its responsibilities include setting standards and good practices, as well as providing guidance and support to various government departments. The Civil Service Human Resources (CSHR) plays an important role in integrating the framework into HR policies and processes across the civil service. Its responsibilities include aligning recruitment, performance management, and development processes with the framework, in addition to workforce planning and talent management.

Other stakeholders include:

- Departmental heads and managers
- Public servants
- Training providers and educational institutions
- Professional organizations and industry partners

Development process

The Government Digital and Data Profession Capability Framework is supported by the Central Digital and Data Office.

The Government Digital Service (GDS) was established in 2011 to spearhead the United Kingdom government's digital transformation. GDS facilitates the digital transformation efforts of various departments by developing platforms, standards, and digital services grounded in user-centric design principles. Initially, the service encountered challenges in attracting and retaining qualified talent, as many civil service roles were not compatible with the demands of the digital age.

The DDaT Framework, which has undergone regular structural changes to better categorize roles, is kept current through a governance mechanism that solicits feedback and suggestions from professionals across the civil service through an online platform. These inputs are then reviewed and discussed by the Capability Framework Design Council, which was set up in 2022. In 2024, the framework added new roles and updated skills to reflect technological advancements. It consistently updates content to remain relevant, adding or removing skills based on good practices and trends.

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Links

- <https://ddat-capability-framework.service.gov.uk/>
- <https://ddat-capability-framework.service.gov.uk/role/analytics-engineer>
- <https://ddat-capability-framework.service.gov.uk/role/software-developer>
- <https://ash.harvard.edu/wp-content/uploads/2024/02/2020-state-digital-transformation.pdf>

4. France - Cycle supérieur du numérique - CSNum

Short description

The Cycle Supérieur du Numérique (CSNum) is an advanced training program provided by the French Institute of Public Management and Economic Development (IGPDE). This program is designed to educate senior civil servants from the French public administration on the essential aspects of digital transformation. Its primary focus is to equip participants with the necessary tools and methodologies to effectively participate in the digital transition of public services.

Year

The program was established in 2019. The training program is organized on an annual basis.

Target groups

The program is specifically aimed at senior executives in the French state administration (cadres supérieurs), including those from various ministries and public institutions.

Key objectives

- Raising awareness among senior managers about the challenges posed by digital transition
- Providing senior managers with tools and methods that enable them to implement digital innovation in public policy
- Assessing and measuring the impact of digital technology on organizations, the functioning of the market, regulation, etc.

Links to strategic frameworks (relevance)

The Cycle Supérieur du Numérique (CSNum) aligns with France's digital transformation goals, particularly through the France Relance Plan, which funds projects designed to support the use of digital skills and methodologies in public administration. This initiative supports TECH.GOUV, a government program training civil servants to lead digital innovation in government.

Areas of competence

There is no official competence framework used in this training program.

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Targeted skills

I. Strategic/specialized knowledge:

- Leading digital change in your organization
- Working in project mode
- Experimenting with digital public service design methods
- Identifying and enhancing data practices in your department
- Mastering the rules of cybersecurity

II. High-level knowledge:

- Understanding the main digital innovations and their application in the economic, societal and public action spheres
- Understanding the dynamics of the digital ecosystem, including the main actors
- Understanding the challenges of digital technology in terms of big data, smart data and the protection of personal data
- Understanding digital public policies: digital identity, inclusion, sovereignty, trusted digital technology, responsible digital technology, etc

Levels of proficiency

Not applicable.

Examples /learning outcomes

Not applicable.

Link to DigComp

Not applicable.

Categories that focus on information and communication technology (ICT)

Not applicable.

Profiling

Not applicable.

Training programs

The class of 2024 has about forty participants, which were selected from among senior officials working in economic and financial ministries and senior managers from other government departments. The participants were selected based on the following criteria:

- Professional experience and level of responsibility (category A+)
- Experience managing a digital transformation project

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- Motivation and openness
- Availability and willingness to get involved in the project

The training is scheduled over 13 days and includes:

- Conferences led by experts on current major issues
- Meetings with start-ups, companies, and administrations that have implemented digital transformation projects
- Workshops to apply knowledge in real-world scenarios
- Field visits to observe good practices
- Roundtable discussions to compare different perspectives and analyses
- An international trip to provide concrete examples and global insights into the topics covered during the seminars

Assessment and certification

- The training program does not include a formal examination process
- At the end of the program, participants receive a certificate of completion, recognizing their participation and the skills acquired throughout the course

Stakeholders

The key stakeholders in the development and implementation of this training program include the IGPDE, senior officials from various ministries, and external experts from both the public and private sectors. These include professionals in digital governance, cybersecurity, data management, and innovation. Additionally, startup companies and other private-sector innovators play a role in providing real-world case studies and examples.

Development process

The CSNum was developed by the Institut de la Gestion Publique et du Développement Économique (IGPDE) as part of France's efforts to modernize public administration and ensure that senior civil servants are equipped to lead digital transformation initiatives. The program was designed to address the need for digital competence in state administration, incorporating insights from a range of high-level experts, government bodies, and academic institutions to create a comprehensive digital training framework.

Links

- [Higher Digital Cycle - CSNum — \(numerique.gouv.fr\)](https://numerique.gouv.fr)
- [Higher cycle of digital technology - CSNum - The IGPDE training offer \(finances.gouv.fr\)](https://finances.gouv.fr)
- [CSNum: Higher Digital Cycle | economie.gouv.fr](https://economie.gouv.fr)
- [Application form for the Cycle Supérieur du Numérique 2024 - The IGPDE training offer \(finances.gouv.fr\)](https://finances.gouv.fr)

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5. Slovenia - Digital literacy training program for public servants

Short description

In 2019, the Administration Academy at the Ministry of Public Administration in Slovenia launched a new digital literacy training program for public servants. This program is designed to align with the DigComp Framework for Citizens, outlining 21 competencies across five key areas. The last training round of the program started in 2021. The project ended on November 30, 2023.

Target groups

The target audience for the program was a group of 1,300 civil service employees.

Key objectives

The primary objective of this training program was to empower civil servants to effectively utilize information and communication technology in their work. Additional objectives include:

- Highlighting the importance of gaining new professional skills, especially those that enable employees to respond more quickly and efficiently to workplace demands
- Acquiring creative problem solving skills to tackle challenges, and designing solutions using different methods and approaches
- Learning different ways of communicating (more effective presentation of ideas, results, etc.) and coordinating discussions in a group setting

Links to strategic frameworks (relevance)

No information was provided.

Title of the Framework /Syllabus

The program is not a framework. It is titled, "Digital literacy training program for public servants."

Areas of competence

The program is not a framework.

The initial phase of pilot training programs aimed at fostering innovation within the state administration began in 2018 and concluded in June 2020. This phase comprised nine distinct modules, which included:

- Moderation: What is it, and strategies for leading group discussions
- Agile work: We are going in the right direction
- Creative – lateral thinking: Let's become a more creative state administration
- Creative writing: Write clearer and more interesting messages
- Basics of visualization: Quick sketching and better display of thoughts;
- Effective presentation: Making our messages memorable
- Evaluation: How to determine if we are on the right track
- Design thinking strategies
- Elevator Pitch: Seize the moment!

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The second round of innovation training for state administration began on September 1, 2021. This round included new and updated content along with the most popular topics from the first round. The program featured 12 modules:

- Moderation: What is it, and strategies for leading group discussions
- Agile work: We are going in the right direction
- Creative thinking: Let's become a more creative state administration
- Creative writing: Storytelling techniques
- Basics of visualization: Quick sketching and better representation of thoughts
- Presentation with charisma: Let our message be remembered
- "Design thinking" strategies
- Emotional intelligence in connection with the introduction of change
- Bottom-up innovation
- Creating a collaborative space for remote meetings
- 3D modeling of a complex challenge: A multifaceted understanding of a complex challenge as a basis for designing solutions
- 6 thinking hats

Levels of proficiency

Not applicable.

Examples /learning outcomes

Not applicable.

Link to DigComp

Not applicable.

Categories that focus on information and communication technology (ICT)

Not applicable.

Profiling

Not applicable.

Links

- <https://www.gov.si/zbirke/projekti-in-programi/inovativnost-v-javni-upravi-inovativen-si/usposabljanja/>
- <https://www.oecd-ilibrary.org/docserver/ef449828-en.pdf?expires=1727874072&id=id&accname=guest&checksum=8C0637590A3D4F26FA08F541A08291E9>
- <https://www.gov.si/zbirke/projekti-in-programi/inovativnost-v-javni-upravi-inovativen-si/>
- <https://digital-skills-jobs.europa.eu/en/actions/national-initiatives/national-strategies/slovenia-digital-slovenia-2030>
- <https://www.gov.si/zbirke/projekti-in-programi/inovativnost-v-javni-upravi-inovativen-si/>

6. Portugal - Quadro Dinâmico de Referência de Competência Digital / Dynamic Digital Competence Reference Framework

Short description

The QDRCD framework is a system used to evaluate and develop the digital skills of the workforce in Portugal, including in the public sector. It is part of the INCoDe.2030 initiative, which aims to improve digital competence within Portuguese society.

The Portugal INCoDe.2030 initiative addresses a broad group of digital skills, and has identified the following priorities: Inclusion, Education, Qualification, Specialization, and Research.

Year

The framework was launched in 2019.

Target groups

- General population, as the framework aims to assess the digital skills of the population
- Students, as the framework is designed to support the development of education programs, indicating its relevance to learners at a variety of levels
- Workers, as the framework is meant to aid in the design of programs for employability skills
- Public sector employees, as the framework has been developed with the involvement of the Direção-Geral da Qualificação dos Trabalhadores em Funções Públicas (INA)
- Educators and trainers
- Policymakers, as the framework is meant to support the definition of policies and strategies
- Certification bodies, as the framework is designed to be used for evaluating and certifying competencies

Key objectives

One of the key objectives of the QDRCD is to assist in formulating digital competence policies and strategies, as well as facilitating the creation of digital competencies in coordination with other reference frameworks.

In addition, the QDRCD serves as a tool for assessing and certifying digital skills. This can be done either through self-evaluation or by completing a training and certification program.

Links to strategic frameworks (relevance)

The QDRCD is an integral component of the broader INCoDe.2030 initiative, which represents Portugal's comprehensive public policy program aimed at enhancing digital competence across society. It aligns with the objectives of the Action Plan for Digital Transition, focusing particularly on capacity building and digital inclusion.

The QDRCD is structured around the DigComp EU framework and is aligned with the National Qualifications Catalogue in Portugal.

Areas of competence

I. Information literacy

- Searching and filtering information
- Evaluation of information
- Information storage and retrieval

II. Communication and citizenship

- Interaction through digital technology
- Sharing information and content
- Citizenship through digital technology
- Collaboration through digital technology
- Code of conduct in the digital environment
- Digital identity management

III. Content creation

- Production of digital content
- Integration and reworking
- Copyright and licenses

IV. Security and privacy

- Device protection
- Protection of personal data
- Health protection
- Environmental protection

V. Solution development

- Technical troubleshooting
- Identification of technological needs and responses
- Innovation and creative use of technology
- Identifying gaps in digital competence

Levels of proficiency

QDRCD has 4 levels of proficiency, which are structured as follows:

- Level 1 - Basic: Simple tasks, with some autonomy or support, focused on remembering/ understanding
- Level 2 - Intermediate: Tasks and routines associated with concrete problems, with autonomy, focused on applying knowledge

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- Level 3 - Advanced: Different tasks and routines associated with concrete problems using different strategies, with autonomy, also focused on applying knowledge
- Level 4 – Highly specialized: Solving complex problems, with autonomy, focused on creating

Each level is characterized by three aspects:

- Complexity of tasks
- Degree of autonomy
- Cognitive domain

Examples /learning outcomes

Information Literacy 1.1 Searching and filtering information - BASIC

When faced with simple tasks, with some autonomy or support, I am able to:

- Identify the information needs in digital environments
- Identify an information search engine
- Search for information and content suited to needs in digital environments
- Navigate digital environments to obtain the necessary information

Examples include:

- Identifying websites where I can search for a job
- Finding job search portals in my smartphone's app store, accessing them and searching for jobs
- Navigating a website focused on employment opportunities and identifying useful keywords to use in a job search

Information Literacy 1.2 Evaluation of information - INTERMEDIATE

When faced with specific problems, with autonomy, I am able to:

- Recognize the reliability and authenticity of different digital sources of information on the same topic
- Choose the information I need from among different sources of data and digital content

Examples include:

- Accessing my bank account, checking my balance, making a payment for services by entering payment credentials, and confirming that the payment was made by checking the remaining balance
- Distinguishing between emails from trusted sources (e.g. from friends) and emails from sources I do not recognize (e.g. unsolicited advertising)

Communication and Citizenship 2.6. Digital identity management - ADVANCED

When faced with specific problems, using different strategies, I am able to:

- Evaluate and operate a variety of digital identities
- Determine appropriate ways to protect my online reputation

→ Check the data produced through various digital tools and services

Examples include:

→ Recognizing the concept of a digital footprint and developing strategies to preserve my identity in digital contexts (e.g. creating different identities and user profiles for different digital services)

Understanding the strategies and processes I need to use to reduce my digital footprint

Link to DigComp

QDRCD is directly derived from and closely linked to the European Digital Competence Framework for Citizens (DigComp). It has a similar structure to DigComp, incorporating five key areas of competence and 20 competencies (note: the programming competency is not included).

QDRCD	DigComp
1. Information Literacy	1. Information and Data Literacy
1. Searching and filtering information	1.1 Browsing, searching and filtering data, information and digital content
2. Evaluation of information	1.2 Evaluating data, information and digital content
3. Information storage and retrieval	1.3 Managing data, information and digital content
2. Communication and Citizenship	2. Communication and Collaboration
1. Interaction through digital technology	2.1 Interacting through digital technology
2. Sharing information and content	2.2 Sharing information and content through digital technology
3. Citizenship through digital technology	2.3 Engaging in citizenship through digital technology
4. Collaboration through digital technology	2.4 Collaborating through digital technology
5. Code of conduct in a digital environment	2.5 Netiquette
6. Digital identity management	2.6 Managing digital identity
3. Content Creation	3. Digital Content Creation
1. Production of digital content	3.1 Developing content
2. Integration and reworking	3.2 Integrating and re-elaborating digital content
3. Copyright and licenses	3.3 Copyright and licenses
	3.4 Programming
4. Security and Privacy	4. Safety
1. Device protection	4.1 Protecting devices
2. Protection of personal data	4.2 Protecting personal data and privacy
3. Health protection	4.3 Protecting health and well-being
4. Environmental protection	4.4 Protecting the environment
5. Solution Development	5. Problem Solving
1. Technical troubleshooting	5.1 Solving technical problems

QDRCD	DigComp
2. Identification of technological needs and responses	5.2 Identifying needs and technological responses
3. Innovation and creative use of technology	5.3 Creatively using digital technology
4. Identifying gaps in digital competence	5.4 Identifying digital competence gaps

Categories that focus on information and communication technology (ICT)

- ICT-enhanced jobs: The framework covers the baseline for digital competence as in DigCOMP 2.2.
- ICT-intensive jobs: It does not define the required skills for IT professions within public administration.
- ICT-dependent jobs: It helps describe tasks related to the digital transformation of public administration systems.

Profiling

The framework does not define “digital profiles” for various tasks or jobs within public administration (e.g. clerks, managerial level, those in IT professions).

Training programs

Training programs based on the QDRCD are available through various platforms under the INCoDe.2030 framework. These include self-assessment tools and formal certifications. The framework guides organizations like ANQEP (National Agency for Qualification and Vocational Education) and IEFP (Institute for Employment and Vocational Training) in creating educational strategies and courses aligned with the QDRCD.

AP Digital 4.0

The AP Digital 4.0 initiative in Portugal is a training program aimed at enhancing digital skills in the Portuguese public administration. AP Digital 4.0 is designed to promote digital skills training for public sector employees, aligning with Portugal’s national strategy for digital development (INCoDe.2030). The training is aimed at workers across various careers and categories within public administration.

The initiative covers several strategic areas:

- Productivity tools
- Emerging technologies
- Management and development of skills for IT career workers

The initiative includes a “Zero Infoexclusion” option, specifically targeting public administration workers who need support in digital inclusion or in consolidating their digital skills.

The program is being promoted by the National Institute of Administration (INA, I.P.) as part of its training program for 2022 and 2023.

Both AP Digital 4.0 and QDRCD are aligned with the INCoDe.2030 strategy, which is Portugal’s national strategy for digital development, but there is no mention of a direct connection between the AP Digital 4.0 initiative and the Quadro Dinâmico de Referência de Competência Digital (QDRCD) framework.

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Application in human resources

The QDRCD framework, based on DigComp EU, aligns digital skill needs with the European vision, aiding employability and career mobility. However, its application in human resources remains unclear.

Assessment and certification

One of the objectives of QDRCD is to evaluate and certify competencies and serve as a tool for assessing and certifying digital skills. The framework allows for a self-assessment of digital skills.

Stakeholders

The framework was developed under the INCoDe.2030 strategy in collaboration with:

- The National Agency for Qualification and Vocational Education (ANQEP)
- The Directorate-General for Education (DGE)
- The Directorate-General for Qualification of Workers in Public Functions (INA)
- The Foundation for Science and Technology (FCT)
- The Institute for Employment and Vocational Training (IEFP)

Development process

The Quadro Dinâmico de Referência de Competência Digital (QDRCD) framework for Portugal evolved as a collaborative effort by multiple key stakeholders. It was jointly initiated by the Minister of the Presidency and Administrative Modernization, the Minister of Science, Technology and Higher Education, the Minister of Education, and the Secretary of State for Employment.

The development process involved contributions from several important organizations in Portugal's education and employment sectors. These included the National Agency for Qualification and Vocational Education (ANQEP), the Directorate-General for Education (DGE), the Directorate-General for the Qualification of Public Sector Workers (INA), the Foundation for Science and Technology (FCT), and the Institute for Employment and Vocational Training (IEFP). Additionally, experts from the University of Aveiro (António Moreira and Margarida Lucas), provided academic input.

The QDRCD framework is based on the European Digital Competence Framework for Citizens (DigComp 2.1), ensuring alignment with EU visions within the context of Portugal.

The QDRCD was officially published through Dispatch No. 1088/2019 in the Diário da República (Official Gazette) on January 31, 2019.

Links

- <https://digital-skills-jobs.europa.eu/en/actions/national-initiatives/national-strategies/portugal-incode2030-programme>
- <https://www.incode2030.gov.pt/en/wp-content/uploads/2023/03/QDRCDP.pdf>
- <https://www.incode2030.gov.pt/qdracd/>
- <https://pontodigital.pt/ofertas-de-formacao/>
- [Digital Skills - INA, I.P.](#)

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- <https://www.nau.edu.pt/pt/curso/introducao-as-tecnologias-emergentes-e-transformacao-digital/>
- <https://diariodarepublica.pt/dr/detalhe/portaria/179-2021-170322930>
- <https://academiaportugaldigital.pt/>
- <https://www.dge.mec.pt/noticias/publicado-o-quadro-dinamico-de-referencia-de-competencia-digital-qdrdc>
- <https://www.cedefop.europa.eu/en/tools/timeline-vet-policies-europe/search/29278#:~:text=and%20target%20groups.,INCoDe.,multiple%20public%20and%20private%20organisations.>

7. SFIA – The global skills and competency framework for the digital world

Short description

The Skills Framework for the Information Age (SFIA) is a globally recognized reference for defining digital skills and competencies, especially those specific to people working in ICT-focused professions. It provides a structured method with which organizations and professionals can identify the IT capabilities required for various roles involved in designing, developing, managing, and protecting digital technology and data. SFIA is used for skills management, career development, and workforce planning within the ICT and digital sectors.

SFIA is divided into seven levels of responsibility, ranging from basic to strategic. Each level outlines the degree of autonomy, influence, complexity, business skills, and knowledge expected from professionals in a specific role. This approach allows for a differentiation between different roles and levels of expertise within an organization.

The framework includes over 120 professional skills, organized into categories and subcategories. These skills span various technical, managerial, and business domains relevant to the digital environment. Each skill is introduced along with a brief description, accompanied by guidance notes, and detailed definitions that illustrate how the skill can be practiced at different levels of responsibility. This structure enables organizations to incorporate SFIA skills into job descriptions, career paths, and competence frameworks.

SFIA can be applied in ICT-focused work scenarios, other technical scenarios, or non-technical scenarios. Its flexible design helps organizations, professional associations, and industries as a whole map out professional pathways, align workforce skills, and support ongoing development.

Year

The SFIA framework was launched in 2021. The 9th update to the framework was published on October 30, 2024.

Target groups

The design and structure of SFIA make it an adaptable resource, effectively supporting various skills and people-management activities.

Key objectives

SFIA standardizes digital skills terminology and definitions on a global scale, helping organizations, professionals, and educational institutions communicate effectively on the topic of digital transformation. In addition, it provides a framework with which to describe and assess professional skills, define responsibility levels, identify skill gaps, support workforce planning, and manage career development. It also guides individuals and teams in building necessary competencies for their roles.

Latest version

The latest version was published in 2022.

Areas of competence, based on version 8

Category	Subcategory	Skill	Levels					
Strategy and architecture	Strategy and planning	Strategic planning ITSP			5	6	7	
		Information systems coordination ISCO				6	7	
		Information management IRMG		4	5	6	7	
		Enterprise and business architecture STPL			5	6	7	
		Solution architecture ARCH		4	5	6		
		Innovation INOV			5	6	7	
		Emerging technology monitoring EMRG		4	5	6		
		Research RSCH	2	3	4	5	6	
		Demand management DEMM				5	6	
		Investment appraisal INVA			4	5	6	
	Security and privacy	Financial management FMIT			4	5	6	
		Measurement MEAS		3	4	5	6	
		Sustainability SUST			4	5	6	
		Continuity management COPL	2	3	4	5	6	
		Information security SCTY		3	4	5	6	7
		Information assurance INAS		3	4	5	6	7
		Personal data protection PEDP				5	6	
		Vulnerability research VURE		3	4	5	6	
		Threat intelligence THIN	2	3	4	5	6	
		Governance, risk and compliance	Governance GOVN					6
	Risk management BURM			3	4	5	6	7
	Audit AUDT			3	4	5	6	7
	Quality management QUMG			3	4	5	6	7
	Quality assurance QUAS			3	4	5	6	

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Category	Subcategory	Skill	Levels						
Change and transformation	Advice and guidance	Consultancy CNSL				4	5	6	7
		Specialist advice TECH				4	5	6	
		Methods and tools METL	3			4	5	6	
	Change implementation	Portfolio management POMG					5	6	7
		Program management PGMG						6	7
		Project management PRMG				4	5	6	7
		Portfolio, program and project support PROF	2	3		4	5	6	
		Business situation analysis BUSA		3		4	5	6	
		Feasibility assessment FEAS		3		4	5	6	
	Change analysis	Requirements definition and management REQM	2	3		4	5	6	
		Business modelling BSMO	2	3		4	5	6	
		Acceptance testing BPTS	2	3		4	5	6	
		Business process improvement BPRE					5	6	7
	Change planning	Organizational capability development OCDV					5	6	7
		Organization design and implementation ORDI				4	5	6	7
		Organizational change management CIPM		3		4	5	6	
		Benefits management BENM					5	6	
		Product management PROD		3		4	5	6	
Development and implementation	Systems development	Systems development management DLMG					5	6	7
		Systems and software life cycle engineering SLEN				4	5	6	7
		Systems design DESN		3		4	5	6	
		Software design SWDN		2	3	4	5	6	
		Network design NTDS			3	4	5	6	
		Hardware design HWDE			3	4	5	6	
		Programming/software development PROG		2	3	4	5	6	
		Systems integration and build SINT		2	3	4	5	6	
		Testing TEST	1	2	3	4	5	6	
		Software configuration PORT			3	4	5	6	
		Real-time/embedded systems development RESD		2	3	4	5	6	
		Safety engineering SFEN			3	4	5	6	
		Safety assessment SFAS				4	5	6	
		Radio frequency engineering RFEN		2	3	4	5	6	
		Animation development ADEV			3	4	5	6	

Category	Subcategory	Skill	Levels				
Development and implementation	Data and analytics	Data management DATM			4	5	6
		Data modelling and design DTAN	2	3	4	5	
		Database design DBDS		3	4	5	
		Data engineering DENG	2	3	4	5	6
		Database administration DBAD	2	3	4	5	
		Data science DATS	2	3	4	5	6 7
		Machine learning MLNG	2	3	4	5	6
		Business intelligence BINT	2	3	4	5	
		Data visualization VISL		3	4	5	
	User experience	User research URCH		3	4	5	6
		User experience analysis UNAN		3	4	5	
		User experience design HCEV		3	4	5	6
		User experience evaluation USEV	2	3	4	5	6
	Content management	Content authoring INCA	1	2	3	4	5 6
		Content publishing ICPM	1	2	3	4	5 6
		Knowledge management KNOW	2	3	4	5	6 7
	Computational science	Scientific modelling SCMO			4	5	6 7
		Numerical analysis NUAN			4	5	6 7
		High-performance computing HPCC			4	5	6 7
Delivery and operation	Technology management	Technology service management ITMG				5	6 7
		Application support ASUP	2	3	4	5	
		IT infrastructure ITOP	1	2	3	4	5
		System software SYSP		3	4	5	
		Network support NTAS	2	3	4	5	
		Systems installation and removal HSIN	1	2	3	4	5
		Configuration management CFMG	2	3	4	5	6
		Release and deployment RELM		3	4	5	6
		Storage management STMG		3	4	5	6
		Facilities management DCMA		3	4	5	6

Category	Subcategory	Skill	Levels						
Delivery and operation	Service management	Service level management SLMO	2	3	4	5	6	7	
		Service catalogue management SCMG		3	4	5			
		Availability management AVMT			4	5	6		
		Capacity management CPMG			4	5	6		
		Incident management USUP	2	3	4	5			
		Problem management PBMG		3	4	5			
		Change control CHMG	2	3	4	5	6		
		Asset management ASMG	2	3	4	5	6		
		Service acceptance SEAC			4	5	6		
	Security services	Security operations SCAD	1	2	3	4	5	6	
		Vulnerability assessment VUAS	2	3	4	5			
		Digital forensics DGFS		3	4	5	6		
		Penetration testing PENT		3	4	5	6		
People and skills	People management	Performance management PENT			4	5	6		
		Employee experience EEXP			4	5	6		
		Organizational facilitation OFCL			4	5	6		
		Professional development PDSV			4	5	6		
		Workforce planning WFPL			4	5	6		
		Resourcing RESC		3	4	5	6		
	Skills management	Learning and development management ETMG		3	4	5	6	7	
		Learning design and development TMCR		3	4	5			
		Learning delivery ETDL	2	3	4	5			
		Competency assessment LEDA		3	4	5	6		
		Certification scheme operation CSOP	2	3	4	5	6		
		Teaching TEAC	2	3	4	5	6	7	
		Subject formation SUBF			4	5	6	7	
Relationships and engagement	Stakeholder management	Sourcing SORC	2	3	4	5	6	7	
		Supplier management SUPP	2	3	4	5	6	7	
		Contract management ITCM		3	4	5	6		
		Stakeholder relationship management RLMT			4	5	6	7	
		Customer service support CSMG	1	2	3	4	5	6	
		Business administration ADMN	1	2	3	4	5	6	
	Sales and marketing	Marketing MKTG	2	3	4	5	6		
		Selling SALE		3	4	5	6		
		Sales support SSUP	1	2	3	4	5	6	

Levels of proficiency

SFIA defines seven levels of responsibility, ranging from Level 1 to Level 7, which form the backbone of the framework. These levels describe a progression from performing routine tasks under close supervision to strategic leadership and establishing a course of action for the organization. Each level represents a distinct set of responsibilities that have direct, measurable outcomes within a professional field. The levels are characterized by generic attributes that encompass behavioral factors such as autonomy, influence, complexity, business skills, and knowledge. As individuals progress through the framework, they must demonstrate a growing level of autonomy, influence, ability to handle complex tasks, and business acumen.

Importantly, SFIA skills are not defined at all seven levels for every skill, but rather at the levels where they are most relevant and practiced in the workplace. This ensures that the framework remains practical and aligned with real-world applications of skills and competencies.

Examples /learning outcomes

Data visualization VISL

Data visualization facilitates a better understanding of data by displaying concepts, ideas, and facts using charts, graphs and other visual representations.

Guidance notes:

- The skill is typically put into practice by using specialized analytics tools. Specialization in this skill implies the use of specialized office software to create graphic representations of data.
- Data visualization activities may include:
 - Condensing data characteristics
 - Showing opportunities and other information in a clear manner
 - Identifying risks
 - Analyzing trends
 - Driving effective decision-making
 - Presenting findings and data insights in creative ways to facilitate the understanding of data across a range of technical and non-technical audiences.
 - Levels of responsibility for this skill: 3,4,5

Data visualization: Levels 1-2

- This skill is not typically observed or practiced at these levels of responsibility and accountability.

Data visualization: Level 3

- Uses a visualization product, as guided, to design and create data visuals
- Selects appropriate visualization techniques from the options available
- Engages with the target user to prototype and refine specified visualizations

Data visualization: Level 4

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- Applies a variety of visualization techniques and designs the content and appearance of data visuals
- Operationalizes and automates activities for efficient and timely production of data visuals
- Selects appropriate visualization approaches from a range of applicable options
- Contributes to exploration and experimentation in data visualization

Data visualization: Level 5

- Leads exploration of new approaches for data visualization
- Establishes the purpose and parameters of data visualization. Provides overall support to ensure the appropriate use of data visualization tools and techniques
- Formats and communicates results using textual, numeric, graphical and other visualization methods appropriate to the target audience
- Advises on the appropriate use of data visualization for different purposes and contexts to satisfy requirements. Develops plans showing how the identified user needs will be met

Data visualization: Levels 6-7

- This skill is not typically observed or practiced at these levels of responsibility and accountability.

Link to DigComp

There is no direct link to DigComp.

SFIA and DigComp EU are both frameworks related to digital skills, but they have different focuses and applications. While there is not a direct link between SFIA and DigComp EU, there are some connections and similarities between the two, such as the fact that the SFIA Foundation has created SFIA-based role profiles for the 30 ICT Professional Role Profiles developed by the European Union as part of their e-CF (European Competency Framework) project. The SFIA Foundation initiative makes the EU role profiles more accessible to organizations that prefer using the SFIA framework or prefer using both frameworks together.

Organizations in Europe might cross-reference SFIA and DigComp EU when developing comprehensive digital skills strategies that cover both professional and general citizen competencies.

Profiling

The framework defines “digital profiles” for various IT-related tasks or jobs, including the roles of IT professionals working in public administration.

Training programs

There are several training programs that use the SFIA framework as a reference.

- Accredited trainings: The SFIA Foundation authorizes accredited training providers to deliver courses following the standard SFIA Foundation training syllabus. These courses are only delivered by SFIA-accredited consultants who have active experience in skills management.

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- **Training for organizations:** Many organizations use SFIA to enhance their learning and development processes. SFIA helps align organizational capabilities to technology and business strategies. It supports creating role profiles and job descriptions, as well as improving employee engagement through career development.
- **Education and training providers:** Several education and training providers work closely with the SFIA Foundation and use SFIA in their offerings, including: APMG International; Australian Computer Society (ACS); BCS Learning and Development Limited; CompTIA IEEE Computer Society; ISACA; Skillsoft.

Learning providers often tailor their products to SFIA skills to demonstrate the relevance of the content. Although informal guidelines for correlating course content with SFIA requirements do exist, these are not official rules. Courses are typically tailored to specific SFIA skill levels to indicate which competencies they help develop.

While SFIA itself is not a training framework, it serves as a valuable reference for designing, delivering, and selecting training programs that align with industry-recognized skills and competencies in the digital and IT sectors.

Application in human resources

SFIA is used extensively in human resources to improve management techniques and boost effectiveness within an organization. **The framework provides a standardized language for describing digital and IT skills, which human resources professionals leverage across various functions, including:**

- **In recruitment** – to create accurate job descriptions and assess candidates' skills against role requirements. For skills assessment and gap analysis, human resources professionals use SFIA to evaluate current employee capabilities, identify skill gaps, and develop targeted training programs.
- **In career development** – to define career pathways and create professional development plans.
- **In performance management** – to set clear expectations based on skill levels, and evaluate employee performance objectively.
- **In workforce planning** – to align workforce capabilities with organizational digital strategies and identify emerging skill requirements.
- **In learning initiatives** – to design and develop training programs that address specific digital skill needs.

Stakeholders

- **The SFIA Foundation:** This global not-for-profit organization oversees the production and use of SFIA. It is responsible for the framework's development, maintenance, and strategic direction.
- **SFIA Board:** Provides governance to the SFIA Foundation.
- **SFIA Council:** Offers guidance, advice, and support regarding strategic direction and technical input.
- **Global SFIA Design Authority Board:** Responsible for framework integrity and overseeing new content released by SFIA.
- **Industry and business professionals:** SFIA is built by and for business and industry practitioners who have practical experience in developing and managing skills and competencies in corporate, public sector, and educational environments worldwide.
- **SFIA-accredited practitioners, consultants, and partners:** They provide support to SFIA end users.

I Introduction	II The EU policy framework	III National strategies, policies and institutional arrangements	IV Job analysis	V International experiences	VI Foresight	VII Conclusions
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- **Employers:** Organizations that adopt and implement SFIA in their HR processes and workforce management.
- **Government agencies:** Many governments have adopted SFIA for their digital workforce management. Examples include Australia, Japan, UK.

Development process

The SFIA framework was developed through a collaborative effort involving industry and professional organizations and is maintained by the SFIA Foundation. SFIA was formally launched in 2000, but its origins can be traced back to initiatives that began in the 1980s. The SFIA Foundation was formed as an international not-for-profit organization to develop and maintain the SFIA Framework. The framework is built by industry and business practitioners for industry and business practitioners, with contributions from people who have experience in developing and managing skills and competencies in corporate, public sector, and educational environments worldwide. SFIA is regularly updated through a global, open consultation process to ensure it remains relevant and aligned with current industry needs. As such, the SFIA Foundation serves as a mechanism for convening the global community to develop and maintain the framework, and ensure it remains a collaborative effort. The framework's development and maintenance are supported by a governance structure that includes the SFIA Board, the SFIA Council, and the Global SFIA Design Authority Board.

Challenges

While SFIA offers numerous benefits, implementing and using the framework can present several challenges. One significant hurdle is the initial complexity and time investment required to fully understand and integrate SFIA into existing HR processes. Organizations may struggle with how to position their current job roles and competencies within the SFIA framework, especially if their existing structures differ significantly. Employee resistance can also be a challenge, as staff members might feel threatened by the assessment process or perceive it as a means of criticism rather than an opportunity for development. Additionally, maintaining up-to-date, SFIA-aligned job descriptions and skill assessments can be resource-intensive. Some organizations may find it difficult to balance the generic nature of SFIA skills with the need for industry-specific or technology-specific competencies. Finally, measuring the return on investment of SFIA implementation presents potential challenges, as the benefits may not be immediately quantifiable and may take time to materialize.

Links

- <https://sfia-online.org/en>
- <https://sfia-online.org/en/tools-and-resources/sfia-for/sfia-for-education-training>
- <https://store.apmg-international.com/landing/sfia-skills-framework-information-age-organizations>
- <https://sfia-online.org/en/forum/mapping-learning-products-to-sfia>
- <https://sfia-online.org/en/tools-and-resources/using-sfia/sfia-assessment>
- <https://apmg-international.com/product/sfia-assessments-and-digital-badges>
- <https://sfia-online.org/en/about-sfia/about-sfia>
- <https://skillstx.com/about-sfia/>
- <https://sfia-online.org/en/forum/supplementary-pages/about-sfia>
- <https://sfia-online.org/en/tools-and-resources/sfia-for/sfia-for-employers>

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- <https://sfia-online.org/en/tools-and-resources/sfia-views/software-engineering/using-sfia-framework-for-software-engineering-competencies>
- <https://sfia-online.org/en/tools-and-resources/sfia-for/sfia-for-government>
- <https://skillstx.com/a-sfia-success-story-building-a-high-functioning-enterprise/>
- <https://skillstx.com/top-5-sfia-hacks/>
- <https://sfia-online.org/en/about-sfia/sfia-and-skills-management>
- <https://skillstx.com/how-sfia-supports-hr-leaders-in-driving-digital-transformation-the-ultimate-guide/>
- <https://www.consultia.co/sfia-a-data-driven-approach-to-measuring-digital-skill-proficiency/>

Annex 8. The foresight exercise – an iterative process

The foresight exercise encompassed four key phases, with consultations reflected in four sessions:

- I. Drivers of change | First online workshop
- II. Baseline scenario & Context scenarios | Second online workshop
- III. Aspirational scenarios & Updated Baseline scenario | Third online workshop
- IV. Validation and enrichment of scenarios | Final in-person workshop

Drivers of change | First online workshop

The foresight process debuted with a horizon scanning of drivers of change and emerging trends that may (re)shape the so-called “digital society” by 2032, covering multiple dimensions: technological, social, economic, environmental, political, and value-driven changes. The scanning resulted in a collection of more than 180 data points, which were grouped into 45 topics. To facilitate engagement during the first online workshop, the topics were further nested into six categories. For each of the six categories we provide below a few examples of relevant topics (in condensed format):

→ Artificial Intelligence

Examples of topics: *AI-as-a-Service; Global race for AI supremacy; Large Language Models soon to reach a plateau*

→ Robots, Wearables, Human-Machine Interfaces

Examples of topics: *IoT ubiquitous in every aspect of life; Humans merging with technology, Socially-apt robots*

→ Computing, Connectivity, Security

Examples of topics: *Global race for semiconductor independence; Satellite based internet in remote areas; Splinternet*

→ Social Media

Examples of topics: *The geopolitics of social media; Social Media algorithms reinforcing filter bubbles and echo chambers; The rise of niche social media*

→ Digital Environments and Underlying Infrastructures

Examples of topics: *Biometric authentication; The Internet of Senses; Digital twins*

→ Behaviors, Attitudes, Values and Emotions

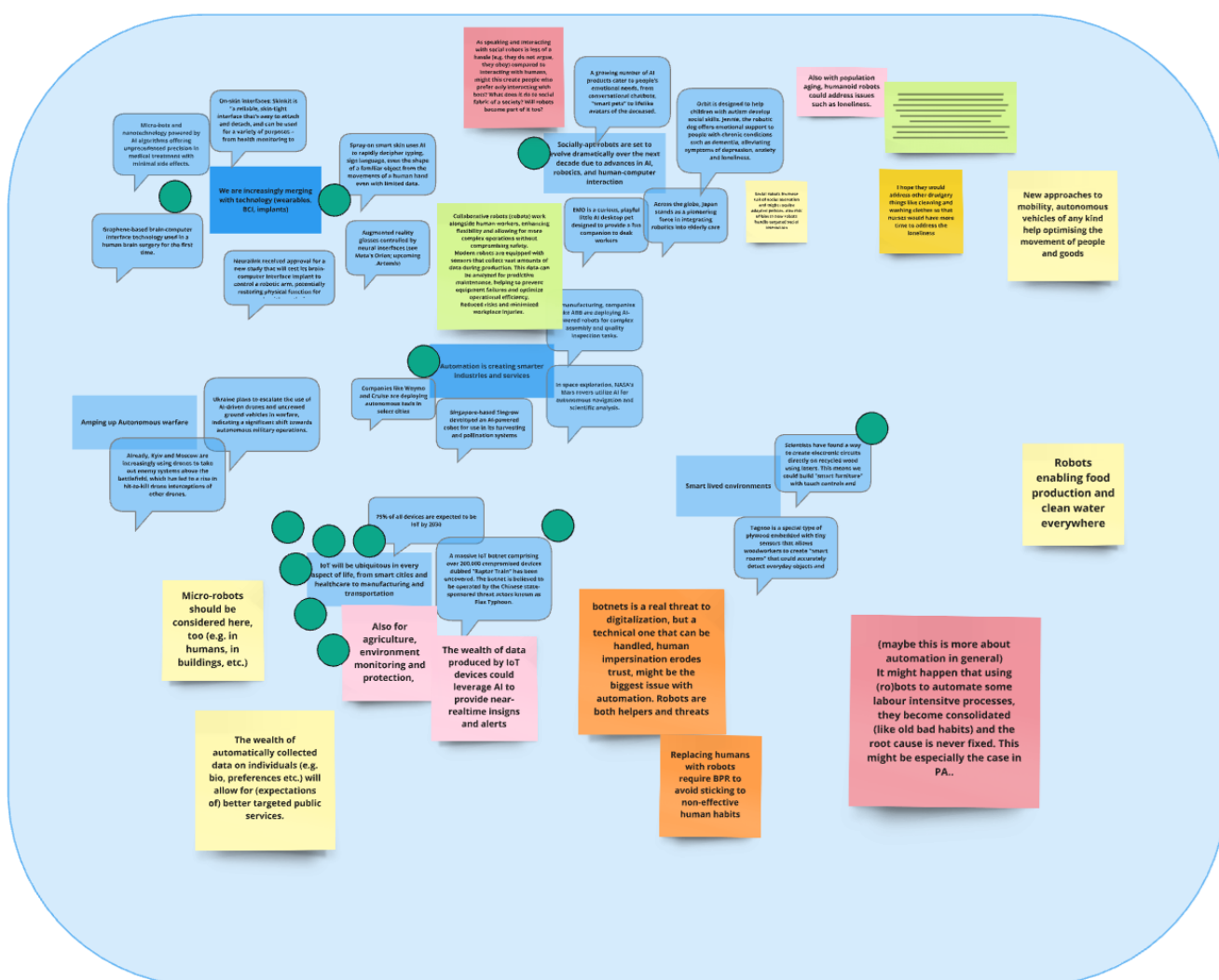
Examples of topics: *Mistrust in government; Privacy increasingly threatened; The spread of misinformation & disinformation*

International and local experts from the Bank and the Joint Research Centre were invited in the first online workshop to explore each category and enrich the topics, if needed, then assess all topics within that category in terms of impact and probability. Green dots were used to mark drivers of change considered to have high impact & high probability. Pink dots were used to mark drivers of change with high impact and high uncertainty.

Annex 10 to this report provides the results of the horizon scanning in full: the entire list of topics and the distribution of votes, as well as additional insights and comments from participants in the online workshop.

FIGURE 33: Snapshot from Miro board - assessment of drivers of change in the category Robots, Wearables, Human-Machine Interfaces

ROBOTS, WEARABLES, HUMAN-MACHINE INTERFACES



Baseline scenario & Context scenarios | Second online workshop

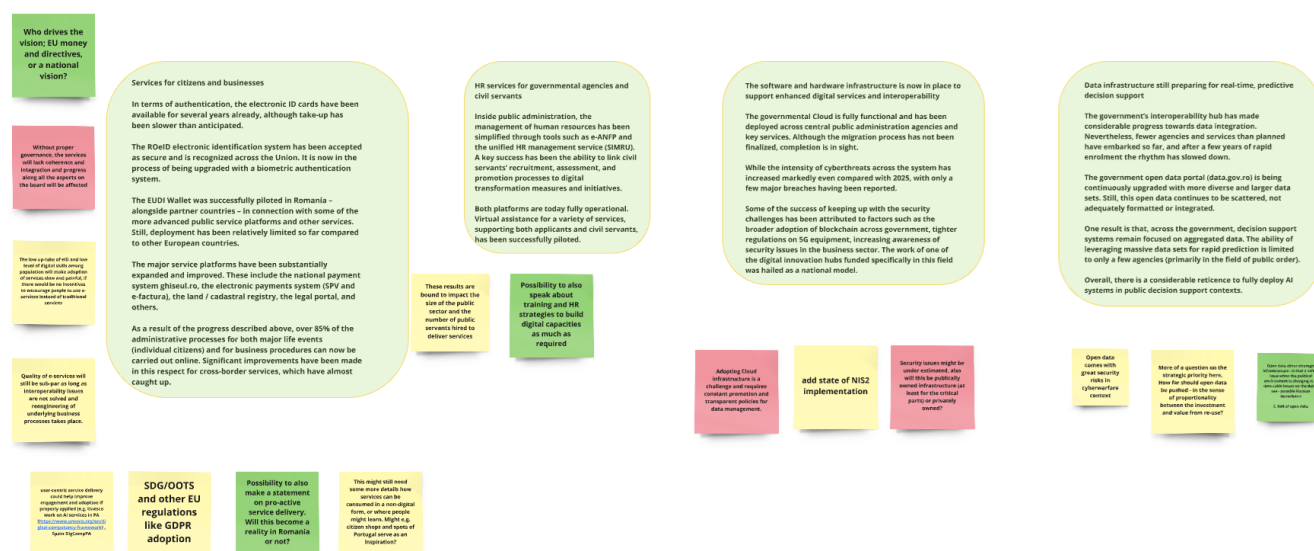
The initial version of the **Baseline Scenario 2032** was developed by Institutul de Prospectiva as a **“current paradigm” case**. The scenario was based on Romania’s existing strategic documents on digital transformation and assumes that the key objectives outlined in these documents will be largely achieved by 2032. Each scenario section was discussed online, where participants were invited to provide three types of comments on the Miro board:

- ➔ **Green post its** - suggestions to amplify a certain dimension/aspect
- ➔ **Red post its** - suggestions to moderate/diminish a certain dimension/aspect
- ➔ **Yellow post its** - collateral observations that may enrich/nuance the scenario

In light of these comments, a second version of the Baseline scenario was presented in the third online workshop.



FIGURE 34: Snapshot from Miro board: Discussion of Baseline scenario



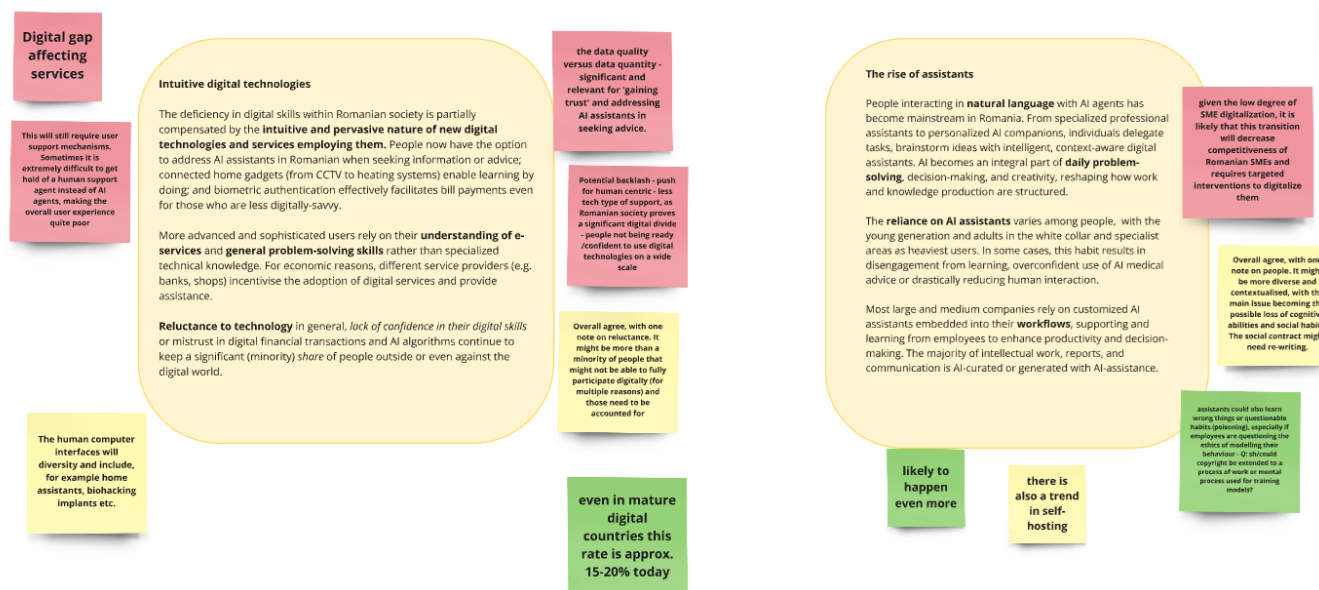
The **Core Context Scenario about the Digital society in Romania in 2032** describes a likely future shaped by the high-impact, high-probability drivers of change identified in the first online workshop. While these drivers describe the evolution of the European and global contexts, their advancement has been partially adjusted to reflect specific conditions in Romania. In addition, four other narratives were built around drivers of change previously identified as having high impact as well as a rather high degree of uncertainty.

Both the core context scenario and the additional narratives around uncertainties were discussed in the second online workshop, where participants were invited to provide three types of comments on the Miro board:

- ➔ **Green post its** - suggestions to amplify a certain dimension/aspect
- ➔ **Red post its** - suggestions to moderate/diminish a certain dimension/aspect
- ➔ **Yellow post its** - collateral observations that may enrich/nuance the scenario



FIGURE 35: Snapshot from Miro board: Discussion of Baseline scenario



Aspirational scenarios & Updated Baseline scenario | Third online workshop

Five Aspirational Scenarios for the digital transformation were developed for Romania's public administration by 2032, extending beyond the trajectory defined in the baseline scenario. These scenarios explore various potential pathways that could, individually or in combination, drive a more ambitious and impactful digital transformation in the public administration.

Each Aspirational scenario revolves around a key dimension. These dimensions are present in the current policy discourse in Romania, and discussed in different strategy documents, often without a high level of precision or commitment. Additionally, they reflect elements of the context scenario discussed in the second online workshop, incorporating anticipated societal developments by 2032. Finally, they are informed by digital trends and paradigm shifts observed in public administrations in the EU and worldwide.

Each scenario begins by describing the dimension of transformation and its impact on beneficiaries and society as a whole. It then outlines the key technological and policy requirements necessary to enable this transformation. Lastly, it presents a set of relevant digital roles, without assuming whether these roles would be integrated within public administration institutions or outsourced.

Thus, in the third online workshop, participants were invited to discuss, enrich and amend the scenario narratives showcased on the Miro board:

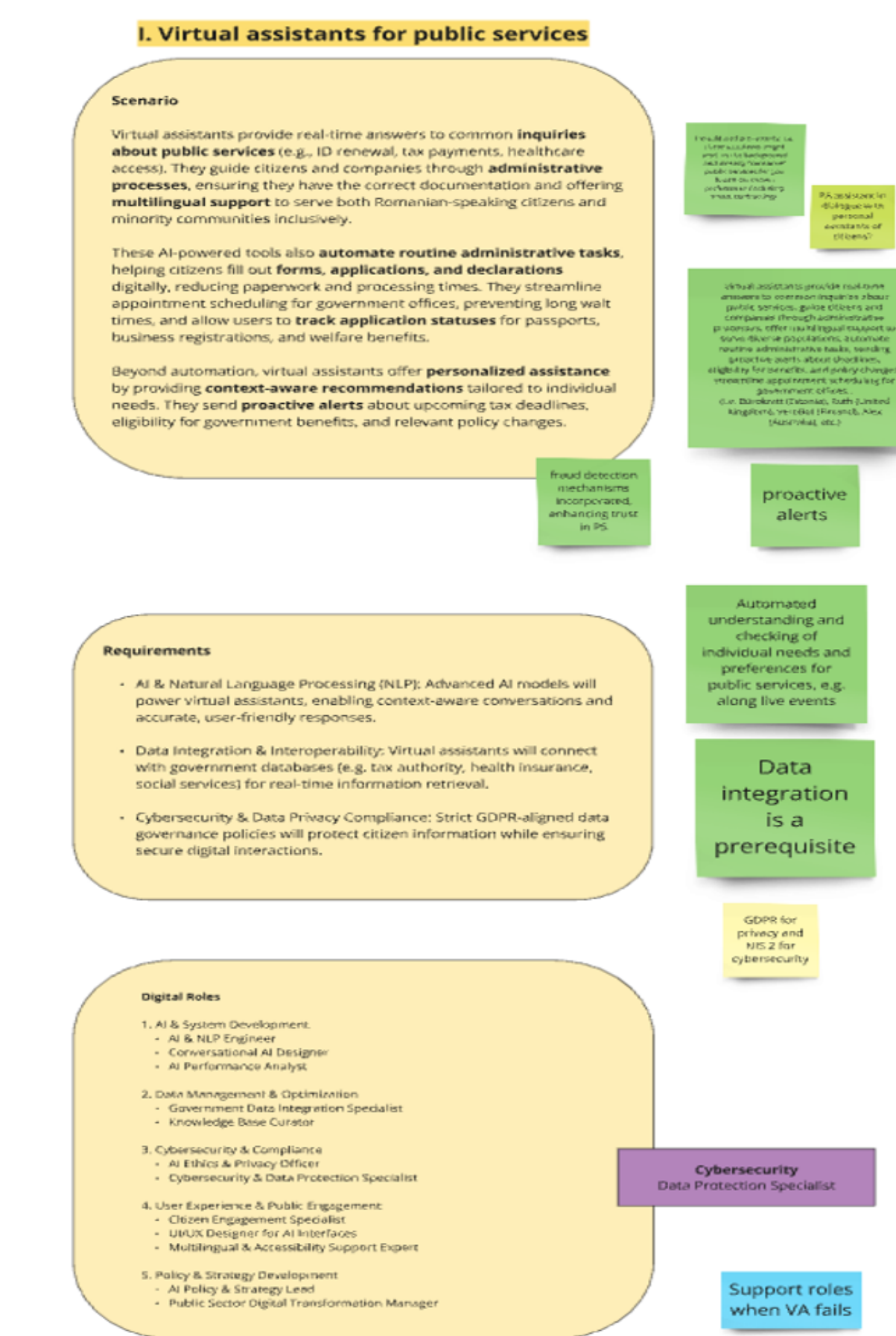
- ➔ **Green post its** - suggestions to amplify a certain dimension/aspect
- ➔ **Red post its** - suggestions to moderate/diminish a certain dimension/aspect
- ➔ **Yellow post its** - collateral observations that may enrich/nuance the scenario

Moreover, in the section outlining relevant digital roles, participants were able to:

- ➔ **Purple post its** - Change or eliminate a certain digital role
- ➔ **Blue post its** - Add a new digital role

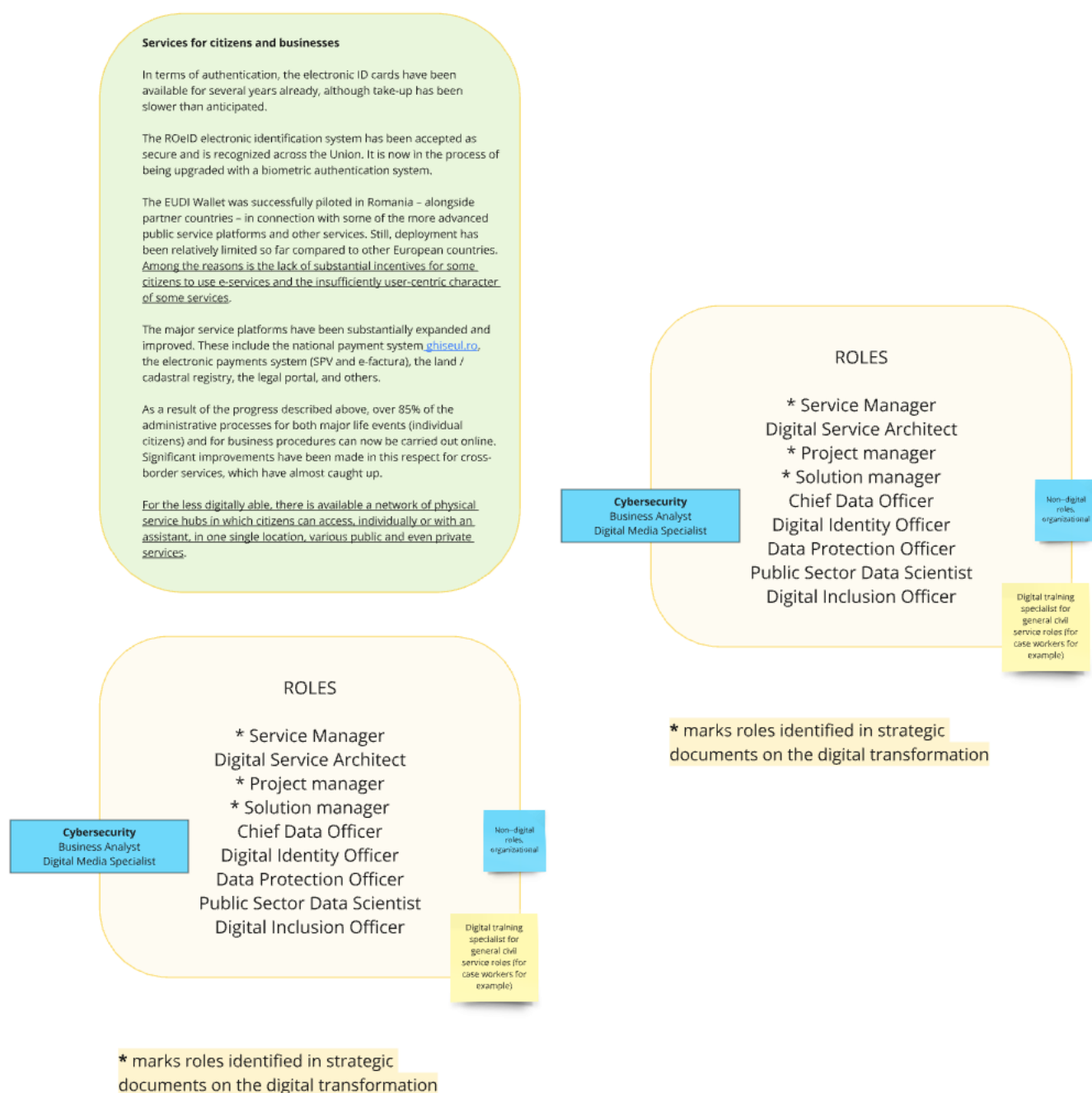


FIGURE 36: Snapshot from Miro board: Discussion of an Aspirational scenario



Between the second and the third online workshop, the Baseline scenario was updated by the Prospectiva team, in light of the comments from participants (text additions are marked in underline in the Miro image below). In addition, for each section of the scenario, a list of relevant digital roles was added, either identified in current strategic documents on the digital transformation or from other sources. Thus, participants in the third online workshop were invited to revisit the upgraded Baseline scenario, focusing on the set of digital roles.

FIGURE 37: Snapshot from Miro board: Discussion on digital roles in the updated Baseline scenario



Validation and enrichment of scenarios | Final in-person workshop

The participatory foresight process culminated in a final, in-person workshop held on February 27th in **Bucharest, engaging representatives of central public administration, ICT experts, academia and NGOs**. The goal of the event was to benefit from diverse perspectives and expertise in further refining the Baseline scenario and the Aspirational scenarios, including the list of digital roles, updated by the Prospectiva team in light of the third online session. The discussion benefitted from a main moderator and facilitation for each of the three working groups.

Finally, a discussion moderated in plenary touched on the following key points:

- In-house IT development vs. Externalization
- Digital skills training versus Talent acquisition
- General digital skills versus System specific digital skills
- Digital training versus Training around new information ecosystems

Participants emphasized the importance of strong representation from beneficiary institutions in their interactions with external IT companies developing digital systems. This representation is crucial for co-creating detailed specifications, iteratively validating solutions and user experience, and defining future upgrades. To achieve this, public institutions should have the flexibility to hire independent external experts who can provide specialized knowledge and oversight.

Additionally, participants called for more flexible policies regarding the definition of digital skills for public servants. They highlighted the need for tailored job requirements when hiring specialists, given the complexity and specificity of digital roles. Similarly, they advocated for a more contextual approach to assessing the digital skills of non-IT civil servants, recognizing diverse work environments and learning trajectories.



FIGURE 38: Snapshot from Miro board: Discussion of Baseline scenario



Annex 9. The foresight exercise – the horizon scanning

The **horizon scanning** aimed at identifying **drivers of change and emerging trends** that may (re)shape the so-called “**digital society**” by **2032**. It covered multiple dimensions: technological, social, economic, environmental, political, and value-driven changes. The scanning resulted in a collection of more than **180 data points**/examples, which were grouped into **45 topics**. To facilitate engagement with the content, these topics were further nested into six overarching categories.

Legend:

The green asterisks (*) represent the number of „High Impact, High Probability” votes

The red asterisks (*) represent the number of „High Impact, High Uncertainty” votes

Topics and examples/observations in italics were provided by the experts during the 1st working meeting on horizon scanning

Topic	Examples/Observations
***** AI-as-a-Service	Microsoft designed a new AI Agent Service to help developers create, deploy and scale AI agents that can automate complex business tasks. Besides OpenAI, the platform allows models from Meta, Mistral, and Cohere. (Source)
*** Global race for AI supremacy creates AI divide between countries and a potential shift in the global AI landscape	In 2025 the US has unveiled stringent new rules to control the export of AI technology, aimed at restricting access for countries like China and Russia. Romania falls into a middle zone in <i>This might be even more so between societies (divides within countries/territories). AI effecting democratic processes, negatively (e.g. by disinformation), but also positively (e.g. by knowledge synthesis).</i> <i>Increased use of AI in public sector will require increased computing capacity and energy requirements to ensure digital sovereignty.</i>
*** While becoming more reliable, the development of Large Language Models might soon reach a plateau	By voting collectively on content validation, multiple LLMs can now cross-check each other’s outputs, achieving an impressive 95.6% accuracy. (Source) The stock of human-generated text data could be fully utilized between 2026 and 2032, potentially limiting the scalability of future LLMs. (Source) The EC’s Alliance for Language Technologies (ALT-EDIC) supports the development of European large language models. (Source)
** AI is creating a massive restructuring of the job market	While AI will displace some jobs, it will also create new ones. A report by the World Economic Forum estimates that AI will displace 75 million jobs but create 133 million new jobs by 2025. (Source) AI’s impact spans various industries, including high-tech manufacturing, and affects job roles across different skill levels. The need for workers to develop new skills to complement AI will increase. (Source) In a recent survey conducted by ResumeBuilder, 37% of business leaders revealed they have already begun to replace staff with AI. (Source) AI is replacing many white-collar jobs, including legal assistants, junior architects, marketing analysts, and digital artists (i.e. OpenArt, Picsart AI Replace, Adobe Photoshop’s Generative Fill). In terms of art, users can create custom AI models tailored to their artistic vision, making it a versatile tool for both amateur and professional artists. (Source)

Topic	Examples/Observations
	AI skills are becoming increasingly valuable across various occupations, including those not traditionally associated with AI, such as recruiters, marketers, and healthcare professionals. Hiring managers are increasingly prioritizing candidates with AI literacy skills. (Source) <i>"AI is better than any programmer that's outsources right now"</i> - Stability AI co-founder Emad Mostaque warns of the "complete destruction" of the Business Process Outsourcing (BPO) market due to AI in 2025. <i>"Anything on the other side of a screen is at risk of displacement while being in person will be beneficial for job security"</i> Is this really the last year when Human work will matter? (Source) <i>Finding a job becomes harder because bots make decisions based on bot written CVs. The human connection will be missing to understand one's real knowledge and experience that are relevant.</i> <i>According to Goldman Sachs estimates, generative AI could affect around 300 million full-time jobs globally, indicating a substantial disruption in the job market.</i> <i>However, many positions are evolving to demand more advanced technological skills, while routine tasks are increasingly automated. This shift necessitates retraining and upskilling of the workforce to meet new employer needs, highlighting a dynamic transformation in job roles and responsibilities.</i>
** AI-augmented society, i.e. people not recognising sources of information anymore (e.g. an issue if public institutions are truly behind certainty statements, instructions, etc.)	Replika is an AI companion app that engages users in lifelike conversations, offering emotional support and companionship. Replika adapts to users' personalities over time, creating a personalized experience. (Source) Revolutionizing Industries with Personalized Assistants: - Healthcare, patient scheduling, symptom tracking (Improved access to care, reduced wait times). - Manufacturing, task automation on production lines (Higher efficiency, reduced human error). - HR, employee onboarding automation (Faster onboarding, reduced administrative workload). - Education, personalized learning experiences (tailored curricula, improved engagement). - Finance, budgeting and financial tracking (smarter savings, fraud detection). (Source) AI virtual assistants bring an entirely new dimension to customer service (chatbots for real-time issue resolution) by delivering conversational experiences that are both intuitive and emotionally intelligent --> better customer satisfaction, 24/7 support. (Source) Emotional Intelligence - By 2025, AI assistants will not just understand what you say but how you feel. It is revolutionary cause these will have emotion-based suggestions, recommending soothing music for stress (enhances mental well-being); and empathetic responses, offering motivational words during tough times (makes technology more human-centric). (Source) <i>"AI assistants aren't just tools—they're becoming partners in productivity."</i> – Jake Lin, CEO of TechFlow

Topic	Examples/Observations
<i>* AI ethics become a major focus, with global standards and oversight bodies ensuring responsible AI development and use.</i> <i>Privacy concerns are addressed through advanced encryption and data protection measures.</i> <i>+ public awareness</i>	Rabbit allows users to automate computer tasks using natural language instructions. (Source) EBay: Agents that write code and sell items. (Source) Video games are beginning to incorporate LAM-like technologies to create more realistic and adaptive non-player characters. (Source)
LAMs: large action models predict what should be done next, breaking down complex tasks into smaller pieces. People will have PLAMs (Personal LAMs), corporations - large action models (CLAMs), and digital-forward governments will have GLAMs	When discriminatory data and algorithms are baked into AI models, the models deploy biases at scale and amplify the resulting negative effects. (Source) As AI systems become more sophisticated and far reaching in data collection and analysis, the line between security and surveillance blurs. (Source) With no oversight and easy access to the software, the abuse of deepfakes presents a significant security gap e.g. in politics, business, personal vendettas. (Source) AI exploitation of intellectual property, e.g. lawsuits against ChatGPT involving writers. (Source) As AI systems make more decisions that impact our lives, it becomes more critical to establish clear lines of responsibility. (Source) <i>Legal implications (who is liable for a wrong decision taken by an AI agent (e.g., in service provision). Appropriate appeal mechanisms need to be built-in.</i>
The E.U. AI Act, which goes into deeper effect in 2025, demands stronger government oversight and regulation of AI technologies, potentially creating further complexities for businesses and hindering the development and adoption of AI solutions in Europe. The EU AI Act is poised to set a global standard for AI regulation, influencing policies beyond the EU	AI Literacy - The Act requires providers and deployers of AI systems to ensure their personnel have sufficient AI literacy to operate these systems. (Source) Banned AI Practices - The E.U. AI Act prohibits AI systems considered to pose "unacceptable risks", including the one that uses subliminal, manipulative, or deceptive techniques; exploits vulnerabilities; or employs social scoring techniques. It also bans certain uses of AI for predicting criminal behaviour, creating facial recognition databases through untargeted scraping, inferring emotions in the workplace or education, and biometric categorization. (Source)
Debates surrounding accidental development of AGI	Study shows that the perceived emergent abilities of AI models are a result of specific metrics used in evaluation. When more appropriate and balanced metrics are applied, there is no substantial evidence to support claims of these models possessing unexpected or emergent abilities. (Source) In the largest survey of AI researchers to date, it was estimated there is a 10% chance that AI systems can outperform humans on most tasks by 2027, assuming science continues progressing without interruption. (Source)
<i>Personalization of AI assistants will require rethinking current data privacy and protection laws and associated safeguards</i> <i>AI could increase the quality of life and service delivery by providing custom solutions (health, education, etc)</i>	

Robots, Wearables, Human-Machine Interfaces

Topic	Examples
***** IoT will be ubiquitous in every aspect of life, from smart cities and healthcare to manufacturing and transportation	75% of all devices are expected to be IoT by 2030. (Source) A massive IoT botnet comprising over 200,000 compromised devices dubbed "Raptor Train" has been uncovered. The botnet is believed to be operated by the Chinese state-sponsored threat actors known as Flax Typhoon. (Source) <i>Micro-robots should be considered here, too (e.g. in humans, in buildings, etc.).</i> <i>Also for agriculture, environment monitoring and protection.</i> <i>The wealth of automatically collected data on individuals (e.g. bio, preferences etc.) will allow for (expectations of) better targeted public services.</i> <i>The wealth of data produced by IoT devices could leverage AI to provide near-realtime insighns and alerts.</i> <i>Botnets are a real threat to digitalization, but a technical one that can be handled, human impersonation erodes trust, might be the biggest issue with automation. Robots are both helpers and threats.</i> <i>Replacing humans with robots require BPR to avoid sticking to non-effective human habits.</i>
** We are increasingly merging with technology (wearables, BCI, implants)	On-skin interfaces: Skinkit is "a reliable, skin-tight interface that's easy to attach and detach, and can be used for a variety of purposes – from health monitoring to fashion." (Source) Spray-on smart skin uses AI to rapidly decipher typing, sign language, even the shape of a familiar object from the movements of a human hand even with limited data. (Source) Augmented reality glasses controlled by neural interfaces (see Meta's Orion; upcoming Artemis). (Source) Neuralink received approval for a new study that will test its brain-computer interface implant to control a robotic arm, potentially restoring physical function for people with paralysis. (Source) Graphene-based brain-computer interface technology used in a human brain surgery for the first time. (Source) Micro-bots and nanotechnology powered by AI algorithms offering unprecedented precision in medical treatment with minimal side effects. (Source)
* Automation is creating smarter industries and services	In manufacturing, companies like ABB are deploying AI-powered robots for complex assembly and quality inspection tasks. (Source) In space exploration, NASA's Mars rovers utilize AI for autonomous navigation and scientific analysis. (Source) Singapore-based Singrow developed an AI-powered cobot for use in its harvesting and pollination systems. (Source) Companies like Waymo and Cruise are deploying autonomous taxis in select cities. (Source) <i>Collaborative robots (cobots) work alongside human workers, enhancing flexibility and allowing for more complex operations without compromising safety.</i> <i>Modern robots are equipped with sensors that collect vast amounts of data during production. This data can be analyzed for predictive maintenance, helping to prevent equipment failures and optimize operational efficiency.</i> <i>Reduced risks and minimized workplace injuries.</i> <i>New approaches to mobility, autonomous vehicles of any kind help optimising the movement of people and goods.</i> <i>(Maybe this is more about automation in general)</i> <i>It might happen that using (ro)bots to automate some labour intensive processes, they become consolidated (like old bad habits) and the root cause is never fixed. This might be especially the case in PA.</i>

* Socially-apt robots are set to evolve dramatically over the next decade due to advances in AI, robotics, and human-computer interaction	A growing number of AI products cater to people's emotional needs, from conversational chatbots, "smart pets" to lifelike avatars of the deceased. (Source) Orbit is designed to help children with autism develop social skills. Jennie, the robotic dog offers emotional support to people with chronic conditions such as dementia, alleviating symptoms of depression, anxiety and loneliness. (Source) Across the globe, Japan stands as a pioneering force in integrating robotics into elderly care. (Source) EMO is a curious, playful little AI desktop pet designed to provide a fun companion to desk workers. (Source) <i>Social robots increase risk of social alienation and might require adapted policies. also risk of bias in how robots handle targeted social interaction.</i> <i>Also with population aging, humanoid robots could address issues such as loneliness.</i> <i>Humanoid robots like ElliQ are designed specifically to combat loneliness among seniors. ElliQ engages users through conversation, music, and games, providing a sense of companionship. Studies have shown that interactions with such robots can significantly reduce feelings of loneliness and improve overall well-being.</i> <i>Robots like SAM provide non-medical care and ensure safety through monitoring systems that help prevent falls and facilitate communication between residents and caregivers.</i> <i>As speaking and interacting with social robots is less of a hassle (e.g. they do not argue, they obey) compared to interacting with humans, might this create people who prefer only interacting with bots? What does it do to the social fabric of a society? Will robots become part of it too?</i>
* Smart lived environments	Scientists have found a way to create electronic circuits directly on recycled wood using lasers. This means we could build "smart furniture" with touch controls and sensors. (Source) Tagnoo is a special type of plywood embedded with tiny sensors that allows woodworkers to create "smart rooms" that could accurately detect everyday objects and actions. (Source)
Amping up Autonomous warfare	Ukraine plans to escalate the use of AI-driven drones and uncrewed ground vehicles in warfare, indicating a significant shift towards autonomous military operations. (Source) Already, Kyiv and Moscow are increasingly using drones to take out enemy systems above the battlefield, which has led to a rise in hit-to-kill drone interceptions of other drones. (Source)
Robots enabling food production and clean water everywhere	

Computing, Connectivity, Security

Topic	Examples
** Satellite based internet provides access in remote areas	Starlink, the satellite internet service developed by SpaceX, is transforming global connectivity by providing ubiquitous Internet access. (Source) The European Space Agency will launch IRIS, a multi-orbit constellation of about 300 satellites that will deliver resilient, secure and fast communications for the EU. (Source) <i>Securing the satellites is an important aspect in the light of radio warfare.</i>
** Global race for semiconductor independence	The EU aims to double (from 10% to 20%) its share of the global semiconductor market value by 2030. The EU Chip Act aims to build a more robust semiconductor ecosystem and resilient supply chain. (Source) Nations intensified efforts to achieve semiconductor self-sufficiency, recognizing the strategic importance of chips in national security and technological leadership. (Source)

** The splinternet is already emerging in various forms, particularly due to geopolitical tensions, data sovereignty concerns, and technological divergences	China's "Great Firewall" restricts access to numerous foreign websites, including major platforms like Google, Facebook, and Twitter, creating a controlled information environment for its citizens. (Source) The European Union's General Data Protection Regulation (GDPR) imposes strict data privacy laws, affecting how international companies operate within its member states. (Source) <i>'Splinternet' as a fragmentation of the global internet standards into distinct national or regional networks reflects the national control over data and geopolitical tensions.</i> <i>Splinternet was seen as a real issue because pages/content was no longer hyper-linked (e.g. different bubbles of language groups; Russia)</i> <i>A holistic approach to security is required, human behavior is the biggest problem.</i> <i>"Privacy" is distinct from "security" goals and they often collide.</i> <i>Collective intelligence combining machine based reasoning and human cognition (who is that collective, and does it scale?)</i>
* Considerably faster Internet paves the way for new use cases (e.g. XR)	It is estimated that globally by 2030 80% of mobile communication will be 5G. (Source) Wireless data has been sent at 938 gigabits per second, or more than 9000 times the average speed of a current 5G phone connection. (Source)
* AI-dedicated computing becomes widespread	Companies developed AI chips capable of performing tasks up to 30 times faster than previous models, driven by the growing power and energy needs of AI technologies. (Source) Neuromorphic Computing, modeled after the human brain (e.g., Intel's Loihi) will improve energy efficiency and enable faster pattern recognition. (Source)
** Quantum communication is adopted in fields where security is important	Quantum communication could be integrated into existing fiber optic networks, new study shows. (Source)
* Quantum computers used for simulating and optimizing complex systems	In 2024, many quantum computing researchers and companies made great progress on quantum error corrections, including Google, QeRa, IBM and CSIRO. (Source) Google's Sycamore processor has demonstrated the potential for quantum supremacy; IonQ is developing trapped-ion quantum computers for commercial use. (Source) Italy-based Ephos makes glass-based photonic chips, allowing operations at room temperature and reducing energy consumption. (Source) The rise of quantum cloud services from companies like IBM, Google, and Amazon is giving wider access to the earliest stages of quantum computing. (Source) <i>Ideally, governments should be involved in piloting quantum services and assessing the impact of quantum computing on GovOps.</i>
* <i>Connectivity and fast access is a commodity by now</i>	Equal opportunities across the globe, i.e. global access to connectivity, computing power (and data) – some countries might be disadvantaged.
Instead of centralized cloud data centers, computing will increasingly happen on the edge (IoT devices, smart appliances, and autonomous systems)	Faster wireless networks will support real-time processing on the edge with lower latency. (Source) <i>In case of major failure or disaster: Establishing comprehensive information security procedures, such as incident response, network security, access control, and business continuity management.</i>

Quantum computing represents a dual-edged sword for cybersecurity	In 2022, the US National Institute of Standards and Technology organized a competition to create algorithms that could withstand a quantum computer assault. (Source) Quantum cryptography will likely become the gold standard for secure communication, replacing many classical encryption methods. (Source) <i>Implications for how cybersecurity is currently ensured, also considering gaps in how countries can adapt to this risk and the resources they can deploy.</i> <i>Efforts should be made to transition government resources to new encryption mechanisms to avoid security nightmares and potential for mass data breaches once traditional cryptography is compromised.</i>
Availability of critical materials (e.g. soils) and finding alternatives to using those	

Social Media

Topic	Examples
***** The geopolitics of social media is set to become increasingly complex over the next years, as governments, corporations, and users grapple with issues of power, control, and influence	In September 2024, Brazil's highest court suspended social media platform X nationwide until the company complied with judicial decisions, as part of efforts to combat disinformation. (Source) TikTok has faced scrutiny and bans in several countries over national security concerns. (Source) Countries like France and the United States have proposed or implemented measures to regulate social media access among minors. (Source) <i>Safeguards against troll armies / targeted campaigns are important (e.g., some form of e-KYC).</i> <i>Mechanisms to ensure transparency of funding social media campaigns are increasingly important.</i>
*** Social Media algorithms reinforce filter bubbles and echo chambers	Algorithms largely prioritize content that is aligned with a user's past behaviour and interactions, creating a feedback loop. (Source) Users tend to have friends who have the same political orientation as them. (Source) Selective exposure and confirmation bias lead individuals to seek information validating their pre-existing beliefs, ignoring contradictory evidence. (Source) <i>Algorithms based on emotional engagement - tend to favor emotionally charged content that provokes strong reactions. Posts that elicit laughter, anger, or surprise are more likely to be promoted, leading users to engage more deeply (thus being manipulative) with these types of content. Users are consistently exposed to similar emotional stimuli, affecting their overall mood and perceptions.</i> <i>Real-time analytics help platforms adapt to changing user preferences quickly. By analyzing engagement metrics as they occur, social media companies adjust what content is shown to maximize user interaction continuously.</i>
** Social media algorithms are increasingly functioning as search engines	Google has acknowledged that younger users are turning to Instagram or TikTok instead of Google Search as a first step in product discovery. (Source) <i>And notification channels (or even service delivery channels), in relation to public authorities.</i> <i>Privacy concerns are likely to remain a significant issue, with users becoming more aware of how their data is collected and used.</i> <i>Seen as support and access channel to digitalized services - and the truth! Citizens expect answers, providers of digitalized services must adapt.</i>

* There is an increasing emphasis on developing 'prosocial media' platforms/indicators that prioritize user well-being, ethical AI usage, and constructive interactions	Stanford University and Jigsaw have created AI tools that score social media posts and comments based on values like compassion, respect, and curiosity. (Source) Deinfluencing promotes mindful consumption and encourages audiences to avoid overhyped products that may not live up to their claims. (Source)
* "Platforms as we know them are over": Decentralized Social Media is up next	Steemit is blockchain based social media where Users are motivated to create high-quality content and interact with the community since they can earn Steem (STEEM) tokens based on participation. (Source) Decentralized social networks, where user data and content are stored on a blockchain and independent servers, gives users more control and will impact the market in the near future. (Source) Mastodon, the decentralized social media app around since 2016, has seen a surge in popularity since Twitter exchanged hands. (Source) For many former Twitter users, the decentralized BlueSky is becoming the platform of choice. (Source) Mastodon, Steemit, Minds, and Diaspora platforms offer features like chronological feeds, user-controlled algorithms, and cryptocurrency rewards. The Fediverse, an interconnected ecosystem of decentralized social networks, allows different platforms to interact, creating a more personalized social media experience. (Source) Decentralized social media offers an alternative to traditional platforms by prioritizing user control, privacy, and freedom of expression. These platforms operate on independent servers, often using blockchain technology to ensure secure and transparent data interactions. (Source)
The rise of Niche Social Media	Instead of one-size-fits-all social platforms, it's predicted that smaller, more niche platforms will lure many users in the coming years. (Source) Brands are no longer showing a preference for high-profile celebrities. Instead, they're turning to micro-influencers (10k-50k followers) and nano-influencers (1k-10k followers). (Source) Platform fragmentation: social media channels will become more fragmented since new platforms emerge to cater to specific niches and user preferences => more competitive market. Social media creates mob-behaviour on the streets (so gets out of digital to become analogue). Social media setting standards and altering socialization mechanisms - especially for young people - requiring targeted regulations/policies to limit exposure. Social media as means for changing behaviours and altering individuals' perceptions about who they are.
Social media for Direct Selling	Globally, social commerce revenue is predicted to reach more than \$1.2 trillion in 2024 and grow to \$6.2 trillion by 2030. That's a CAGR of more than 31%. (Source) HubSpot data shows that 1-in-5 social users (Gen Z, Millennials, Gen X) have made a purchase in a social media app in the past three months; nearly half of brands are currently selling their products directly within social media apps. (Source) Running businesses from SM could make the line between personal and professional nearly indistinguishable. (Source)
A growing number of individuals are expressing a desire to disconnect from social media	A survey revealed that over half of Generation Z regrets the advent of social media, with 86% attempting to reduce usage. (Source)

Digital Environments and Underlying Infrastructures

Topic	Examples
***** Biometric authentication will become the default method for secure and seamless identity verification across various sectors	Amazon One palm-scanning payment system is already gaining traction in stores and venues. (Source) Airports in Italy are trialling new security and boarding technology that will mean passengers do not have to show their documents to get on a flight. (Source) <i>Accessibility to become challenged by privacy and security.</i> <i>Biometric (remote) identification becomes crucial for digital services, e.g. to restore digital identity</i> <i>Biometric authentication to become stronger than knowledge and possession-based authentication, but with an inherent risk – very difficult to change your biometry.</i>
*** The Internet of Senses is anticipated to enable digital experiences that engage all human senses—sight, sound, taste, smell, and touch	The startup Ajinomatrix is providing taste and smell sensitivity software, which can quickly measure subtleties in flavor and odor. (Source) Norimaki Synthesizer, designed by researchers from Meiji University in Japan, artificially recreates any flavour on a user's tongue. (Source) Haptic feedback is already available today, but more advanced forms of wearables that replicate the sense of weight and motion in digital objects will also emerge as technologies evolve. (Source) In the years to come, digital malls may be able to offer smell, texture, and taste to make online shopping experiences indistinguishable from buying things at brick-and-mortar stores. (Source) <i>Applications Across Industries - the potential applications of IoS are vast, ranging from remote healthcare where doctors can feel textures during examinations to education where students can virtually taste food from different cultures.</i>
* Digital twins become key ways of managing complex systems as cities, factories and supply chains	Unilever has generated an AI-powered digital twin for approximately 300 plants to monitor their manufacturing closely, implement real-time changes, increase productivity, reallocate materials and reduce waste. (Source) Dubai Municipality has launched a cutting-edge digital twin platform called "Dubai Here," providing access to comprehensive geospatial data for government entities, private companies, and students. (Source)
*** Sustainability of digitalisation: finding ways to consume few and all clean energy without polluting our environment	
*** Decentralized Autonomous Organizations (DAOs) are blockchain-based entities that operate without centralized leadership, utilizing smart contracts and token-based governance to enable collective decision-making	MetaCartel Ventures enable members to pool funds and invest in startups, sharing profits equitably. (Source) KlimaDAO allow members to coordinate efforts and resources toward common social goals. (Source) Romania is the first EU country to use a voting reporting tool that is based on blockchain technology for national elections. (Source)

* Extended reality becoming more seamless and natural

Microsoft Mesh enables teams to collaborate in virtual spaces using holograms and avatars. ([Source](#))

AR shifting towards more immersive, hands-free devices: headsets and smart glasses (see Google, Meta, Apple, Microsoft). ([Source](#))

Users will be able to interact with digital objects just by moving their hands, looking at them, or speaking to them. ([Source](#))

Tangible Augmented Reality: Combining AR with physical objects enables users to manipulate digital information through real-world items. ([Source](#))

While VR experience continues to improve, the health challenges such as motion sickness, eye strain, and physical discomfort hamper its frequency of use. ([Source](#))

Affective computing (i.e recognition and simulation of human emotions) is pushing the boundaries of marketing, politics, education and social interactions

Emotion detection based on various inputs (face, voice, body sensors) has already reached high accuracy. ([Source](#))

Unilever is one of the companies that is currently using emotion AI during job interviews. ([Source](#))

Brazil's Yellow Line of the Sao Paulo Metro deployed an emotion AI analytics technology to optimize their subway interactive ads according to people's emotions. ([Source](#))

Portability of virtual identities (incl. avatars between different environments)

Augmentation of virtual environments will bring us closer to (or further away from) nature

Behaviors, Attitudes, Values & Emotions

Topic	Examples
**** From digital literacy to a more holistic digital readiness	In addition to technical skills, there will be a greater emphasis on critical thinking, problem-solving, and creativity. (Source) Without significant changes, only 59% of the EU population will be able to possess basic digital skills by 2030. (Source) Currently, Romania is well below the EU average on basic digital skills (28% vs 54% EU average). (Source) <i>With the development of LLMs and AI agents this transition can be made easier as most actions could be done using natural language prompts. This can also tremendously enhance accessibility. Of course, BPR efforts should be continued.</i> <i>Digital skills not only about using digital services/technologies but also understanding their socio-economical models and logic of how they work and make money - and gain a better power position.</i> <i>Digital skills need also to cover robotics, IoT etc - so more of the physical world.</i>
*** When surveillance capabilities continue to grow, privacy is becoming increasingly threatened	Edge AI cameras are predicted to evolve into intelligent AI agents capable of independently understanding and assessing situations, generating events, and providing real-time alerts. (Source) While the EU is leading in privacy protection (GDPR, AI Act, Digital Services Act), national security concerns and corporate data collection continue to push the boundaries of surveillance laws. (Source) <i>The complexity of AI algorithms often obscures how decisions are made, leading to calls for greater transparency in AI systems. Users need to understand how their data is used and how decisions affecting them are reached.</i> <i>Ethical frameworks must be established to ensure accountability for AI-driven outcomes, particularly in high-stakes areas like healthcare or criminal justice, among vulnerable populations, etc.</i> <i>Expect citizen push-back to digitalization for various reasons mostly in those areas.</i>

**** Mistrust in government has become a significant issue globally	Antiestablishment populism is on the rise in Europe, fuelled not just by migration and economic and security fears, but by an eroding confidence in governments' ability to overcome them. (Source) <i>Missing the opportunity for empowerment (rather than assuming mistrust) in democratic systems, i.e. a need to foster inclusiveness in the public sphere.</i> <i>Public governance is not a matter of public sector organisations alone, many other actors (incl. private ones) play increasingly stronger roles in the governance of societies.</i> <i>Government mistrusting digitalisation. They could also push back to automatisation because they lose their jobs, so they might sabotage the system.</i>
* According to the WEF, the most severe global risk over the next two years is the spread of misinformation& disinformation aimed at widening societal and political divides	The emergence of 'doppelganger' sites that closely mimic legitimate news sources has been used to spread false information, particularly noted in geopolitical contexts. (Source) The EDMO Task Force reveals widespread disinformation during the 2023 elections in Europe in all the considered countries, particularly about the electoral process, often through unfounded claims of voter fraud, foreign influences and unfair practices. (Source) <i>To combat this, focused efforts should be made to educate all generations on navigating a post-truth/ post-reality world.</i>
* Average daily screen time is continually increasing	A 2023 Statista study found that the average daily screen time for adults worldwide increased from 6 hours in 2019 to nearly 7.5 hours by 2023, with further growth expected. (Source) Excessive screen media use has been associated with poorer mental health among children and adolescents in several observational studies; new study provides evidence for a causal link. (Source) <i>Outsource our social media use to robotics.</i>
*** Being accustomed to bite-sized content trained our brains to lose focus after mere 8-12 seconds	Fuelled by FOMO, the fear of missing out, users continuously switch between digital platforms ("platform hopping"). (Source) Users are now turning to TikTok videos (up to 60 seconds) for quick, digestible information on a wide range of topics, from science and history to personal development and life hacks. (Source) Given social media's endless production of updates and news, people have developed what is known as the syndrome of endless scrolling. (Source) Micro dramas on the rise: low-budget productions in vertical format, with each episode a few minutes long, that are shown on short-video streaming platforms. (Source) <i>Ability to focus longer will diminish: This could lead to challenges in education, professional development, and other areas that require sustained attention.</i> <i>Traditional educational methods may need to adapt to shorter attention spans by incorporating more interactive and engaging content.</i>
* "From post-truth to post-reality"	Within the XR metaverse we'll be faced with 'virtual humans,' who – armed with hyper-precise microtargeting data on us – will try to convince us to believe certain narratives. (Source)
Moving seamlessly between natural and digital environments (maybe digital becomes natural)	

Annex 10. Key research questions for the bottom-up analysis

The bottom-up analysis was structured around key research questions aimed at understanding the digital needs across various roles, from general civil service positions to specialized IT roles. The goal was to provide a comprehensive understanding of how digital competencies influence both current job functions and the evolving landscape of public administration.

- *What are the key strategic directions in terms of digital development for the public administration and what are the typical responsibilities implied for the general civil service roles and the specialized IT roles?*

The first focus was identifying the strategic tasks for digital development within the public sector. The analysis sought to understand the primary goals for digital advancement and how these objectives translate into specific responsibilities for civil service roles. It examined the differences in competencies required for general positions versus specialized IT roles, considering how digital transformation impacts these responsibilities and what new skills may be necessary in the future.

- *What IT tools are used in the civil service and what new IT tools are expected to be introduced and to what extent do they impact the digital competencies needed?*

Another question addressed the role of IT tools within the civil service. The study assessed current digital tools and emerging technologies that are expected to enter public administration. This analysis provided a general understanding of how these tools are shaping the digital competencies needed for various roles, as well as the challenges they may present in terms of skills and knowledge gaps.

- *For general civil service jobs that are not directly involved in activities directly connected to the digital domain (e.g. ICT-enhanced jobs), what are the typical responsibilities that do require certain knowledge/skills pertaining to the digital area?*

Another area of focus was the digital skills required for roles not directly related to IT. Many general civil service jobs do not center on technology yet still require employees to have a certain level of digital competency. This part of the analysis identified which specific responsibilities within these roles necessitate digital knowledge, even when the core tasks are not technology focused.

- *In what structures do we find jobs and roles that require specialized digital competencies? What are the responsibilities and performance expectations for these roles? What specific digital competencies are necessary to fulfill these responsibilities?*

The study also explored roles that demand specific digital competencies. It aimed to identify structures and job categories within public administration where specific digital skills are essential.

- *What are the main gaps between what SHOULD BE in place as job roles and WHAT IS, as reflected in current job descriptions, for the digital domain?*

A crucial component of the analysis was identifying gaps between current and ideal digital competency frameworks. The study reviewed job descriptions to highlight discrepancies between the competencies outlined and those needed to effectively support digital transformation. This step helped clarify the path to aligning current roles with future digital needs.

I	Introduction	II	The EU policy framework	III	National strategies, policies and institutional arrangements	IV	Job analysis	V	International experiences	VI	Foresight	VII	Conclusions
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→ *What are the criteria for determining whether a specific digital competency should be required for a job or if it is a set of digital skills required for other general competencies?*

The research also focused on determining the criteria for digital competency requirements. It examined how to assess whether a specific digital competency should be required for a role, or if it should be integrated into a broader set of digital skills linked to general competencies. This approach offered a more nuanced understanding of how digital skills can be embedded in various roles across the public sector.

→ *How can digital competencies be integrated into HR processes?*

Another significant aspect of the study was exploring the integration of digital competencies into HR processes. The research investigated how public administration can incorporate these competencies into recruitment, training, and career development practices. This ensured that digital transformation would be supported not only by the necessary skill sets but also by a strategic approach to workforce development.

→ *What feedback / testing mechanisms should be used to ensure that the competence framework meets the needs and expectations of the main stakeholders?*

Finally, the analysis emphasized the importance of feedback and testing mechanisms to ensure the competency framework met stakeholder expectations. The study gathered feedback from key stakeholders to ensure the framework was practical and aligned with the real-world needs of the public sector, ensuring its relevance and effectiveness.

