Developing skills for digital government: A review of good practices across OECD governments

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Developing Skills for Digital Government: A review of good practices across OECD governments

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Abstract

Digital technologies are having a profound impact on economies, labour markets and societies. They also have the potential to transform government, by enabling the implementation of more accessible and effective services. To support a shift towards digital government, investment is needed in developing the skills of civil servants. This paper reviews good practices across OECD countries to foster skills for digital government. It presents different approaches in public administration to organising training activities as well as opportunities for informal learning. It also provides insights into how relevant skills can be identified through competence frameworks, how they can be assessed, and how learning opportunities can be evaluated.

Résumé

Les technologies numériques ont et vont avoir un impact profond sur les économies, les marchés du travail et les sociétés. Elles ont également le potentiel de transformer l'administration publique, en permettant la mise en œuvre de services plus accessibles et plus efficaces. Pour soutenir le passage à l'administration numérique, les pays doivent absolument investir dans le développement des compétences des fonctionnaires. Ce document passe en revue les bonnes pratiques des pays de l'OCDE en matière de développement des compétences pour l'administration numérique. Il présente différentes approches utilisées dans l'administration publique pour organiser des activités de formation ainsi que pour favoriser l'émergence d'opportunités d'apprentissage informel. Il donne également un aperçu de la manière dont les compétences adéquates peuvent être identifiées et mesurées au sein du gouvernement, et de la façon dont les activités de formation peuvent être évaluée.

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Executive Summary

Governments should be at the forefront of the digital transformation. Digital technologies are transforming the way people interact, how and where businesses operate, and what goods and services are consumed. Recent advances in generative artificial intelligence could further increase the pace of change. Digital technologies present opportunities to provide simpler, more effective, and more agile public services. During the COVID-19 pandemic, for example, governments with greater digital maturity were better able to manage and respond to disruptions in service provision. Achieving a digital government, where technology is applied to the design of processes, policies, and services that meet the needs of users, requires the adoption of new ways of working and new competences in public administration. Governments need to foster the skills, attitudes, and knowledge that allow civil servants to work in a digital environment, integrating digital technologies to create public value.

The continuous skills development of civil servants will play a key role in fuelling the digital transformation. For digital roles, for example in service design, programming, or data analysis, providing reskilling or upskilling opportunities to in-house candidates could be an alternative to hiring scarce talent in the labour market. For generalist profiles, continuous skills development is important, because job security in the public sector tends to be comparatively high, and the digital transformation requires a broad set of digital and complementary skills, including basic digital skills, professional skills, socio-emotional skills, and leadership skills. This paper reviews good practices for developing skills for digital government, based on desk research and expert interviews with policy makers and practitioners from over 10 OECD countries, including Australia, Canada, Denmark, France, Germany, Italy, Korea, Slovenia, Spain, and the United Kingdom. It focuses on practices to identify and assess the skills required by government employees, and to organise and evaluate learning opportunities.

Competence frameworks support strategic approaches on skills for digital government

Competence frameworks are important for a strategic approach to skills development for digital government. Competence frameworks describe and synthesise the knowledge, skills, and attitudes required by civil servants involved in the digital transformation and the delivery of digital services. A dedicated framework or model helps to identify the competences that civil servants require to work in a digital-era government and to establish a common language across public authorities. This can help with recruitment, skills assessment, training, and strategic workforce planning.

Competence frameworks should be designed according to the skills that are covered, their target group and application. Public administrations can use frameworks that describe very general digital skills (as does DigComp), the specific skills of digital professionals (e.g. SFIA or the DDaT Capability Framework in the UK), or the skills that should be present in government organisations as a whole (such as the Danish Model of Digital Skills). Frameworks that target digital professionals are often used in human resource management, while frameworks on general digital skills serve to identify skills gaps and design general

upskilling policies or programmes. Organisational-level frameworks can guide strategic organisational and workforce development, for instance, for identifying priority areas for training.

Sound competence frameworks should rely on extensive consultation with civil servants in different government institutions and external experts and be updated regularly. The consultations are important to ensure that the skills, knowledge, and attitudes are fit for purpose and reflect the main tasks and responsibilities of civil servants in a digital government. The Danish Government Digital Academy, for instance, took a qualitative approach with broad stakeholder consultation to develop a model its model of digital skills. In the United Kingdom, a dedicated expert council is responsible for the updating of the DDaT Capability Framework.

Skills assessments identify skills gaps and help to target learning opportunities

Skills assessments allow public administrations to track skills gaps in their workforce. The results of skills assessments help to better target learning opportunities, leading to a more efficient use of resources. To conduct skills assessments, governments can evaluate the skills of individual employees and compare them against a certain standard, for instance, as defined in a competence framework.

Systematic assessments of the digital skills of civil servants are not yet very common. Existing approaches often rely on qualitative information from civil servants and executives in different government departments about their skill needs. Systematic and larger-scale assessments should be based on results of self-assessment tools and performance-based tests. Self-assessment tools or performance-based tests should be user-friendly, rely on a well-defined list of skills, and may use gamification methods, for instance, as in the case of the Deep Skills assessment in Italy.

Public administrations can offer a mix of training and informal learning opportunities

Public administrations typically provide a combination of different types of learning activities to develop skills for digital government. Most commonly, public administrations offer non-formal training in the form of courses, workshops, or guided on-the-job training. A few government authorities provide formal training to employees, lasting at least 6 months and awarding an officially recognised qualification upon completion. Informal learning opportunities often complement the training offer, for instance, in the form of coaching or mentoring schemes, experiential learning (such as through the Empathy Lab in the United Kingdom), communities of practice for digital professionals, resource centres with learning content or guidance on digital solutions, learning events (like expert lectures), or job rotation programmes that enable on-the-job learning.

Learning opportunities have different target groups. Within the public administration, learning opportunities typically target executives, digital professionals, or civil servants more generally. Training may be more useful for employees to acquire new and specialised skills, while informal learning can support employees to foster collaboration, stay up to date with technological developments, and develop leadership or soft skills that matter for digital government.

Design choices, incentives to participate, and the institutional set-up make a difference

Public administrations face a trade-off between the intensity and coverage in organising learning opportunities for digital government. Given that resources are usually limited, public administrations face a trade-off between the learning intensity, or time spent on training, and its coverage of employees

within government authorities. Short, self-paced courses, for instance, can easily be made accessible online to a large group of civil servants at relatively low cost. Longer and more tailored training, or intensive types of personalised coaching, however, are usually only targeted at selected individuals or teams. Both strategies can be useful. Governments often aim to reach a large group of civil servants with foundational learning content on skills and knowledge around digital government to lift the general level of competence, for instance, a learning module on cyber security offered by the Digital Academy of the Canada School of Public Service for all Canadian public servants. More intensive learning opportunities, however, are typically targeted at individuals that are expected to become drivers in the digital transformation of their institutions. An example is the Advanced Digital Cycle CSNum (*Cycle Supérieur du Numérique*), a leadership programme of several months for French civil servants.

Participation to most learning opportunities on skills for digital government is voluntary. Participation in certain learning opportunities may be mandatory across the government workforce for learning content that is considered essential**.** Most learning opportunities on skills for digital government, however, are voluntary and there are additional ways to incentivise participation. In some public administrations, employees receive visible badges or titles upon the completion of a course. Freeing up time for learning may be a frequent barrier, which can be countered with flexible worktime arrangements or a dedicated time budget for learning. In Australia, for example, some civil servants benefit from a 12-month work and study scheme called APS Digital Traineeship Program which allows them to obtain a formal qualification and transition into digital roles. For certain learning opportunities, typically those which are more resource and time intensive, public authorities run an application procedure with the aim of selecting more motivated individuals.

The institutions that offer learning opportunities on skills for digital government are typically Schools of Government or Digital Governments Units. An example of a School of Government is the Federal Academy of Public Administration in Germany, which oversees the general skills development of public servants. An example of a Digital Government Unit is the Government Digital Service in the UK, which are responsible for the integration of digital technology across government services. The two types of institutions have different advantages. Schools of Government have a clear mandate and experience to organise training and learning for the civil service, while Digital Government Units have responsibility to drive the digital transformation of services and processes across government and are therefore at the forefront of the adoption of technology in government. In all countries and across institutional approaches, training is frequently offered in collaboration with external providers.

Evaluating learning opportunities can improve their effectiveness

Evaluating learning opportunities for digital government is important but rarely done systematically. Evaluation provides evidence to understand whether the opportunities have been effective and how they could be improved in the future. However, evaluation is rarely done systematically. Governments can focus on different dimensions, such as participant satisfaction, learning gain, changes in behaviour, and the impact of training on individual performance and organisational goals.

Existing initiatives on skills for digital government typically collect information on participant satisfaction. There are only a few examples where public administrations have examined changes in behaviour, learning gain or the impact of training. The Australian Public Service Commission has a larger framework in place to monitor the 'digital capability' of its workforce, as a result of training and other initiatives. While training evaluation is also relatively rare in the private sector, governments can take inspiration from some specific approaches that rely on a quasi-experimental design to evaluate the impact of training. Initiatives on developing skills for digital government could be well-suited to implement these methodologies, due to the availability of data and the widespread adoption of modular learning formats.

1 The importance of investing in skills for digital government

The adoption of digital technologies is having a profound impact on economy and society. Digital technologies are changing the way people interact, how and where businesses operate, and what goods and services are consumed. Most recently, advances in generative artificial intelligence, exemplified by the release of Chat GPT, have raised expectations about new opportunities to boost productivity and growth but also concerns about privacy, less autonomy at work and job losses. The OECD has undertaken different efforts to help governments, stakeholders and individuals navigate this transformation. The OECD Skills Outlook has identified skills policy priorities to address different social and economic challenges (OECD, 2023[1]; OECD, 2019[2]), while the OECD Employment Outlook has explored how skills demands have been affected by technological change (OECD, 2019[3]) and most recently by the adoption of artificial intelligence (OECD, 2023[4]). The OECD's Future of Education and Skills 2030 project has offered an opportunity to explore the longer-term challenges facing education and make the process of curriculum design and development more evidence-based and systematic (OECD, 2019[5]).

The overall conclusion from this body of work is that governments should proactively invest in skills, training, and education to make the most of the digital transformation, rather than mitigate the impact of technology on workers, society, and economies. A comprehensive adult learning strategy is needed to adapt to a changing world of work and to ensure that all individuals, particularly the most vulnerable, have adequate opportunities for upgrading their skills throughout their careers (OECD, 2019[3]). Within such a strategy, it is important to address digital skills gaps. Individuals with stronger digital skills are better able to access digital services and use digital technologies in the workplace, which contributes to better career prospects and higher levels of well-being (OECD, 2019[2]). Digital skills can also play a major role in supporting the green transition, for example by facilitating the acquisition of environmental competences (OECD, 2023[1]).

The importance of digital government

A proactive approach is also important within government. A successful digital transformation enables the public sector to operate efficiently, to offer more effective and simpler services, that allow it to better respond to crises and unforeseen shocks (OECD, 2020[6]). Governments with greater digital maturity, for example, were better able to manage and respond to the COVID-19 pandemic, thanks to the faster deployment of digital solutions and innovative use of data.

The 2014 OECD Recommendation of the Council on Digital Government Strategies defines digital government as "the use of digital technologies, as an integrated part of governments' modernisation strategies, to create public value" (OECD, 2014[7]). Achieving this vision requires countries to make a paradigm shift away from e-government approaches. Digital government practices concentrate on using technology to design processes, policies, and services that meet the needs of users (see Box 1.1), whereas e-government approaches focus on using technology to improve efficiency.

Box 1.1. The OECD digital government policy framework

Building on the *OECD Recommendation of the Council on Digital Government Strategies* (2014[7]), the OECD has defined six core dimensions to measure digital government:

1. **Digital by design:** establishing clear organisational leadership, paired with effective co-ordination and enforcement mechanisms so that "digital" is considered not only a technical topic, but an embedded transformative element for rethinking and re-engineering public processes.

2. **Data-driven public sector:** recognising data as a strategic asset and establishing the governance to generate public value through planning, delivering, and monitoring public policies and services while adopting rules and ethical principles for trustworthy and safe access, sharing and re-use.

3. **Government as a platform:** building an ecosystem of guidelines, tools, data, standards, and common components that equip teams to focus on user needs in public service design and delivery.

4. **Open by default:** making government data and policy-making processes (including algorithms) available for the public to engage with, within the limits of existing legislation and in balance with the national and public interest.

5. **User-driven:** awarding a central role to people' needs and convenience in the shaping of processes, services, and policies; and by adopting inclusive mechanisms for this to happen.

6. **Proactiveness:** the ability of governments and civil servants to anticipate people's needs and respond to them rapidly, so that users do not have to engage with cumbersome processes associated with service delivery and data.

The OECD Digital Government Index tracks the maturity of countries across these six dimensions. Countries with high maturity, such as Korea, the UK and Denmark have consistently worked to build long-term foundations and strategies as a basis for the digital transformation of government.

Figure 1.1. The OECD Digital Government Index Composite Results, 2019
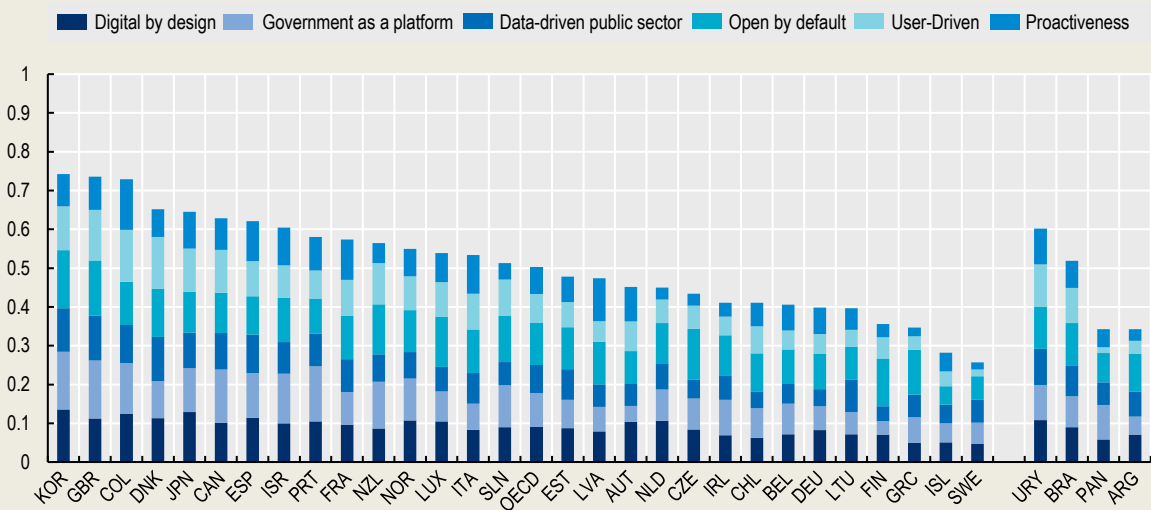
Note: Data are not available for Australia, Hungary, Mexico, Poland, Slovakia, Switzerland, Turkey, and the USA.
Source: OECD (2020[6]), The OECD Digital Government Policy Framework: Six dimensions of a Digital Government, https://dx.doi.org/10.1787/f64fed2a-en.

The crucial role of workforce management and investment in skills

Achieving digital government also relies on a forward looking and proactive approach to the management of the public sector workforce and its competences, which should be part of a wider strategic effort (OECD, 2021[8]; OECD, 2014[7]). A future-ready public service will need to identify the way the work will change and will need to plan to translate these changes into concrete actions. It needs flexible workforce management to be able to access the skills to meet fast emerging, often-unforeseen challenges and it has to provide fulfilling work experiences to attract, retain and motivate an increasingly diverse workforce. This evolution should happen in a way that protects and reinforces the public service values, such as the rule of law, accountability, objectivity and political neutrality, merit, and protection from discrimination.

As part of this forward looking and proactive approach, governments need to build effective strategies to foster talent and skills for digital government. Previous work by the OECD has shown that digital government requires a broad set of skills, expressed through the work of diverse and multi-disciplinary teams (OECD, 2021[9]). The adoption of digital technologies in the public sector means that all civil servants should have a basic level of 21st century skills that enables them to be confident in using key digital tools and digital technologies. Digital government efforts build on this foundation in four areas: digital government user skills, digital government socio-emotional skills, digital government professional skills and digital government leadership skills (Figure 1.2).

Figure 1.2. Skills for digital government maturity
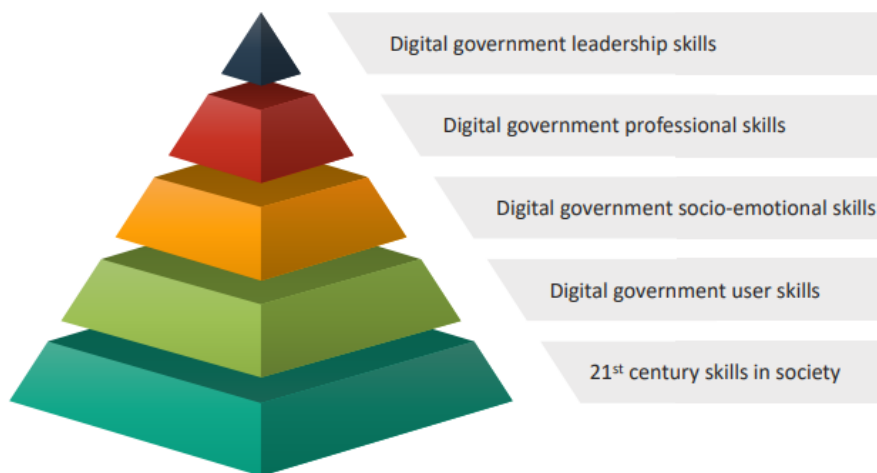
Source: OECD (2021[9]), "The OECD Framework for digital talent and skills in the public sector", https://doi.org/10.1787/4e7c3f58-en.

Digital government user skills entail different competence areas for civil servants, for instance, the recognition of the potential of the digital transformation, an understanding of users and their needs, and open collaboration for iterative delivery as well as the trustworthy use of technology and data. Socio-emotional skills also become increasingly important when government functions are supported by digital technology, as digitalisation may lead to a decline in routine work and the creation of more flexible team-based settings that require agile management, collaboration and problem solving (Deming, 2017[10]). Professional skills matter too, including, for instance, advanced digital and data skills, or awareness of legal and policy developments that can influence the adoption of digital solutions. Lastly, leadership skills are key for being a role model and creating an environment that facilitates and encourages greater digital government maturity (OECD, 2021[9]).

Given the breadth of competences that are important for digital government, public administrations face a range of strategic decisions. For example, what capabilities should be built in house and what capabilities should be outsourced? What is the right balance of training and recruitment? Who should receive training and why? Several governments have recently focused on reintegrating key digital functions of government into public administration rather than outsourcing potentially fragmented IT tasks, to take a more joined-up and sustainable approach to the key digital functions of government (OECD, 2021[11]; Clarke, 2020[12]). To succeed in this transformation, governments need to create a working environment and leadership practices that support the adoption of digital technologies. Previous work by the OECD has provided some insights on how to make progress on this front, by providing some principles and examples that governments could consider (OECD, 2021[9]). This study builds on these previous efforts and aims to review practices to foster skills development for digital government among existing civil servants.

Investment in the skills of the existing government workforce should be a priority for governments for several reasons. While attracting, recruiting, and retaining candidates from outside the civil service matters, it is likely not to be sufficient. Recruitment can and should play an important role, especially for advanced technical skills, such as service design, programming, or data analysis. However, ICT skills across OECD countries are in high demand, and governments will need to compete with the private sector in terms of salary and working conditions for a candidate pool that may be relatively small to begin with. Providing reskilling or upskilling opportunities to in-house candidates could be an alternative to hiring scarce digital talent in the labour market. Furthermore, job security in the public sector is still relatively high, even if most countries have moved away from lifetime tenure principles (OECD, 2016[13]). Lower turnover compared to the private sector, and more difficulties to dismiss workers whose skills are no longer required means that governments have strong incentives to prevent the skills obsolescence of their workforce and invest in their continuous skills development. This is especially important given the breadth of skills that is required. A high proportion of civil servants will need to be involved in learning opportunities to improve basic digital skills, professional skills, socio-emotional skills, and leadership skills that are spread across different roles.

Approach and structure of this study

Existing research shows that the way learning opportunities are designed, delivered, and implemented determines the impact it will have on employees, organisations, and economies as a whole (OECD, 2021[14]). Approaches to strengthen skills for digital government are no exception (Figure 1.3). In a first step, governments need to identify the digital and complementary skills required and assess the extent to which their employees already master them. This makes it possible to detect gaps and organise training and learning opportunities to address them, maximising the use of available resources. Governments then need to evaluate the impact of learning opportunities, to draw lessons for future initiatives.

Figure 1.3. Approach to foster skills for digital government

Source: Adapted from OECD (2021[14]).

To identify good practices across these four dimensions, this report draws on a combination of desk research and expert interviews. The desk research covered policy and academic publications that focus on skills for digital government. Expert interviews involved policy makers and practitioners from countries with a strong tradition of digital government, based on the OECD Digital Government Index (Figure 1.1), such as Canada, Denmark, Korea, and the UK, and the OECD's findings during the desk research.

The good practices are presented in two chapters. Chapter 2 focuses on the identification and assessment of skills for digital government (step 1 and 2 in Figure 1.3). It discusses competence frameworks and assessment methodologies that have been applied to identifying and measuring the skills for digital government of civil servants. Chapter 3 illustrates the delivery and evaluation of learning opportunities in the area of skills for digital government, including training and informal learning approaches (step 3 and 4 in Figure 1.3).

2 Identifying and assessing skills for digital government

To promote digital government, public authorities need to identify the types of skills that are required and understand the skills gaps of the current workforce. Without a mapping exercise and skills assessment, there is a risk that learning opportunities will not be fit for purpose and the resources for the learning will not be used effectively. For example, if governments train employees who are already sufficiently skilled or leave some skill gaps unaddressed, this would represent an inefficient use of resources.

When strengthening skills for digital government, public authorities can rely on competence frameworks or models that describe the relevant competencies that civil servants should have. Competence frameworks describe and synthesise the knowledge, skills and attitudes required by civil servants involved in the digital transformation of government and the delivery of digital services. These frameworks are designed to inform the delivery of learning opportunities, but also to guide recruitment efforts.

Governments can also undertake some form of skills assessment of their workforce to detect skills gaps and target learning initiatives. Skills assessments are a process of evaluating the skills of an individual and comparing it against a certain standard, for instance, as defined in a competence framework. Assessments help determine who should be trained and will help employees avoid spending time on training that is not at the right proficiency level. They may also help to identify civil servants with advanced digital skills who can become drivers of the transformation towards digital government. Following the results of skills assessments, governments can offer modular training opportunities or ad-hoc learning experiences that focus on the specific skill gaps of different employees.

Identifying skills for digital government

Existing frameworks that are used in OECD governments differ with respect to the types of competencies they describe, reflecting different priorities and contextual circumstances. Governments can rely on existing frameworks on digital skills, whether general or specific, and adapt them to their needs or develop a new framework based on the key competences that focuses on the tasks and competences in a digital government in a bottom-up way. Competence frameworks typically distinguish different levels of proficiency for each skills area, for example, beginner, intermediate and advanced levels. If sufficiently detailed and structured, competence frameworks can directly be used as a basis for the design of skills assessments.

The focus of competence frameworks can either be core digital skills and knowledge, technical digital skills, or the specific competencies required in a digital-era government (see Table 2.1). Frameworks focusing on core digital skills generally describe the skills that individuals need for certain tasks. This may include some 'hard' digital skills, such as creating digital content, as well as socio-emotional skills linked to the use of technology, for instance, digital collaboration. An example is the European Digital Competence Framework (DigComp).

Frameworks that focus on technical digital skills are designed to offer a taxonomy for the skills needed in a wide range of digital professions. Examples for skills in these frameworks would be data engineering, supplier management, and user experience analysis. The Skills Framework for the Information Age (SFIA), and the Digital, Data and Technology Profession Capability Framework in the United Kingdom are both skills frameworks with a focus on technical digital skills.

Lastly, frameworks may be designed to illustrate competencies that are needed at an organisational level. This is the case for the Model of Digital Skills used by the Danish government, which shows the digital competences needed in the civil service based on the core digital functions the government needs to fulfil. Such frameworks may provide an overview of the skills and knowledge that should be represented in government authorities to succeed in the digital transformation.

Table 2.1. Skills frameworks for digital government

Name	Focus	Target	Development	Main application in government
The European Digital Competence Framework (DigComp)	Core digital skills	All individuals	Stakeholder consultation and expert group	Design of policies and programmes To guide upskilling
The Global Skills and Competency Framework for a Digital World (SFIA)	Technical digital skills	All digital professionals	Stakeholder consultation	Human resource management of digital professionals
The Digital, Data and Technology Capability Framework	Technical digital skills	Digital professionals in government	Expert group	Human resource management of digital professionals
Model of Digital Skills used by the Danish government	Skills for digital government	Government authorities	Extensive research and consultation across government authorities	Strategic orientation of training, hiring, and organisational development

Source: OECD elaboration.

The process through which competence frameworks are developed matters for their accuracy and applicability. In many of the good practices featured, the identification of skills for digital government is based on a substantive stakeholder consultation to understand the tasks and requirements individuals, digital professionals, or general civil servants face. Most commonly, the development of a competence framework also involves a step of stakeholder validation, to confirm the relevance and precision of the competence areas it describes. Good frameworks are regularly updated according to changes in the use of technology, or according to organisational priorities.

The following sections describe three competence frameworks in details, the European Digital Competence Framework (DigComp), the Global Skills and Competency Framework for a Digital World (SFIA), the Digital, Data and Technology (DDaT) Capability Framework used by the government of the United Kingdom and the Model of Digital Skills used by the Danish government.

The European Digital Competence Framework (DigComp)

The European Digital Competence Framework for Citizens (DigComp) has been developed since 2010 by the Joint Research Centre on behalf of the European Commission. It aims to help policy makers to plan education and training initiatives to improve the digital competence of specific target groups (Vuorikari et al., 2022[15]). Variations of DigComp exist for consumer, educators, and organisations. The framework is accompanied by guidelines to facilitate implementation.

DigComp was first published in 2013 and has been updated three times since, most recently in March 2022. The revisions reflect developments in misinformation and disinformation, Artificial Intelligence (AI),

remote working and emerging technologies. The framework and its updates have benefitted from extensive stakeholder consultations. The latest version, for example, was revised in twelve working groups comprised of the DigComp Community of Practice. It underwent validation through a public online survey and an international workshop with experts from academia and international organisations. The fact that DigComp is published by an official body and updated regularly through stakeholder consultations helps to ensure that it is robust and fit-for-purpose.

DigComp describes digital competences in five key areas (see Table 2.2.). The first three areas include skills that can be traced back to specific activities and uses, such as information and data literacy, communication and collaboration and digital content creation. The last two areas are "transversal" as safety and problem solving apply to any type of activity carried out using digital technology. Each of these five areas consists of several competences, for example, information and data literacy includes browsing and searching, evaluating, and managing data, information, and content.

Table 2.2. Description of the DigComp framework

1. Area	2. Competence	3. Levels	4. Examples	5. Use cases
1. Information and data literacy	1.1 Browsing, searching, filtering data, information & content	4 overall levels, each with two steps, for each competence	Examples of knowledge, skills, and attitudes for each competence	An employment and an education use case for a specific level in each competence
	1.2 Evaluating data, information, and digital content			
	1.3 Managing data, information, and digital content			
2. Communication & collaboration	2.1 Interacting through digital technologies			
	2.2 Sharing through digital technologies			
	2.3 Engaging citizenship through digital technologies			
	2.4 Collaborating through digital technologies			
	2.5 Netiquette			
	2.6 Managing digital identity			
3. Digital content creation	3.1 Developing digital content			
	3.2 Integrating and re-elaborating digital content			
	3.3 Copyright and licences			
	3.4 Programming			
4. Safety	4.1 Protecting devices			
	4.2 Protecting personal data and privacy			
	4.3 Protecting health and well-being			
	4.4 Protecting the environment			
5. Problem solving	5.1 Solving technical problems			
	5.2 Identifying needs and technological responses			
	5.3 Creatively using digital technology			
	5.4 Identifying digital competence gaps			

Source: Vuorikari et al (2022[15]), DigComp 2.2: The Digital Competence Framework for Citizens - With new examples of knowledge, skills and attitudes, https://publications.jrc.ec.europa.eu/repository/handle/JRC128415.

Competences are assessed along four proficiency levels: "foundation", "intermediate", "advanced", and "highly specialised", according to the complexity of the tasks that an individual can perform. For each competence, DigComp provides specific examples of knowledge, skills, attitudes, and use cases to show concrete applications to employment and education scenarios. For instance, an individual with a foundation level in competence 1.1 ("browsing, searching, and filtering data") should be able to identify information needs and find out how to access information at a basic level and with guidance. The levels and specific examples are useful for the design and implementation of skills assessment exercises and training opportunities, because they allow practitioners to develop the questions for the assessment and the curricula for the training courses.

DigComp has been widely applied in policies targeting investment in the digital competencies of citizens, and several governments in the EU have used DigComp as a starting point to describe the digital competencies of civil servants (see Table 2.3). It has been adapted to map the skills of general civil servants, the staff of public and private employment providers as well as museum professionals. On the back of these initiatives, the projects also implemented training programmes (see Chapter 3), mainly in an online format.

Table 2.3. Applications of DigComp to digital skills of civil servants and public sector employees

Name of practice	Country	Description
Mu.SA: Museum Sector Alliance	Belgium, Greece, Italy, Portugal	Defining the digital competence for new ICT-related job roles of museum professionals and developing training solutions.
ProDigeo	Italy	Using DigComp to provide advanced training for public and private employment service staff, through a specifically designed educational IT platform, using digital and innovative content.
Syllabus	Italy	Mapping digital skills required by all Italian civil servants and delivering a structured training programme.
Renovating training for digital literacy of civil servants	Slovenia	Using DigComp to map digital literacy skills by civil servants, and implementing training programmes to develop their personal growth
Ikanos	Spain	Mapping, developing, and certifying digital competence of the population in general and of specific jobs, including civil servants (through the BAIT certification system).
Training civil servants with e-Learning Courses	Spain	Using DigComp to define digital competences required by public employees and delivering training programmes across the five key competence areas.
Australian Digital Capability Framework	Australia	Adapting DigComp to identify generic digital capability requirements across different occupations in the public service.

Source: Kluzer, Centeno, and O´Keeffe, W. (2020[16]), DigComp at Work. The EU's digital competence framework in action on the labour market: a selection of case studies, https://data.europa.eu/doi/10.2760/17763 (accessed on February 06, 2023); information provided by the Australian Public Service Commission; Department for Public Administration of Italy (2020[17]), Syllabus – Digital Competences for the Italian PA, https://www.competenzedigitali.gov.it/fileadmin//user_upload/documenti/28feb22_Syllabus-competenze-digitali-pa_v2.pdf.

The recent Syllabus project in Italy provides a particularly interesting application of DigComp, because it aims to describe the digital skills and knowledge that all public employees should have to bring forward the digital transformation (Department for Public Administration of Italy, 2020[17]). In July 2020, Italy's Department for Public Administration published the final version of the framework. The mapping excludes basic digital skills that should be possessed by all individuals, such as being able to use a computer or tablet, and the skills of digital professionals in the public workforce. The framework has five areas that cover data and information management, communication, safety, and online services, and the knowledge of the goals and the emerging technologies for the digital transformation (Table 2.4). For each area, there are then either two or three key competences and three levels of mastery ("basic", "intermediate", and "advanced"), each with a detailed description of knowledge and skills. For example, a civil servant with a "basic" level in "managing data, information and digital content" needs to know the difference between data and information and be able to use the internet to search for information.

Table 2.4. Description of the Syllabus framework

Area	Competence	Levels	Knowledge and abilities
1. Data, information, and digital documents	1.1 Manage data, information, and digital content	3 levels for each competence	Description of knowledge and abilities for each level
	1.2 Produce, evaluate, and manage computerised documents		
	1.3 Learn about Open Data		
	2.1 Communicate and share within the administration		

2. Communication and sharing	2.2 Communicate and share with citizens, businesses, and other public administrations		
3. Safety	3.1 Protect devices		
	3.2 Protect personal data and privacy		
4. Online services	4.1 Know the concept digital identity and its use to access digital public services		
	4.2 Deliver online services		
5. Digital transformation	5.1 Know the goals of digital transformation		
	5.2 Know the emerging technologies for digital transformation		

Source: Department for Public Administration of Italy (2020[17]), Syllabus – Digital Competences for the Italian PA, https://www.competenzedigitali.gov.it/fileadmin//user_upload/documenti/28feb22_Syllabus-competenze-digitali-pa_v2.pdf

Using DigComp as a base, the drafting of the Syllabus framework drew on substantial input from experts and stakeholders, including experts from the Italian Association for ICT, law firms and universities. The draft was refined in an extensive public consultation that lasted for two months. Italy's Department for Public Administration co-ordinated the project, and funding was provided through the European Structural and Investment Funds over the period between 2014 and 2020. The consultation process helped to ensure that the skills and knowledge would be fit for purpose, reflecting the tasks that public employees need to undertake daily.

The Syllabus framework was then applied to assess digital skills across different ministries and agencies of the Italian public administration. Employees were able to self-assess their digital skills and had access to training material, while the government departments and agencies received information on the skills gaps in their organisation. These training activities are still ongoing at the time of writing, making it difficult to evaluate the success of Syllabus. As with DigComp, the framework only targets general digital skills. Governments should also consider other skills in the digital transformation efforts, such as advanced digital skills and socio-emotional skills.

A different and more targeted approach at the European level is the European framework for interoperability skills and competences in the public sector (EIFISC). It specifically focuses on the skills needed by civil servants to increase the efficiency of the digital transformation by making services, IT systems and data interoperable. EIFISC comprises 9 attitudes (such as 'result oriented'), 4 values (such as 'contribute to public values'), 6 knowledge areas, and 23 skills areas (including 'collaboration' or 'research skills') (European Commission and Directorate-General for Informatics, 2021[18]). EIFISC is the basis for the training offer by the Interoperable Europe Academy (IOPEU Academy, an educational initiative to strengthen the skills related to interoperability in European public administration. Currently, it consists of 22 online, self-paced Massive Open Online Courses (MOOCs). These courses are specially targeted at public servants interested in interoperability and engaged in digital transformation. EIFISC does not directly link to DigComp but is built on the basis of the European Skills, Competences, Qualifications and Occupations (ESCO) framework. While it includes broad skills and knowledge areas, it is specifically designed with a focus on interoperability rather than the general skills needed in digital government.

The Global Skills and Competency Framework for a Digital World (SFIA)

The Global Skills and Competency Framework for a Digital World (SFIA) has been developed by the SFIA Foundation, a global not-for-profit organisation based in the UK. In contrast to DigComp, which describes general digital skills, SFIA defines the skills and competences required by professionals who design, develop, implement, and manage data and technology. SFIA offers a conceptualisation and language for the skills required in digital professions, for example, in data science, software engineering, computational science, or user centred design. Rather than representing a general set of digital skills, it provides a high

level of detail for skills in specialised digital professions. Frequently used in the private sector, the SFIA framework has also been applied by the Australian Public Service Commission (APSC) to describe the skills of digital professionals in the public service, and to develop an online career pathfinder tool for civil servants in Australia (see Chapter 2).

In 2000, the first version of SFIA was launched and has been updated several times through consultation processes with global stakeholders from business and the public sector. The framework follows a range of principles: it is experience-based, applicable across sectors and organisational structures, and independent of the technology and approach chosen. Currently, the framework is at its eighth version. It consists of a list of more than 120 professional skills, which are described at seven different levels of responsibility. The following table (Table 2.5) provides an example of a skills description in SFIA, for the specific area of "data management" at responsibility level 4. This level of detail makes the framework useful for different human resources functions, including recruitment, skills assessment, training, and strategic workforce planning.

Table 2.5. SFIA example for data management skills

Level of responsibility	Behavioural factors	Description of responsibility level 4	Description of data management skills at level 4
Level 4	Autonomy	Works under general direction within a clear framework of accountability	Devises and implements master data management processes.
	Influence	Influences customers, suppliers, and partners at account level	Derives data management structures and metadata to support consistency of information retrieval, combination, analysis, pattern recognition and interpretation, throughout the organisation.
	Complexity	Work includes a broad range of complex technical or professional activities, in a variety of contexts	
	Business skills	Communicates fluently, orally and in writing, and can present complex information to both technical and non-technical audiences	Plans effective data storage, sharing and publishing within the organisation. Independently validates external information from multiple sources.
	Knowledge	Has a thorough understanding of recognised generic industry bodies of knowledge and specialist bodies of knowledge as necessary	Assesses issues that might prevent the organisation from making maximum use of its information assets. Provides expert advice and guidance to enable the organisation to get maximum value from its data assets.

Source: SFIA Foundation (2023[19]), The Global Skills and Competency Framework for the Digital World, https://sfia-online.org/en.

The Australian Government purchased a country-wide license of the SFIA framework that is free for all Australians to use. The framework is applied by government authorities for workforce planning, recruitment, human resource management, skill recognition and capability development processes related to digital and data professionals in government. SFIA was used as the foundation for a skills accreditation pilot targeted at civil servants in digital roles. The career pathfinder developed by the Australian Public Service Commission (APSC) is based on SFIA. It is an online tool that shows possible career paths for digital roles in Australia, which link to tailored suggestions for learning solutions (see also Chapter 3). The Australian Government is taking an active role in developing the framework further through a representative on the SFIA Board of Governance. Australian users actively submit requests and participate in review activities to ensure it remains relevant and up to date. Other governments can take inspiration from SFIA and the Australian initiatives for designing a framework on advanced digital skills. However, digital government professionals still represent a minority in the government workforce, and public administrations may also want to find ways to map the skills needed by other civil servants.

The Digital, Data and Technology Capability Framework in the United Kingdom

Created in 2017, the Digital, Data and Technology (DDaT) Capability Framework aims to improve the recruitment, retention, and training of digital professionals in the United Kingdom civil service. The DDaT Capability Framework is managed and maintained by the Central Digital and Data Office (CDDO), a unit within the Cabinet Office of the United Kingdom. Among the responsibilities of CDDO is the development of the civil servant's digital capability and the scaling of digital skills. The framework consists of a list of more than 160 skills that are related to digital functions that government authorities perform. These skills can be configured into 43 job roles for digital professionals, which divide into the following six job families (Central Digital and Data Office and Gov.uk, 2023[20]):

- Architecture roles

- Data roles

- IT operations roles

- Product and delivery roles

- Quality assurance testing (QAT) roles

- Software development roles

- User-centred design roles

Each unique digital profession within the framework consists of different individual skills, at four levels of proficiency. The framework includes a description of the main tasks and objectives that are linked to each digital profession, as well as the levels of seniority and job grade it is often performed at within the civil service. Table 2.6 illustrates the framework at the example of the "data architect" job role.

Table 2.6. DDaT Capability Framework example: Senior Data Architect

Skill	Proficiency level	Description
Communicating between the technical and non-technical	3 (practitioner)	• Listen to the needs of technical and business stakeholders, and interpret them • Effectively manage stakeholder expectations • Manage active and reactive communication • Support or host difficult discussions within the team or with diverse senior stakeholders
Communicating data	2 (working)	• Understand the appropriate media to communicate findings • Shape communications for the audience
Data analysis and synthesis	2 (working)	• Undertake data profiling and source system analysis • Present clear insights to colleagues to support the end use of the data
Data governance (data architect)	3 (practitioner)	• Evolve and define data governance • Take responsibility for supporting and collaborating around wider governance • Assure and integrate data services to meet the needs of multiple business services • Work proactively to ensure the organisation designs architecture that considers data
Data innovation	2 (working)	• Understand the impact on the organisation of emerging trends in data tools, analysis techniques and data usage
Data modelling	3 (practitioner)	• Produce relevant data models across multiple subject areas • Explain which models to use for which purpose • Understand industry-recognised data modelling patterns and standards, and when to apply them • Compare and align different data models
Data standards (data architect)	3 (practitioner)	• Develop and set data standards across multiple subject areas • Act as the escalation point for breaches of data standards and make recommendations about how the organisation should resolve them
Metadata management	3 (practitioner)	• Design an appropriate metadata repository and present changes to existing metadata repositories

		• Understand a range of tools for storing and working with metadata • Provide oversight and advice to more inexperienced members of the team
Problem management (data architect)	3 (practitioner)	• Ensure that the right actions are taken to investigate, resolve and anticipate problems • Co-ordinate the team to investigate problems, implement solutions and take preventive measures
Strategic thinking	2 (working)	• Work within a strategic context and communicate how activities meet strategic goals • Contribute to the development of strategy and policies
Turning business problems into data design	3 (practitioner)	• Design data architecture that deals with problems spanning different business areas • Identify links between problems to devise common solutions • Work across multiple subject areas, or a single large or complicated subject area • Produce appropriate patterns

Source: Central Digital and Data Office; Gov.uk (2023[21]); Digital, Data and Technology Profession Capability Framework; https://ddat-capability-framework.service.gov.uk/ (accessed 19 September 2023).

CDDO relies on inputs from HR professionals, digital teams, and digital professionals across the government to request changes to the framework to ensure that it is fit-for-purpose. Since March 2022, a Capability Framework Design Council (CFDC) operates to decide on how to prioritise changes to the framework. The Council consists of digital experts and senior officials across the UK government.

The DDaT Capability Framework provides a tool for workforce planning related to digital capacity. Since it is targeted at individual digital professionals, it can be used as a reference for hiring, career progression, or skills assessment and development. The framework is very similar to SFIA (see above), with a focus on certain job roles related to the use of technology and data. Designed for the public sector, however, the DDaT Capability Framework helps standardise digital roles across government authorities and map out consistent pathways for career development in these professions. Another innovative feature of the framework is its governance mechanism whereby professionals from across the civil service are asked to provide feedback and suggestions online to keep the framework up to date, which are then discussed by the Capability Framework Design Council. As the SFIA, the DDaT Capability Framework is not designed to facilitate the development of digital skills of the larger civil servant workforce beyond digital professionals.

The Model of Digital Skills by the Government Digital Academy in Denmark

Following its creation in 2018, the team of the Government Digital Academy in Denmark (*Statens Digitaliseringsakademi*) developed a comprehensive model to identify the digital competences required in government. The model is based on an extensive consultation process across different government entities, to identify the skills that are needed to fulfil core digital government functions. Rather than detailing specific advanced digital skills, it describes the skills that should generally be represented within digital government organisations. The purpose of the model is to create a universal framework for good digital government, developing a common language on skills for digital government and enhancing co-ordination across ministries and government agencies at the national level. A similar framework has been developed by Local Government Denmark (*Kommunernes Landsforening, KL),* the association of Danish municipalities, for the specific skills required in municipalities. Both frameworks take the shape of a 'skills wheel' that is practice-oriented and focuses not purely on digital skills but rather the competences needed to work in an environment shaped by the digital transformation.

The Danish Model of Digital Skills was conceived following a structured bottom-up approach. The process of defining skills categories relied on expert interviews and a broad involvement of more than 35 different government authorities which contributed to the creation of the model. In the consultation process, the researchers of the Government Digital Academy identified a range of technology trends. They also developed prototypes for central government employees, adapted to eight different generalist roles. In workshops that included people within government who work in one of these roles, participants were asked to define which skills they need in their function, and to narrow down a comprehensive list of competences.

This extensive consultation was at the core of the approach to develop a framework that is representative of the distinct areas of government responsibility, and that considers the distinct functions, duties, and size of different government authorities.

The skills needed by an individual civil servant may depend on their specific role, tasks and responsibilities, and each civil servant would only need a subset of the models' skills. The model in its entirety, therefore, describes the set of competencies that should be represented at an organisational level within each digital government authority (Figure 2.1).

Figure 2.1. Danish Model of Digital Skills
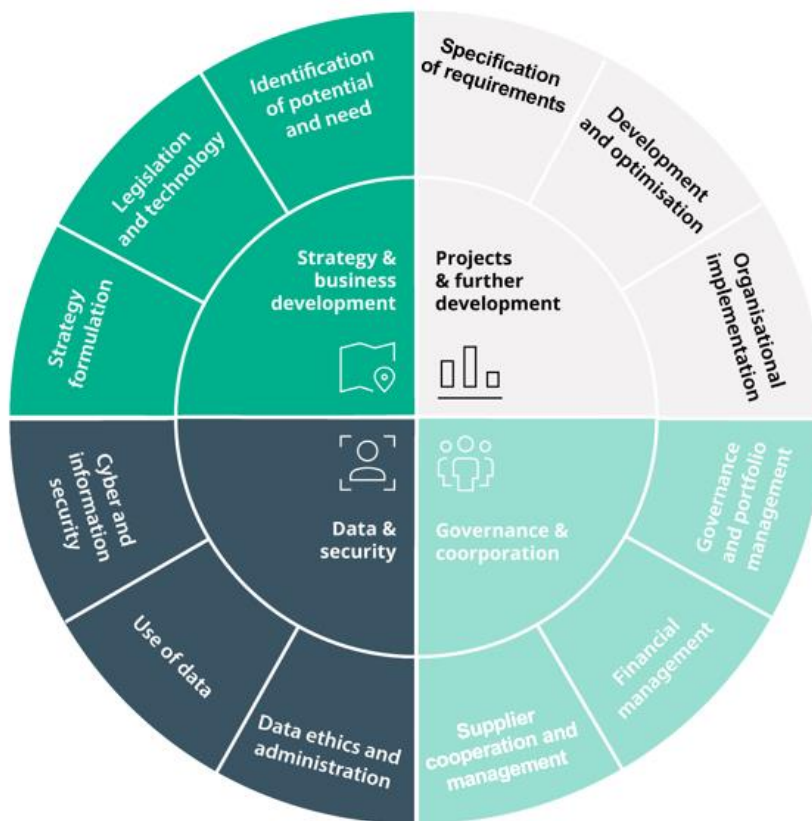
Source: Danish Agency for Digital Government (2022[22]), Government Digital Academy, https://en.digst.dk/policy/government-digital-academy/ (accessed December 12, 2022).

The model identifies four main areas of digital competencies for the Danish central government: (i) strategy and business development, (ii) projects and further development, (iii) data and security, and (iv) governance and co-operation (Figure 2.1). Each of the four main categories of skills are divided into 12 subcategories that contain 32 unique skills. All the areas, subcategories and unique skills are further described and explained in detail (Danish Agency for Digital Government, 2023[23]). Next to digital skills such as "use of data" or "cyber and information security", the model also features skills that are predominantly socio-emotional, for instance, skills related to "governance and co-operation" when implementing and managing digital technology in government. The following table shows the main categories, subcategories and unique skills defined by the Danish Model of Digital Skills (Table 2.7).

Table 2.7. Skills areas and subcategories of the Danish Model of Digital Skills

Main skills categories	Skills subcategories	Unique skills
Strategy and business development	Strategy formulation	1. Formulate strategies and action plans 2. Determine financial implications and potentials
	Legislation and technology	3. Ensure the link between legislation and digitalisation 4. Know the potential of new and existing technologies 5. Know the common public IT solutions and digital public architecture
	Identification of potential and need	6. Involve users and stakeholders by continuously identifying and testing needs 7. Determine the digital potential of the core public functions 8. Map and model business processes 9. Integrate business and IT
Projects and further development	Specification of requirements	10. Formulate user stories, acceptance criteria and requirements specification 11. Use, evaluate and implement different forms of tenders and contracts 12. Assess implications for administrative law
	Development and optimisation	13. Be able to implement government IT projects 14. Ensure the quality of digital solutions 15. Apply relevant development and operational methods 16. Be able to further develop and optimise operations
	Organisational implementation	17. Practice change management 18. Ensure continuous operation
Data and security	Cyber and information security	19. Act cyber safely 20. Act in accordance with GDPR 21. Acting in accordance with ISO 27001
	Use of data	22. Use data to develop core public functions 23. Create an overview of data and data flows
	Data ethics and administration	24. Know ethical issues and assess legal issues when working with data
Governance and co-operation	Supplier co-operation and management	25. Be able to manage and collaborate with suppliers 26. Know the IT market and be able to assess its offerings
	Financial management	27. Manage IT costs 28. Manage project finances 23. Ensure the attainment of returns
	Governance and portfolio management	30. Map and analyse the systems landscape 31. Manage the IT portfolio through its life cycle 32. Ensure adequate governance, IT organisation and skills

Note: Own translation from Danish.
Source: Danish Agency for Digital Government (2023[23]), Model for Digital Skills, https://digst.dk/media/19945/model-for-digitale-kompetencer.pdf.

Public authorities in Denmark are invited to use the framework to develop the digital skills of their own employees and executives. The framework has not yet been applied to assess skill gaps, however, as in the case of DigComp or SFIA. The Model of Digital Skills also guides the training offer by the Government Digital Academy, which operates within the Agency for Digital Government (*Digitaliseringsyrelsen*) at the Ministry of Digital Government and Gender Equality. The Government Digital Academy offers a variety of training courses that target executives and civil servants with little or no formal qualification in IT. In line with the model of digital skills, it includes training courses on agile methodologies, data management, cyber information and security, and automation (Danish Agency for Digital Government, 2022[22]).

The Danish Model of Digital Skills is unique in its deliberate focus on the skills needed in a digital government. Its point of departure are the core tasks a digital government needs to fulfil. This can support the strategic development towards digital government on an organisational level, as it identifies priority competence areas that governments need for their most important digital functions. The extensive consultation process across a diversity of government institutions and stakeholders makes the framework valuable for strategic workforce planning and organisational development, and also suitable to create a

prioritisation of training areas for civil servants. However, the model is not as detailed as the DigComp and SFIA frameworks, which are more difficult to use as a basis of skills assessments.

Key lessons: identifying skills for digital government

- **Competence frameworks are important for a strategic approach to skills development for digital government.** A dedicated framework or model helps to identify the skills, knowledge, and attitudes that civil servants require to work in a digital-era government and to establish a common language on competences across public authorities. This can help with recruitment, skills assessment, training, and strategic workforce planning.

- **Competence frameworks should be designed according to the skills that are covered, their target group and application.** Public administrations can use frameworks that describe very general digital skills (as does DigComp), the specific skills of digital professionals (e.g. SFIA or the DDaT Capability Framework in the UK), or the skills that should be present in government organisations as a whole (such as the Danish Model of Digital Skills). Frameworks that target digital professionals are often used in human resource management, while frameworks on general digital skills serve to identify skills gaps and design general upskilling policies or programmes. Organisational-level frameworks can guide strategic organisational and workforce development, for instance, to identify priority areas for training.

- **Sound competence frameworks should rely on extensive consultation with civil servants in different government institutions and external experts, and be updated regularly**. The consultations are important to ensure that the skills, knowledge, and attitudes identified are fit for purpose and reflect the main tasks and responsibilities of civil servants in a digital government. The Danish Government Digital Academy, for instance, took a qualitative approach with broad stakeholder consultation to develop a model of digital skills for central government. In the United Kingdom, a dedicated expert council is responsible for updating the DDaT Capability Framework.

Assessing skills for digital government

Systematic assessments of the skills that civil servants need for digital government are not yet very common. Skills assessments aim to measure skills of individual employees in a particular area and compare them against a certain standard, for instance, as defined in a competence framework. The scarcity of skills assessment in government might to some extent be driven by cultural and technical challenges in a public sector context. Governments might find it difficult to internally justify the need to assess the skills of their employees, and they might lack the technical resources in house to conduct or outsource the assessments. Countries that have performed assessments use different methods. In Denmark, for instance, the collaborative development of the Model of Digital Skills by the Government Digital Academy relied on qualitative inputs from human resource staff, civil servants, and managers in different departments about their skills needs. The Academy relied on this information in developing their course offers. Human resource or training departments in other public administrations often also use qualitative or ad-hoc information from different departments to identify training gaps.

Other approaches to assessing skills for digital government rely on self-assessment tools or performance-based tests. Self-assessment tools are typically based on self-reported strengths and weaknesses of employees, but also questions on digital skills, knowledge, and behaviour, while performance-based tests require respondents to perform certain tasks to complete an assignment (Kluzer, Centeno and O´Keeffe,

2020[16]). Self-assessment tools and performance-based tests can support the evaluation of learning opportunities (see Chapter 3). Combining their results with those from tests that are taken after the learning opportunity has taken place can provide an estimate of learning gain. Self-assessment tools and performance-based tests are relatively rare in the public sector. For example, few initiatives that have mapped and developed the digital skills of civil servants based on DigComp (see Table 2.3.) have made use of self-assessment tools. This section presents an example of a skills assessment tool implemented at the National Institute for Social Security in Italy (INPS).

Deep Skills by INPS in Italy

The National Institute for Social Security (INPS) is the main social security organisation in Italy and one of the largest in the EU. INPS stores and processes data of more than 90% of pensioners and workers and serves over 40 million citizens every year, thanks to a workforce of over 23,000 employees. Most recently, the organisation played a fundamental role in helping Italy to navigate the COVID-19 pandemic, by channelling over 44.5 billion euros to approximately 15 million beneficiaries.

Since 2019, INPS has launched a range of initiatives to strengthen the digital skills of its employees. The cornerstone of these initiatives was the "Deep Skills" project, which aimed to assess digital hard skills, digital soft skills, and digital attitudes among the INPS employees. INPS worked with an external provider to identify the skills and attitudes and design a tailored assessment. The list of skills and attitudes was deliberately wide (Table 2.8), ranging from basic IT skills to knowledge networking, because one of the key objectives of the project was to uncover individuals with high digital potential, who could become "digital champions" in future learning initiatives.

Table 2.8. The skills in Deep Skills

Area	Skills
Digital hard skills	Social networks
	Digital payments
	Basic IT skills
	Cyber security
	Cloud computing
	Digital collaboration
	Big data
	Mobile app development
	Artificial intelligence and Machine Learning
	Agile and design thinking
Digital soft skills	Knowledge networking
	Virtual communication
	Digital awareness
	Self-empowerment

Source: Information provided by INPS staff.

The project saw a high-level of participation and engagement among INPS staff, according to the information provided by INPS. Three key reasons may explain this success. First, the list of skills tested was practical and aligned with the expectations of employees, which increased engagement. Second, the assessment was adaptive, meaning that the duration adjusted depending on the levels of skills of the employees. After some background questions, the assessment was administered in three levels of increasing difficulty: if the employees did not pass the first or second level, then they would pass directly to the next set of skills in the framework. Third, the style of the questions was "gamified". Employees were

presented with some "real-life riddles" without a clearly right or wrong answer, which made them less nervous to undertake the assessment. On the back of this project, INPS was able to identify a group of 2,300 "digital champions" that will help in the delivery of future initiatives related to digital skills. The digital champions will raise awareness internally about the importance of strengthening digital skills and will coach employees who might be running behind. This will allow INPS to save resources, by decreasing the involvement of external training providers in future initiatives.

The first two features are always important for governments to consider in building skill assessment tools for civil servants. Linking the tool to a well-defined competence framework and making the assessment adaptive can help increase engagement and produce higher-quality results. Conversely, the effectiveness of gamification techniques in training and skills development is heterogenous (Vermeir et al., 2020[24]). In the case of the skills assessment tools, the choice should be driven by the organisational context and the objectives of the initiative. For example, in a project like "Deep Skills" that aimed to generate a sense of enthusiasm for the digital transformation, the use of gamification could make sense. However, it might prove counterproductive in an assessment that is meant to inform future training opportunities. Employees might perceive the assessment as too "playful" to inform the future scope of their learning activities.

Key lessons: assessing skills for digital government

- **Systematic skills assessments for digital government are still rare.** To conduct skill assessments, public administrations typically rely on qualitative information from different departments. Systematic assessments may be undertaken through self-assessment tools and performance-based tests. These two assessment instruments are most suitable to assess the level of digital skills of a larger number of employees.

- **Self-assessment tools should rely on a well-defined competence framework and be user-friendly.** As in the "Deep Skills" project at INPS, governments should rely on a list of skills that is aligned with the expectations of employees and make the assessment adaptive. This can help increase engagement and produce higher-quality results. Governments can also consider the use of gamification, although its effectiveness depends on the organisational context and the objectives of the assessment tool.

3 Organising and evaluating learning opportunities

Identifying and assessing skills for digital government are only two preliminary steps that governments should take to strengthen skills development of their workforce. The crucial step to foster learning for digital government lies in organising effective learning opportunities. As other employers, governments typically rely on a mix of training and informal learning.

Public administrations most commonly offer non-formal training, which are institutionalised training opportunities in the form of courses, workshops, or guided on-the-job training. Non-formal training consists of structured courses with well-defined methods, schedules, admission requirements, and locations. These learning opportunities can provide participants with a certificate or badge upon completion, but not a nationally recognised qualification. Skills development for digital government can also happen through informal learning, through coaching or mentoring schemes, experiential learning, communities of practice (peer learning), resource centres, learning events with experts in digital technology, or job rotation programmes that allow employees to develop their knowledge and skills. Informal learning is difficult to measure but constitutes a large part of total learning in organisations, and is positively related to overall job satisfaction, and self-related measures of job performance (Noe, Clarke and Klein, 2014[25]; Fialho, Quintini and Vandeweyer, 2019[26]). Only a few government authorities, similar to employers in the private sector, provide formal training on digital skills to civil servants. According to the Eurostat definition, formal training would allow civil servants to obtain a qualification recognised in the national education system and should last at least 6 months (Eurostat, 2022[27]; OECD, 2021[14]).

Once learning has taken place, public administrations can also assess its effectiveness through evaluation. This helps inform the design and delivery of future learning opportunities, allowing to achieve greater impact and value for money. Evaluation can focus on access and outcomes. Governments may target different dimensions, such as the reaction by participants, their learning gain, changes in their behaviour and results for the organisation as a whole (OECD, 2021[14]).

Organising learning opportunities for skills for digital government

Governments typically rely on a mix of training and informal learning opportunities to foster skills for digital government (see Table 3.1). When developing learning activities, public authorities have to consider a range of design choices that concern the type of learning activity, learning formats, target group, incentives for employees to participate, and the institution where learning activities are based.

Table 3.1. Types of learning opportunities for digital government

Type of learning	Definition	Target groups	Example cases
Formal training	Structured training programmes that last at least 6 months and lead to a nationally recognised qualification	Digital professionals, civil servants	AUS
Non-formal training	Structured training in the form of courses,	Executives, digital professionals, civil	AUS, CAN, FRA, GER

	workshops or guided on-the-job training which may lead to a certificate or badge that is recognised within public administration	servants	
Informal learning	Informal learning through coaching or mentoring schemes, experiential learning, communities of practice, resource centres, learning events or job rotation programmes.	Executives, digital professionals, civil servants	AUS, FRA, GER, UK

Note: A detailed description of each learning type and format with a corresponding country example can be found in the annex of the document (Table A.1.).
Source: Adapted from Eurostat (2022[27]) and OECD (2021[14]).

Governments may rely on training and informal learning through a range of learning formats to target different groups. Learning opportunities may be provided face-to-face, online, in hybrid format. Innovation in delivery has led to a range of options for training and informal learning that go beyond the traditional classroom-based course, for instance, through workshop formats, online self-paced courses, hybrid peer learning sessions, or on-site and virtual study visits. Learning opportunities typically target executives, digital professionals, or civil servants more generally. Depending on the target group, the content of learning activities may differ, for instance, strategy and leadership for digital government for executives, advanced data protection for digital professionals, or basic digital literacy and service design for general civil servants who are in a diversity of different (non-digital) roles. Learning opportunities may also rely on different competence frameworks (see Chapter 2).

Public authorities also need to consider the incentives for employees to participate in learning activities. Incentives for participation in learning hinge on the larger performance management system in place in the civil service. Delving into this issue goes beyond the scope of this study. The focus in this paper is on ways in which public authorities can motivate employees to participate in the learning opportunities they have organised. Participation in training is mostly voluntary, but for some short learning content that is considered essential for all civil servants to know, some governments opt to make participation compulsory. To increase motivation and engagement, governments can offer flexible working arrangements, collaborate internally to raise awareness, and reward participation with increased visibility. In the case of more resource and time-intensive training, most government authorities rely on a selection of civil servants who have either shown high performance in the past or have passed an application process.

Lastly, there are differences with respect to the institution that offers training or informal learning. Mostly, training is offered either by existing units dedicated to skills development (e.g. Schools of Government), or public bodies dedicated to digital technology (e.g. Digital Government Units). In the former case, institutions are usually placed at the very centre of government, have a clear mandate for the skills development of the government workforce, and experience with the provision of training. Examples are the Digital Academy within the Canada School of Public Service, or the Federal Digital Academy of the German Academy of Public Administration. In comparison, Digital Government Units are mainly responsible for leading and coordinating the reform of public services design and delivery leveraging the opportunities provided by digital technology in public administration (OECD, 2021[11]; Clarke, 2020[12]). While their main focus tends to be to attract and recruit multidisciplinary teams, some Digital Government Units, including the French Inter-ministerial Digital Directorate (*Direction interministérielle du numérique, DINUM*), also run activities to develop digital skills across government. Irrespective of the institutional set-up, governments frequently offer training in collaboration with external training providers with expertise in a particular area of technology, or digital skills. Informal learning activities, in contrast, are often not organised centrally, but may develop through network effects within or across government authorities.

The following sections present different approaches to training and informal learning opportunities related to digital government that are offered for civil servants in OECD countries.

Training digital talent and empowering leaders in Australia

In Australia, the Australian Public Service Commission (APSC), a central government agency is responsible for ensuring the organisational and workforce capability of the Australian Public Service. In their work on digital skills in government, APSC supports the strategic goal to attract, retain, develop, and deploy a workforce with the digital skills that will help deliver high-quality digital government services. The APSC reinforces the Australian Government Digital Strategy, which looks to "embed digital capabilities and growing the digital workforce to support it", across the approximately 145 000 employees in the federal public service (Australian Government, 2021[28]). The APSC offers a mix of informal learning opportunities, including coaching and mentoring for (female) executives, and different formal training initiatives to allow employees to transition into digital roles (see Table 3.2).

Table 3.2. Approaches to skills development by the Australian Public Service Commission

Learning activity	Description	Type of learning	Learning format	Target group
Emerging Talent Programmes	A range of programmes that enable formal training as part of a scholarship programme. Typically, they target (young) people who enter a part-time work arrangement in an Australian public agency combined with pursuing an external degree or certification in a digital field.	Formal and informal	Scholarship programme	(Future) Digital professionals
APS Digital Traineeship Program	Upskilling and reskilling programme in a digital profession with a blended approach – both on-the-job learning and training courses, with a formal qualification at the end	Formal and informal	Traineeship programme	(Future) Digital professionals and civil servants (that want to reskill and become digital professionals)
Communities of Practice	Online community for mentorship, learning and collaboration, and members-only training and events. Includes an online career pathfinder tool for digital roles in the public service based on SFIA.	Informal	Community of practice, mentoring scheme, learning events	Digital professionals
Mobility pilot	Short-term and flexible mobility opportunities to connect digital talent to workplaces in need of their expertise	Informal	Job rotation programme	Digital professionals
Leading in the digital age programme	Training programme on how to lead the digital transformation and create public value through digital ways of working. Implemented in partnership with Deloitte and Microsoft.	Non-formal	Structured training	Executives
Women in IT executive mentoring (WITEM)	12-month mentoring, and coaching program sponsored by Dell™ that develops women in public service as leaders in senior digital and ICT roles.	Informal	Mentoring and coaching scheme	Executives
Coaching women in digital	12-month online group coaching for women to develop leadership skills in digital related roles within the public sector.	Informal	Coaching scheme	(Future) executives

Source: Australian Government (2023[29]), Emerging Talent Programs, https://www.digitalprofession.gov.au/career-development/emerging-talent-programs (accessed June 26, 2023); Australian Government (2023[30]), Digital Traineeship Programme, https://www.digitalprofession.gov.au/career-development/emerging-talent-programs/digital-traineeship-program (accessed June 26, 2023); Australian Public Service Commission; Digital Transformation Agency (2020[31]), APS Digital Professional Stream Strategy, https://www.apsc.gov.au/sites/default/files/2021-03/digital_professional_stream_strategy_final_accessible.pdf; Australian Government (2023[32]), https://www.digitalprofession.gov.au/career-development/women-digital (accessed June 27, 2023); Australian Government (2023[33]), Mobility opportunities, https://www.digitalprofession.gov.au/career-development/mobility-opportunities (accessed June 27, 2023).

The APSC offers formal training programmes to develop digital talent within the public service to overcome the scarcity of ICT skills in the public service and allow existing employees to transition to digital roles. These programmes are not offered in-house but facilitated through work-and-study arrangements. Under the "Emerging Talent Programmes", work-and-study arrangements are available for individuals who pursue a qualification or degree in a digital field while working in the public service (see Table 3.2). For the APSC, this type of formal training programmes requires collaboration both across different public authorities in Australia as well as training or education providers.

The most recent "Digital Traineeship Programme" is a 12-month programme that allows participants to combine training towards a certificate or diploma with on-the-job learning in the Australian government in a work-and-study scheme. The first cohorts are starting in late 2023. It is designed to facilitate career transitions into digital roles, especially targeted at First Nations peoples, older Australians, women, and former defence personnel. Trainees are employees with an agency of the Australian government in regional or metropolitan areas, which also covers their study fees, and receive mentoring and networking opportunities. Participation in the Digital Traineeship Programme is application-based for individuals, and agencies can register their interest to take trainees. The initiative aims to support people who are starting their career, want to transition to another type of job, or re-enter the workforce to develop into digital roles. Participants typically change their position within the public service when starting the Programme.

In addition to these training programmes, the APSC has also developed a range of support activities targeted at digital professionals. As part of a redefinition of digital functions within the Australian Public Service, APSC developed a career pathfinder online tool based on the SFIA framework (see Chapter 2) that shows the necessary skills for different digital roles and suggests upskilling opportunities according to career goals and the skills profile of individuals (https://aps-career-pathfinder.digitalprofession.gov.au/). In addition, the APSC created communities of practice for the informal learning of digital professionals across the Australian Public Service, which includes opportunities for mentorship, learning and collaboration, and members-only training and events. (Australian Public Service Commission and Digital Transformation Agency, 2020[31]). The mobility pilot is an initiative that creates opportunities for digital professionals to work on projects and tasks in other departments or organisations. While the digital professionals themselves are able to learn on-the-job, the entire team the digital professional is assigned to benefits from peer-learning and may be able to increase their digital capability through knowledge transfers.

Different informal learning activities by the APSC target executives in the public service, to strengthen their role in the digital transformation. In 2017, the APSC, in partnership with the Australian Digital Transformation Agency, a Digital Government Unit, launched a programme called "Leading in a Digital Age". It targeted executives and their role in leading the digital transformation of government, creating public value through digital ways of working, creating an enabling environment, and applying agile ways of working in their teams. The coaching programme was implemented in co-operation with Deloitte and Microsoft. Of the 160 executives that participated in the programme in 2019, ninety-six percent of participants said that they would recommend the programme to others. By 2020, more than 300 senior executives had completed the programme (Australian Public Service Commission and Digital Transformation Agency, 2020[31]), which was under review at the time of writing. The APSC also offers a range of coaching and mentoring programmes targeted explicitly at women in digital leadership roles, for instance, "Women in IT Executive Mentoring", or "Coaching for Women in Digital", which aim to increase the female representation in digital roles and strengthen the leadership skills of participants.

The approach to learning opportunities on digital government in Australia is a mix of formal training and informal learning for different target groups. Formal training is mainly targeted at training (future) digital professionals, while the informal learning offered on behalf of the APSC is targeted at executives, digital professionals, and women in digital roles. The formal training offer by APSC is very innovative given that examples for formal training on digital skills for civil servants are rare both in the private and public sector. The fact that the APS Digital Traineeship and Emerging Talent Programmes, upon completion, provide a

qualification or degree that is recognised nationally, is likely to be an additional incentive for individual civil servants to participate.

Both informal learning and training offered by the APSC seems to target a relatively selected group of people rather than addressing the general workforce. This approach pursues the strategic goal of enhancing digital maturity across the Australian public administration. However, other governments might find it necessary to integrate this strategic focus with a wider effort targeting civil servants in non-digital roles. Institutionally, the central position and the clear mandate of APSC to drive workforce development across different departments and through a range of policy levers can prove a key advantage in this respect.

Supporting civil servants to drive the digital transformation in government in France

In France, different types of non-formal training and informal learning are available for civil servants. A selection of these opportunities is summarised in Table 3.3. They are organised by different institutions of the French government, including the Directorate-General for Administration and the Civil Service DGAFP (*Direction générale de l'administration et de la fonction publique*) with responsibility for the skills development of public servants, and the Interministerial Digital Department *(Direction Interministérielle du Numérique*, *DINUM*), which takes care of core digital functions across government authorities.

Table 3.3. Activities to develop skills for digital government in France

Offer	Description	Type of learning	Learning format	Target group
Advanced Digital Cycle CSNum *(Cycle Supérieur du Numérique)*	Leadership programme of several months on the digital transformation of government with field visits, lectures, workshops, and a study trip.	Non-formal and informal	Structured training, learning events	Executives
Training by DINUM on design, accessibility, user research, and eco-design	Series of webinars and workshops provided by technical experts within DINUM on different topics. Mostly short and self-paced learning units, but also interactive live workshops.	Informal	Learning events	Civil servants Digital professionals
MENTOR platform	An inter-ministerial training platform to develop the digital skills of civil servants (currently under development) with short, self-paced course units on different topics	Non-formal	Self-paced learning units	Civil servants Digital professionals Executives
Female Digital Talent *(Talents Féminins du Numérique),* now called ADA *(Le programme d'accompagnement au développement professionnel des agents du numérique de l'État)*	2.5 day-long coaching programme for female digital professionals to support their professional development.	Informal	Coaching scheme	Civil servants Digital professionals (Future) executives

Source: République Française and IDPDE (2022[34]), CSNum Cycle Supérieur du Numérique, https://www.economie.gouv.fr/files/files/directions_services/igpde/CSNum/CSNnum-2020-plaquetteA4.pdf; République Française (2023[35]), Formations – DesignGouv, https://design.numerique.gouv.fr/formations/ (accessed June 27, 2023) ; République Française (2023[36]), Mentor, https://mentor.gouv.fr/login/index.php (accessed June 27, 2023) ; République Française (2023[37]), ADA, le programme d'accompagnement au développement professionnel des agentes du numérique de l'État, https://www.numerique.gouv.fr/services/ada/ (accessed June 27, 2023).

Most training and informal activities in France target civil servants and executives rather than digital professionals. The French Institute of Public Management and Economic Development (*Institut de la Gestion Publique et du Développement Économique, IGPDE*), for instance, offers the *Cycle Supérieur du Numérique.* The training programme is specifically targeted at senior executives in the French civil service. Its aim is to develop executives' digital skills and attitudes and train them in more agile and project-based

work methods. It aims to raise skills and awareness linked to digital government among participants, provide them with tools and methods they can apply in their daily work, and showcase the impact of digital technology in government. The training programme consists of six 2-day seminars and a study trip abroad, spread over several months. It is open to approximately 40 senior managers each year who lead digital transformation projects in ministries of the French government. Learning formats include field visits, lectures, workshops, and a study trip. It is structured into learning units (see Table 3.4).

Table 3.4. Learning units in the French *Cycle Supérieur du Numérique*

Learning unit	Title	Content
Session 1	Embracing tomorrow	Prospects, challenges, and potential of digital technology
Session 2	Thinking differently	Digital creativity and the practice of design thinking
Session 3	Coding for better decision-making	From prototyping to coding
Session 4	Learning expedition abroad	Visiting a government department, meeting companies
Session 5	Exploiting data	Using open data and big data, data visualisation
Session 6	Taming artificial intelligence	Overview of advances in AI, critical approaches, issues, and impact
Session 7	Successfully transforming your organisation	New forms of organisation, governance, liberated companies

Source: République Française and IDPDE (2022[34]), CSNum Cycle Supérieur du Numérique, https://www.economie.gouv.fr/files/files/directions_services/igpde/CSNum/CSNnum-2020-plaquetteA4.pdf.

Non-formal training is also offered by the Interministerial Digital Department *(Direction Interministérielle du Numérique, DINUM)* to civil servants across the French national government. Created in 2019, DINUM is a Digital Government Unit responsible for co-ordinating the IT functions across the different institutions of the French national public administration. Its mission is modernising the government's IT systems, ensuring the quality of digital public services, creating innovative services for citizens, and providing collaborative tools for the public workforce (République Francaise, 2023[38]). Some of DINUM's activities also aim at the skills development for digital government of the existing workforce (see Table 3.3). It offers workshops or webinars in priority skills areas that such as service design, accessibility, user research, and eco-design, both online and in-person.

DINUM has also developed a coaching programme for female civil servants that work in digital roles, for instance, called *Talents Féminins du Numérique*. The scheme is open to women of all levels of seniority; however, applicants need to present a concrete professional objective for skills development, mobility, or an increase in responsibility. The programme's aim is to help participants detect their potential, support them in their professional development, and build professional networks. The programme offers targeted coaching sessions on 2.5 days in small groups of 6 participants. Since the start of the programme in 2019, 107 women from different ministries have taken part in it. More than 90% stated to be satisfied with the programme after having participated in it, 4 out of 5 identified a positive change in their professional life, and 1 out of 5 experienced a promotion or change in job (République Française, 2023[39]).

A new online training platform called MENTOR aggregates learning content, pools the procurement of new training, and collects training content to make it accessible for civil servants across the French government. The platform is financed through the France Relance, a stimulus package to support the economic recovery after the COVID-19 crisis. Developed by the Directorate-General for Administration and the Civil Service DGAFP (*Direction générale de l'administration et de la fonction publique*), MENTOR categorises different types of learning content into different topic areas, including digital and ICT in collaboration with DINUM, and makes them accessible on one centralised platform. Courses are available in different formats such as self-paced online courses, hybrid trainings with both in-person and remote sessions, or instructor-led fully digital virtual classrooms.

The approach to skills development for digital government in France relies on non-formal training and informal learning offered across multiple institutions. Generally, learning activities are targeted at civil

servants or executives rather than digital professionals. Training programmes such as the French *Cycle Supérieur du Numérique* are relatively resource-intensive and target a small number of participants, clearly favouring intensity over coverage. The underlying assumption is that the impact of innovative leadership practices will trickle down and positively impact the work of their teams and organisations. Training platforms such as MENTOR, on the other hand, might achieve impact through its large coverage. The platform can provide access to a potentially large group of civil servants across different government institutions.

A key question in France, as in other countries, are the incentives for individual civil servants to participate, complete, and put training and learning into practice. Participation in more intensive non-formal training programmes such as the *Cycle Supérieur du Numérique* is usually application-based and aims to attract intrinsically motivated individuals that then become drivers of the digital transformation. Incentivising the take-up of shorter online training might be more difficult, but the self-paced and modular format could help improve participation.

The involvement of multiple institutions requires good coordination to ensure that the learning opportunities offered are coherent, and consistent with overall priorities for the digital transformation of government. However, it could lead to the development of learning opportunities that are closer to the needs of different target groups. DINUM, which coordinates key IT functions, is a competence centre for digital technology and therefore well placed to offer learning opportunities to civil servants. They are in a good position to choose up-to-date learning content that is linked to the most recent developments in the use of technology in government. Other institutions, such as the DGAFP and IGPDE, may be closer to the broader objectives for workforce development in the French civil service.

Developing civil servants' skills for digital government in Canada

In Canada, skills for digital government have become a priority in recent years and were incorporated in the offer of the Canada School of Public Service (CSPS) through the foundation of the CSPS Digital Academy in 2018. The objectives of the Academy are (i) to provide individual civil servants with the skills and mindsets for their day-to-day activities, (ii) to maximise the impact and success of digital services and projects, and (iii) to support the strategic direction of the digital transformation of the Canadian government through skills development. The curriculum aims to support a potential pool of approximately 350 000 federal civil servants in Canada in modernising government operations and deliver better digital services (Government of Canada, 2023[40]). The Steering Committee of the CSPS Digital Academy consists of different government stakeholders, including the Canadian Digital Service, Employment and Social Development Canada, the Canadian Centre for Cyber Security, and Statistics Canada. The Digital Academy also relies on many public and private partners to create and implement learning and training opportunities.

The approach by the CSPS Digital Academy does not rely on a formal competence framework, but a conceptualisation of competences and approaches for digital government, which guides the development of learning content (see Table 3.5). This conceptualisation is based on an in-depth analysis of the tasks of civil servants, and the necessary competences required for their role in a digital government.

Table 3.5. Conceptual framework used by the CSPS Digital Academy

Competences	Skills areas	Type of learning	Learning format
Technical and practitioner skills	User experience and design research	Non-formal training and informal learning	Communities of practice, learning events, and training courses
	Product management		
	Development		
	DevOps		
	Data science and data pipelines		

Collaborative, human-centred, iterative approaches to working	Information security / cyber security	Non-formal training and informal learning	Structured non-formal training courses delivered at scale (self-paced / instructor-led)
	Cloud computing		
	Data and digital literacy		
	Tools and software		
	Open collaboration		Informal learning through learning events
	Incorporating agile and product management practices into teams, particularly virtual ones		Informal learning through resources centres
	Digital era leadership practices		Informal learning through experiential learning in groups

Source: Information provided by the CSPS Digital Academy to the OECD secretariat.

The CSPS Digital Academy delivers a range of training opportunities, which are open to the entire pool of approximately 350 000 federal civil servants in Canada. It offers non-formal training in the form of self-paced and virtual live courses that allow skills development on organisational management, policy development, design, and service delivery in the digital age. The Academy also provides some mandatory trainings in the form of "micro-units" for new government employees, for instance, on cyber security. An example is the "Discover Series", a collection of foundational courses that introduce a digital mindset, skills, and basic digital techniques.

Training courses are generally organised virtually, take place in different course formats and are available both in French and English. The group size for live courses ranges from 20 to 30 participants, similar to a physical classroom. The Digital Academy's courses cover 10 broad topic areas: (1) digital government, (2) product management, (3) artificial intelligence, (4) digital leadership, (5) agile, (6) data, (7) emerging technologies, (8) service design, (9) cyber security, and (10) cloud. Table 3.6 provides a snapshot of structured training courses available for civil servants and executives in the topic area of "data".

Table 3.6. Course content on "data" by the CSPS Digital Academy

Course title	Learning format	Duration
How Data Literate Are You?	Self-paced online training course	<1 hour
A Self-Directed Guide to Understanding Data	Self-paced online training course	2.5 hours
The Role of Data in Digital Government	Instructor-led training course in a virtual classroom	2 hours
Learning Path: Discover Data	Learning path: initial self-assessment and then tailored training content	individualised
Making Data-Driven Decisions	Self-paced online training course	<1 hour
Exploring Data Visualization	Self-paced online training course	<1 hour
Organizing Business Data with Data Modelling	Self-paced online training course	<1 hour
Turning Social Intelligence into Actionable Insight	Self-paced online training course	<1 hour
Big Data Fundamentals	Self-paced online training course	<1 hour
Big Data Interpretation	Self-paced online training course	<1 hour

Source: Government of Canada (2023[41]), CSPS Digital Academy, https://www.csps-efpc.gc.ca/about_us/business_lines/digitalacademy-eng.aspx (accessed June 26, 2023); information provided by the CSPS Digital Academy.

The Digital Accelerator Programme at the CSPS Digital Academy is a good example of applied non-formal training that is offered to entire teams. A trainer accompanies teams with tailor-made learning opportunities along the implementation of a project in a 10-week process. Each team defines a certain project target at the outset. For instance, the Marine Spatial Planning Team at Fisheries and Oceans Canada aimed to create a national database of Marine spatial planning data. The development of competences to enable the success of the project is effectively supported through workshops, group sessions, and coaching along

the project cycle. The first round of the Digital Accelerator took place between April and June 2021 with five teams and 58 participants, while the second round included eight teams with 58 participants. Due to its resource-intensive approach, the CSPS is considering ways to overcome the challenges of scaling the programme. In the future, therefore, the Academy aims to offer additional asynchronous learning opportunities, learning paths for individuals and teams, a lower time commitment through modular approaches and further applied learning opportunities with a coaching element.

The training offer at the CSPS Digital Academy is complemented by informal learning opportunities that help individuals and teams to familiarise themselves with topics such as design innovation, or digital and product management practices. These opportunities are provided through learning events and online resource centres, to make information on technological trends, digital services and data from experts and other government departments readily available. The Digital for Executive programme, for instance, is a learning event hosted once a year in each federal ministry. Another example is the Annual Digital Open Government Forum, or a talk series on the responsible use of AI and biometric technology.

Most of the learning activities at the CSPS Digital Academy are non-formal training courses for the general workforce of civil servants. Some of the training offer is also explicitly targeting executives. They are complemented by opportunities for informal learning that are widely available. With this focus, the skills development by the Academy is contrary to the approach by the Australian Public Service Commission, where the priority has been placed on training for digital professionals. Much of the course offer of the CSPS Digital Academy consists of small and self-paced online training units that are accessible to a pool of 350 000 federal civil servants, with potential to achieve impact through scale and coverage. The Digital Accelerator, on the other hand, is a more resource and time-intensive training designed for selected teams that implement a specific digitalisation project. It is innovative in tailoring learning to entire teams in a very practice-oriented way but is more costly to scale.

The incentives for Canadian civil servants to participate in learning opportunities depend on the type of offer. For certain small training units, for instance, on cyber security, participation is mandatory and expected of everyone. Underpinning this type of training offer is the idea of a minimum level of skills and knowledge that all civil servants should have attained in a digital-era government. The Digital Accelerator Programme, in contrast, has certain application requirements to select the most relevant projects and motivated teams. In the case of the Digital for Executive programme, the CSPS Digital Academy has decided to host the learning event only once a year to increase the appeal of the event. As in other countries, incentivising participation is not entirely up to the institution where learning opportunities are offered, but also depends on the incentives for skills development and the performance management within the respective departments where civil servants work.

The CSPS Digital Academy is situated at the central level of government within an existing School of Government, which gives it a clear institutional mandate for the skills development of civil servants. It works in line with strategic priorities for digital transformation in the Canadian government, for instance, the Digital Standards defined at the federal government level.

Strengthening digital skills of civil servants in Germany

Digital government and digital skills of civil servants have become a growing priority in the German public administration, demonstrated by the 2022 German Digital Strategy. In recent years, different institutions and providers from within and outside government have developed training and informal learning opportunities. The approach taken by public authorities is to increasingly integrate skills for digital government into existing structures for the skills development of civil servants. Table 3.7 provides an overview of different approaches to informal learning and training at a federal level in Germany.

Table 3.7. Learning activities on skills for digital government at a federal level in Germany

Offer	Description	Type of learning	Learning format	Target group
Training offer at the Federal Academy of Public Administration (BAköV)	Training to promote skills for digital government; behavioural training, human resources development, agile coaching, IT, and organizational skills	Non-formal training	Short, instructor-led training courses	Civil servants
Digital journey by the Federal Digital Academy	Leadership programme for digital government, comprises six training days and a reflection day for a group of 15 participants.	Formal and informal learning	Structured training course, coaching scheme, and community of practice	Executives
Coaching for digital transformation by the Digitalakademie	Support for executives in the leading digital transformation.	Informal learning	Coaching scheme	Executives
Digital Peer Group at the Digitalakademie	Small groups of digitally advanced employees supported by external agile coaches in case consultations	Informal learning	Community of practice, coaching scheme	Civil servants Digital professionals
Training platform developed by School of Government & Technology	Website with online learning content on competences for digital government that provides participants with badges and certificates upon completion, offered in co-operation with partner organisations	Non-formal learning	Online course offer	Civil servants
NExT events organized by the NExT association	Conferences, panel sessions, workshops, and meetings on digital administration, and topics including the application of AI, use of data, etc.	Informal learning	Learning events with different learning formats	Civil servants Executives Digital professionals
NExT Communities of Practice	Digital platform for collaboration, information, and resource-sharing on the implementation of digital technology in government.	Informal learning	Communities of practice, resource center	Civil servants Executives Digital professionals
Tech4Germany and Work4Germany by the Digital Service	Job placement programme that pairs digital professionals with civils servants on a project basis	Informal learning	On-the-job learning, peer learning	Digital professionals Civil servants

Source: Bundesakademie für öffentliche Verwaltung (2022[42]), https://www.bakoev.bund.de/SharedDocs/Publikationen/LG_1/Jahresprogramm_2023.pdf?__blob=publicationFile&v=7 (accessed June 26, 2023); Digitalakademie (2023[43]), Die ressortübergreifende #digitaljourney für oberste Führungskräfte ist gestartet!, https://www.digitalakademie.bund.de/SharedDocs/04_Aktuelles/Meldungen/SonstigeMeldungen/23_Digital_Journey/23_Digital_Journey.html (accessed June 26, 2023); information provided by the Federal Digital Academy; Digitalakademie (2023[44]), Coaching in Zeiten der Digitalisierung, https://www.digitalakademie.bund.de/SharedDocs/03_Episoden/Lernreise_07/26_Coaching.html?cms_ref=48d89ea9-8d87-45af-a451-a63b19e83329 (accessed June 27, 2023); NexT e.V. (2023[45]), NExT Netzwerk: Experten für die digitale Transformation der Verwaltung, https://www.digitaler-staat.org/wp-content/uploads/2020/03/NExT_SE_2020.pdf; Digital Service (2023[46]), Fellowships for digital pioneers and change makers, https://digitalservice.bund.de/en/fellowships (accessed June 27, 2023).

The long-standing Federal Academy of Public Administration (*Bundesakademie für öffentliche Verwaltung*, BAköV) offers training opportunities on digital technology in government, while additional institutional capacity dedicated to skills for digital government has since 2021 become part of a dedicated unit at the BAköV, the Federal Digital Academy (*Digitalakademie*). The federal states run their own schools of administration or training centres that offer courses, for instance, on basic digital skills, or IT processes of the government. Some of them are targeted at training for specific subgroups of civil servants, such as public finance professionals or defence personnel.

The BAköV is placed centrally under the Federal Ministry of the Interior and offers different types of non-formal training courses, including courses on digital skills for civil servants from different departments of the federal government. Furthermore, a recent pilot project aims to train agile coaches in public administration, who will then work as multipliers for the digital transformation by offering agile coaching in their own institutions. The Federal Digital Academy (*Digitalakademie*) has the mission to contribute to the

digital transformation in the federal public administration through change management and organisational development, to create new forms of digital collaboration that overcome departmental silos, and to offer new training formats for federal employees and promote inter-departmental learning (German Federal Government, 2022[47]). As their flagship learning offer, the Federal Digital Academy targets executives with the Digital Journey programme that aims to reinforce participants' digital mindset and form a peer network supportive of the digital transformation in public administration. The Academy generally collaborates with other stakeholders to offer learning content. One example is the cooperation with the School of Government & Technology, a non-profit organisation, which develops an online learning platform with modular learning content on topics relevant for the digital transformation of government (see Table 3.7).

An important initiative for informal learning across government in Germany is the NExT association, which was founded by a voluntary network of civil servants in 2018 to accelerate the digital transformation. The goal of the NExT association is to overcome siloed thinking in public administration, offer a community for innovative and like-minded civil servants, and facilitate access to expert knowledge on digital technology (NExT e.V., 2023[45]). The network organises regular learning events, offers communities of practice, provides resources, and fosters collaboration across all levels and organisations of public administration. In panel sessions, workshops, expert meetings, and other formats, NExT facilitates informal learning on recent developments in technology and its application to government. At the time of writing, over 2000 civil servants from 500 different public authorities were part of the network, along with approximately 100 active volunteers. NExT is independent of political parties and not affiliated to a specific public authority but sustains itself through different sources of public funding.

The Digital Service, which was established in 2020 as a Digital Government Unit at the federal level in Germany, also undertakes skills development activities. Through their job placement programmes Tech4Germany and Work4Germany fellowships, they recruit digital professionals externally, and pair them with experts in different Federal Ministries to work on digital transformation projects. These placement programmes may provide opportunities for informal learning on-the-job for digital professionals and allow to multiply knowledge on digital technologies and approaches through peer learning in the respective institution.

Different formats of non-formal training and informal learning are offered across a range of institutions in Germany, even if much of the learning offer is still under development. The target group is mainly the general civil service workforce, but some training focuses on executive leadership and their role in facilitating change towards a digital government. The range of institutions and actors involved may make it difficult to ensure the alignment of the non-formal training and informal learning offer, but allows for testing innovative learning approaches that, if successful, can be institutionalised. Strategic collaboration across the organisations and actors that provide learning opportunities is necessary to bundle resources, even if each institution fulfils, as in the French case, an important function.

The "Digital Journey" is a relatively intensive programme for a small group of executives, with the objective to facilitate the digital transformation across institutions in a top-down manner. Other initiatives, such as the training platform that is currently being built, or the learning activities by the NExT association, aim to achieve change through the potentially large number of civil servants that participate. Systematically incentivising civil servants to engage in learning is an issue in Germany as elsewhere, and much of the existing learning opportunities rely on voluntary participation by motivated government employees.

Learning on digital government in the United Kingdom

The United Kingdom's Government Digital Service (GDS) has taken a leading role in skill development for digital government since its creation in 2011 as a unit of the Cabinet Office, with the mission to "make digital government simpler, clearer and faster for everyone" (Government Digital Service, 2023[48]). It has since grown into a Digital Government Unit with more than 800 product managers, software engineers, designers, researchers, and other specialists. GDS also had responsibility for operating the UK public

sector's Digital Academy between 2016 and 2022. Originally established by the UK Department for Work and Pensions to build the capability of its 100 000 civil servants in 2014, the Digital Academy offered training courses on different topics related to digital government.

GDS has overseen a series of activities to strengthen digital skills for government officials, through a mix of informal learning and non-formal training. The Digital Academy offered non-formal training on topics such as agile methodology, digital awareness, or product management. These training courses typically had a duration of 3-5 days and targeted newly hired civil servants, or civil servants working in digital areas that wanted to upskill. Some trainings also explicitly targeted leadership.

As part of the Digital Academy, GDS established the Empathy Lab, modelled after an equivalent approach at Facebook. The Empathy Lab was a physical testing space for assistive technology in GDS' London office, open to any government or public sector employee. It contained different types of computer equipment, for instance, tablets and mobile phones, but also devices to simulate visual or hearing impairments to test digital services from a user perspective. For the same purpose, seven fictional user personas of different ages, backgrounds, and impairments were created to test government services. While the Empathy Lab was phased out in 2022, its approach to accessibility may have inspired other public institutions. Both the National Health Service Digital (NHS Digital) as well as His Majesty's Revenue and Customs (HMRC) have set up Accessibility Empathy Labs, and offer expertise to create more accessible digital services (NHS Digital, 2023[49]; HMRC, 2023[50]).

Figure 3.1. The GDS Empathy Lab

Source: Government Digital Service (2023[51]), Creating the UK government's accessibility empathy lab, https://gds.blog.gov.uk/2018/06/20/creating-the-uk-governments-accessibility-empathy-lab/ (accessed on February 14, 2023).

As a digital government unit that is close to the implementation of services, GDS has managed to unite a diversity of digital professionals and strategically spread knowledge and skills on the principles of digital

government across the UK civil service (Government Digital Service, 2021[52]). Since the closing of its Digital Academy, some of the activities dedicated to the digital skills development of civil servants have been continued by the Central Digital and Data Office (CDDO), a unit within the Cabinet Office of the United Kingdom.

Two ongoing programmes by CDDO for the development of skills for digital government target different groups of civil servants. First, the 'Digital Excellence Programme' launched in February 2023 is a pilot programme offered in collaboration with Apolitical, Ernst & Young, and the London School of Economics. It aims to support senior civil servants that are not digital professionals in becoming drivers of the digital transformation of government. Two training courses, called 'Building a Digital Culture in Government' and 'Building a Data Culture in Government' are limited to 200 participants each. They are designed as online courses that can be completed at one's own pace within 8 weeks, with three live events in-between (GOV.UK and Office, 2023[53]). Second, the 'One Big Thing' programme is an annual upskilling initiative around a reform priority in which all civil servants are required to participate. The focus for autumn 2023 is data training, which is delivered as a 90-minute online programme, accompanied by additional resources and events. The training is tailored to different levels of skill and experience and can be completed flexibly. The scale of the programme amounts to almost 500.000 training days across the civil service (GOV.UK and Office, 2023[54]).

An important informal learning offer has been created through the establishment of various communities of practice for digital professionals. These communities span across different government authorities to offer a platform for collaboration and information-sharing, with the aim of stimulating informal learning among digital professionals and civil servants with an interest in developing advanced digital skills. Currently, GDS hosts four communities dedicated to design, user research, content, and accessibility, with many more communities of practice across the UK government's digital ecosystem (GOV.UK, 2023[55]). Each community provides resources such as blog posts, and newsletters and offers regular workshops where case studies of digital service transformation projects can be discussed. Members can join a cross-governmental Slack channel, to exchange with other experts.

The approach to developing skills for digital government in the United Kingdom relies, as in other countries, on a mix of training and informal learning opportunities with different target groups and strategies to achieve impact. Some initiatives, such as the different communities of practice, are established for the peer learning of digital professionals. The Digital Excellence Programme by CDDO is designed for a small group of senior civil servants, while the One Big Thing initiative is delivered at scale for all civil servants. Together, these approaches are very complementary, which may be considered a good practice for other governments.

Providing data-driven training in Korea

The Korean government has taken a systematic approach to the education and training of civil servants in the area of digital skills, to support the digital transformation of public administration. The National Human Resources Development Institute (NHI), a government agency under the Ministry of Personnel Management founded in 2016, provides a range of different training and learning opportunities for civil servants. The NHI offers both training through a government e-learning platform as well as regular courses as part of a training curriculum. Training is customised to match different digital capability levels ('beginner', 'intermediate', or 'advanced'), and job roles (e.g., IT officers or general administrative staff) of civil servants.

A part of the learning and training opportunities offered cover general knowledge on ICT, Artificial Intelligence (AI), and big data technology and their use in government. These types of training target general civil servants and may include courses such as 'Understanding Big Data', or 'Living a Smart Life'. One training programme is called 'Digital Literacy Building' and is offered to civil servants across different functions in government. Another important focus of training content is IT management and web development, and IT and cyber security, which is offered to digital professionals.

Building on a longer tradition of e-learning, during the COVID-19 pandemic, the Ministry for Personnel Management established the Talent Development Platform (Ministry of Personnel Management, 2023[56]). The Platform offers an online learning environment that encourages informal learning and on-the-job training through different learning and training resources from the public and private sector. Besides offering learning and training content, it also allows civil servants to share their own content. Experts within government can provide training in their area of expertise through the 'HERO Creators' programme. Civil servants have different ways to digitally participate and interact through the platform, for instance, through a real-time video learning system.

A unique feature compared to other e-learning platforms is that the Talent Development Platform is fed with a series of human resource data, including on individuals' learning history and behaviour, job profiles, years of service, etc. to then provide civil servants with customised training recommendations. For executives and human resource personnel, this big data analysis provides insights on the skills development of employees, which may be used to improve the strategy to strengthen skills for digital government.

As other countries, the Korean government targets training at different groups; digital professionals, general civil servants, or executives, and offers different types of training and informal learning to upskill its workforce. Its approach to customise training through a data-driven approach via the Talent Development Platform is promising to identify well-targeted and relevant training with the right proficiency level for each civil servant. At the same time, data protection and privacy concerns should be carefully considered when using individual-level human resource data.

Key lessons: organising learning opportunities for skills for digital government

- **Public administrations should rely on a mix of training and informal learning opportunities for different target groups to foster skills development for digital government**. Within the public administration, learning opportunities typically target executives, digital professionals, or civil servants more generally. Training is useful for employees to acquire new and specialised skills related to digital government. Informal learning can support employees to better collaborate and exchange knowledge, to learn about recent technological developments, and to improve leadership and soft skills. Several countries have coaching schemes, for example, that target under-represented groups in specific roles, such as women in digital professions. Training and informal learning may be complementary and mutually reinforcing, for example, when civil servants stay up to date on technology applications they have gained skills and knowledge on in non-formal training.

- **There is a trade-off between the intensity and coverage of learning opportunities on skills for digital government**. Given that resources are limited, public administrations need to prioritise achieving impact through offering shorter learning opportunities for many employees, or through more intensive learning formats focused on a selected group. Short, self-paced course content can easily be made accessible online to many people at relatively low cost. However, longer, and more tailored training may support digital government if targeted at a sample of selected civil servants in key roles, as in the case of the Canadian Digital Accelerator programme.

- **Governments can incentivise participation in training and learning in different ways**. To motivate employees to engage in learning opportunities, some provide visible badges or titles upon course completion, or offer flexible worktime arrangements to support learning. Access to certain training activities can be application-based to identify and select intrinsically motivated individuals. Some training courses, for example, an introductory course on cyber security by the CSPS Digital Academy in Canada, are made mandatory across the government workforce. Generally, incentives for training are intimately linked to the system of performance management that public authorities have in place.

- **Learning opportunities are likely to be most impactful if they are integrated into a larger organisational strategy for the digital transformation of government.** Training and informal learning can be designed to support organisational priorities. The Digital Traineeship Programme in Australia, for example, is a 12-month work and study scheme that enables employees to work as digital professionals within government upon completion, with the aim of increasing digital capacity of the public service.

- **Governments can choose between two main institutional set-ups, involving a School of Government or a Digital Government Unit.** Both institutional set-ups have distinct benefits. Schools of Government have a mandate and experience to support professional development across public administration, while Digital Government Units are responsible for the digital transformation of public services and processes and are likely to be at the forefront of the adoption of technology in government. Regardless of the model chosen, in all countries and across institutional approaches, training is frequently offered in collaboration with external providers.

Evaluating skills development for digital government

Evaluating access and outcomes of training for digital government can inform changes and improvements to increase effectiveness. Evidence from the psychology and HR literature suggests that evaluations need to consider multiple dimensions (OECD, 2021[14]). One of the most prominent and influential approaches for the evaluation of training is Kirkpatrick's model, which prescribes looking at four steps: (Kirkpatrick and Kayser Kirkpatrick, 2016[57]):

- **Reaction:** Whether participants participated to learning opportunity and how they reacted or responded, for example if they found it engaging or relevant to their jobs. This may be assessed, through a satisfaction survey at the end of the training.
- **Learning:** What participants have learnt, i.e., which knowledge, skills, or attitudes they have gained. Learning assessments include quizzes that test the knowledge gained or practical tests.
- **Behaviour:** If participants put their learning into practice when they are back on the job. This is typically evaluated through a self-assessment, or the observations made by supervisors at work.
- **Result:** What the impact of the training is on wider organisational goals and objectives.

Each step is harder to measure and requires increasingly sophisticated data collection techniques. The last two steps are particularly complex, because a multiplicity of factors can influence individual and company performance. As a result of this complexity, governments typically monitor the reaction by participants, through surveys and questionnaires. In Canada, for instance, the Digital Academy at the Canada School of Public Service systematically measures course satisfaction and participant feedback after training. In the past, through these surveys, the academy realised that some individuals were not satisfied after the training opportunities, because they did not translate into a meaningful change in how teams worked and co-operated. This insight led the academy to offer trainings targeted at entire teams.

The Danish Government Digital Academy systematically collects feedback from participants after course completion. When a new course is piloted, comprehensive feedback from participants is collected immediately and incorporated before the course is officially released. When training is offered to a group, the team of the Digital Academy also asks about the learning gain of the team.

Some governments have pursued efforts to monitor the learning gain and change in behaviour by employees. Evaluating the learning gain requires knowing the baseline level of skills of employees. Skills assessment before the learning opportunity takes place, through self-assessment tools or performance-based tests, can help in this respect (see Chapter 2). The following section discusses the BAIT certification system in Spain, a skills evaluation tool developed by the CDDO in the UK, a framework to monitor digital capability in Australia, and innovative approaches from the private sector that governments could consider.

Certifying learning: the BAIT system in Spain

The BAIT system in Spain provides an example of the use of tests to assess whether participants have acquired new digital skills from training. As part of the Ikanos initiative launched in 2015, the Basque government developed a new system to evaluate and certify digital competences, in combination with a training programme for civil servants.

BAIT builds on IT Txartela, an established system of certification of ICT competences for citizens and professionals in the Basque Country. It is based on a network of physical test centres that perform a range of skills assessments leading to 97 different certificates. Basque public authorities have incorporated Txartela certifications as a requirement for the entrance into public service. Since 2002, IT Txartela has issued close to 454.000 certificates to individuals. Compared to the total Basque population of approximately 2.2 million, this number underlines the widespread application and recognition of the IT Txartela certification system.

While IT Txartela assesses the ability to use specific software or operating systems, the innovation brought about by BAIT is a focus on general digital skills based on the DigComp framework. Tecnalia Research & Innovation, a non-profit foundation, developed the tool in collaboration with the Basque Institute of Public Administration (Instituto Vasco de Administración Pública, IVAP) and Mondragon University. The training offer and the BAIT certification were conceived to be closely aligned, both founded on the DigComp framework. After the system was piloted on 143 civil servants, BAIT became the main tool for certifying the digital competences of administrative staff in the Basque civil service, and has been made available to individuals outside government (Kluzer, Centeno and O´Keeffe, 2020[16]). Upon successful completion of training followed by the BAIT test, civil servants receive a certification of their respective skill level as part of a 'digital profile', with potential benefits to their career progression.

The BAIT certification system has four main features. First, the tests are carried out through a web platform, but must be taken in a limited time and under supervision in an approved physical centre to ensure compliance with regulations. Second, the tests measure performance in real-word situations based on multiple-choice questions, interactive simulations, or concrete, applied tasks. Questions may require the user to create a new document file, to download and insert an image in the first page, set a given size for the image and save the file (see Figure 3.2). Third, the tests are adaptive, that is, they change the level of difficulty based on user responses to the questions. This makes the overall assessment shorter and less frustrating to complete for users, while providing the same precision in results. Lastly, the information gathered from the tests is used to improve the system itself.

Figure 3.2. BAIT certification test
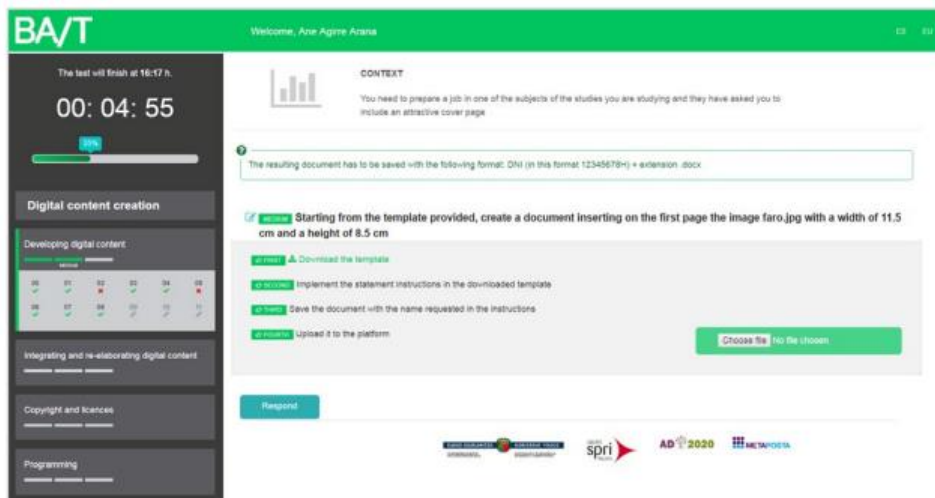
Source: Kluzer, Centeno and O´Keeffe (2020[16]), DigComp at Work. The EU's digital competence framework in action on the labour market: a selection of case studies, https://data.europa.eu/doi/10.2760/17763

In principle, the result of skills assessment and certification is not in itself a complete evaluation of training impact but can give insights about the learning acquired through a particular training. Especially if training and evaluation are closely aligned and rely on the same skills framework as in the case of BAIT, the assessment gives a good indicator of individuals' skills development. The use of real-life examples and the adaptive nature of the test are two important features that should be considered by governments in the evaluation of competences, as well as for skill assessment tools (see Chapter 2). Using real-life examples can allow for verifying whether the skills that have been acquired will transfer successfully to the job context. Adaptive tests can adjust the duration to reflect the level of competences of the individual, which can help improve the user experience. However, conducting the test under supervision in approved

physical centres is very costly. Governments should think carefully about whether this is necessary to ensure compliance, and may consider technological alternatives to identification and supervision during online tests, which have become commonplace during the COVID-19 pandemic (Bilen and Matros, 2021[58]).

Using skills evaluation for performance-related pay in the United Kingdom

In the United Kingdom, the CDDO in the Cabinet Office of the United Kingdom performs a yearly evaluation of skills that is linked to individual pay in digital roles. Across 32 of the largest government authorities, including the Ministry of Defence, Home Office, and HM Revenue and Custom, the CDDO assesses the skills of digital professionals that are specific to their role. Based on the Digital, Data and Technology Capability Framework (DDaT, see above), certain skills are associated with or weighted as more important for a user researcher compared to a software developer in the assessment.

The CDDO has collaborated with human resource functions in different public authorities to implement the skills assessment for digital professionals. They continuously update and improve the assessment. The assessment shows the learning gain of employees, in terms of training or experience. CDDO uses the test results as an indicator for the productivity of individual employees, which can then be used to justify increases in their remuneration. According to the experience of CDDO, the direct link to pay also provides strong incentives for digital professionals to participate in the skills assessment, more so than if the assessment was only applied to target learning opportunities.

This evaluation approach is novel in two ways. First, it shows that an assessment of learning gain can be linked to overall performance evaluation and pay decisions. However, the feasibility of this approach for governments in other countries will depend on how their overall HR framework is organised. Second, it demonstrates that it is possible to conduct a horizontal evaluation across different government departments. General HR functions, nonetheless, often operate autonomously within each government department, which can make it more difficult to achieve a fully a systematic approach to skills assessment and related performance management.

Measuring the impact of larger "digital capability building initiatives" in Australia

The Australian Public Service Commission (APSC) has developed a comprehensive framework to monitor the digital capability of its workforce. The evaluation of learning programmes is only one of the four objectives that are tracked: the other three are the attraction, retention, and deployment of digital talent (Table 3.8). For each objective, the framework monitors a number of indicators which are gathered from multiple data sources. For the evaluation of learning programmes, for example, it measures attendance, learning gain and application of the material to the work context.

Table 3.8. Indicators to measure the impact of digital capability-building initiatives by APSC

Objective	Indicator	Desired change	Data sources
Attract	Proportion of advertisements for digital roles which attract suitable applicants	Increase	APS Jobs
	Proportion of job offers accepted	Increase	
	Proportion of roles advertised but not filled	Decrease	
Develop	Are people attending training?	Increase	APS Academy monitoring and evaluation
	Are people learning something?	Increase	
	Are people applying what they have learned?	Increase	
Retain	What proportion of people stay in an APS digital role for at least 2 years?	Increase	APS Employee Census for intent to leave
	What proportion of people leave a digital role and the APS for a role outside the APS?	Decrease	
	What proportion of these people return to the APS?	Increase	

	Proportion of digital roles readvertised within six months of filling	Decrease	
Deploy	What proportion of people are using their digital skills in their current job?	Increase	APS Employee Census
	What proportion of digital skill gaps are being filled from within the APS via short or long-term redeployments?	Increase	Mobility section of APS jobs

Note: The measurement framework is still under development.
Source: Information provided by APSC.

The APSC combines data from different sources, including the APS Employee Database (APSED), which contains data on hirings, promotions, transfers, and separations of civil servants that agencies provide to the APSC. It measures the number of employees by job role, educational qualification, age group, gender, and other characteristics. As outcomes, it considers the number and type of positions related to digital technology that are filled due to trainings and other capability-building measures.

The implementation of the monitoring framework follows three principles. First, the framework is a means to an end, and not an end in itself – the information should support efforts to strengthen digital skills in the public workforce. Second, the data are gathered at regular intervals to show change over time. The APSC acknowledges that building workforce capability, that is strengthening in-house capacity and skills for digital government, is a long-term process. Third, the framework's indicators are meant to be part of a feedback process that aims to achieve the outcome that the indicator is measuring.

The framework to monitor the digital capability in Australia provides a useful example of how governments could monitor the effectiveness of their efforts to foster digital capability in the public sector, as a tool for strategic workforce management, both for training and recruitment. The framework serves to monitor a complex system through different approaches in order to show its impact (positive, negative, or neutral) on attracting, developing, retaining, and deploying digital talent. While it may not deliver insights on the impact of a particular training programme or learning initiative, it can be useful to monitor the broader development of digital competence in the Australian Public Service, compared to the objectives set out by the government.

Evaluating training in the private sector

Some experts argue that HR departments – public and private – spend most of their resources on the development and implementation of training, and then "hope for the best". A review of training practices in 100 private enterprises across Europe confirms this view (OECD, 2021[14]). Employee surveys, verbal feedback and certification are among the most common methods to assess the effectiveness of training while actual evaluations are very rare (OECD, 2021[14]).

Table 3.9. Type of methods used to evaluate training

Dimension	Methods	Incidence in the sample
Reactions	Verbal feedback	Very common
	Participant survey	Common
Learning	Certification	Common
	Other assessment	Rare
	Competence database	Very rare
Behaviour	Monitoring at work	Very common
Results	Performance data	Very rare
	Customer satisfaction	Very rare

Note: Interviewees were asked if and how they assess if the expected benefits of training materialise; incidence relative to the share of enterprises that evaluate training.
Source: OECD (2021[14]), based on interviews in 100 enterprises in AUT, EST, FRA, IRE, ITA

However, a minority of private sector enterprises have implemented quantitative quasi-experimental methodologies to estimate the impact of training interventions on actual outcomes, which could be well suited to evaluate training programmes on digital skills. An interesting example of this approach is provided by a field experiment in a Dutch multi-national telephone company, undertaken by academics at the University of Maastricht (De Grip and Sauermann, 2011[59]). The experiment aimed to estimate the impact on productivity of a training programme for the agents working in a service centre for current and prospective customers. Quantifying the impact of training on productivity is generally hard because participation in training is positively correlated with work motivation and other personal characteristics. A simple analysis of the relationship between participation and performance risks overestimating the role of the training intervention. To overcome this problem, the participation in training in the Dutch study was made compulsory, and call agents were split in two groups, with one receiving the training well in advance of the other. Comparing the performance across the two groups allowed for estimating the impact of training on individual productivity, measured by the handling time for customer calls.

A similar approach could be applied to evaluating training programmes on skills for digital government and programmes to boost digitalisation more broadly. The use of digital technologies, such as Microsoft Teams or Zoom, allows for collecting data that can be used to derive metrics of performance, if permission is given by individuals. As training interventions are frequently provided asynchronously, individuals can be separated into two groups that receive training at different times. Yet, there are at least three caveats to consider when implementing this methodology in a public sector context. First, identifying the right performance metrics could be difficult. Depending on the role of civil servants, for instance, whether they are in leadership positions or frontline staff who cater to different users, it might not always be clear what counts as "good" performance. Second, it would be important to work with fully anonymised data and clearly communicate that the purpose of the exercise is not to monitor individual effort but understand whether the training programme has worked well or not. Third, implementing evaluation at scale can be difficult depending on the governance across different public authorities, which often have autonomy in matters of human resources. A good start can be to evaluate the results of specific training programmes related to skills for digital government.

Key lessons: evaluating learning opportunities for digital government

- **Public administration can evaluate multiple dimensions of learning initiatives that target skills for digital government and typically monitor participant satisfaction.** Governments can track the reaction by participants, the learning gain, the change in behaviour and the impact of training on individual performance and organisational goals. Tracking the last two dimensions is more complex, given the multiplicity of factors influencing individual and company performance. The findings are useful to understand whether the learning initiatives have been effective and how they could be improved. The reaction and feedback of participants after course completion is the most common dimension that is evaluated and used to improve delivery, for example, at the Digital Academy of the Canada School of Public Service and the Danish Government Digital Academy.

- **To measure their impact, public administrations can measure the learning gain after training activities and introduce evaluation frameworks.** In Spain, the BAIT system provides an example of how government can use a certification system to verify whether training has resulted in a meaningful learning gain. Australia's Public Service Commission has developed an evaluation framework that monitors changes in the digital capability as a result of training and other initiatives across the civil service, combining data from multiple sources. A challenge for implementing evaluation at scale can be that human resources are often not managed centrally, but autonomously by each public authority.

- **Specific evaluation initiatives in the private sector can provide inspiration for the public sector.** Private enterprises do not generally make use of more advanced evaluation methods than governments, but some have implemented quantitative quasi-experimental methodologies to estimate the impact of training interventions on performance outcomes. These could also be well-suited to evaluate training programmes on skills for digital government

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Annex A. Overview of approaches to develop skills for digital government

Table A.1. Types of skills development activities for digital government

Type of learning	Learning format	Description	Target group	Case study	Example
Non-formal training	Non-formal training in courses, workshops, or guided on-the-job training	Shorter, structured training on skills that are relevant for digital government which may take place in person on remotely. Courses can be self-paced or live. Topics of training may include agile methodology, data management, cyber security, user centred design, etc.	Executive leadership Digital professionals Civil servants	GER, AUS, DK, CAN, UK	Structured training path "Data protection in public administration" by the German Academy of Public Administration (BaköV)
Formal training	Formal training programmes	Structured training (mostly for advanced digital skills) that ends with a degree or certification and lasts more than 6 months, e.g., apprenticeships, or graduate programmes. This type of training is typically not offered by governments in-house but supported through work-and-study arrangements and/or scholarships.	(Future) Digital professionals Civil servants	AUS	Digital Traineeship Programme by the Australian Public Service Commission (APSC)
Informal learning	Coaching schemes	Coaching by more digitally experienced colleagues or external service providers on digital service solutions, user centred design, or other topics. Often organized in group sessions.	Executive leadership Civil servants	AUS, FR, GER	Coaching in Services Design within The Digital Transformation Department (DINUM) in France
	Experiential learning	Learning activities that facilitate learning through experience, for instance, on the accessibility of digital services for different target groups. Also includes learning on-the-job, or learning-by-doing (e.g., on a project basis).	Executive leadership Digital professionals Civil servants	AUS, CAN, UK	Empathy Lab of the Government Digital Service (GDS) in the United Kingdom
	Mentoring schemes	Buddy programmes, peer learning or mentoring schemes whereby individuals are paired with and supervised by more digitally advanced colleagues.	Executive leadership Digital professionals Civil servants	AUS, GER	Women in IT Executive Mentoring by the Australian Public Service Commission (APSC)
	Communities of practice	Networks, online forums, or groups for digital professionals or interested civil servants across different public institutions or departments, to facilitate peer learning and information exchange.	Executive leadership Digital professionals Civil servants	AUS, CAN, GER, UK	Communities of practices by the NExT association in Germany
	Resource centres	Online repositories with information, guidance and learning content, e.g., support material to ensure that digital public services are designed accessibly, or online learning platforms on digital skills.	Digital professionals Civil servants	AUS, CAN, FRA, GER, UK	Learning catalogue by the Digital Academy of the Canada School of Public Service (GSPS)
	Learning events	Activities such as workshops, events, panel discussions, lectures, podcasts to raise awareness and inform civil servants	Executive leadership Civil servants	AUS, CAN, FRA, GER, UK	Events organised by the NExT association in Germany, e.g., on

		about technological developments and how they affect public administration. Potentially provide an entryway for further training.			digital collaboration.
Job rotation / placement programmes	Exchanges and secondments typically for digital professionals to work across different projects and units to facilitate on-the-job learning and knowledge diffusion.	Digital Professionals Civil servants	AUS, GER	Mobility pilot by the Australian Public Service Commission (APSC)	

Source: Adapted from OECD (2021[14]), *Training in Enterprises: New Evidence from 100 Case Studies*, https://doi.org/10.1787/7d63d210-en.