Artificial Intelligence
and Digital Transformation
Competencies for Civil Servants

September 2022
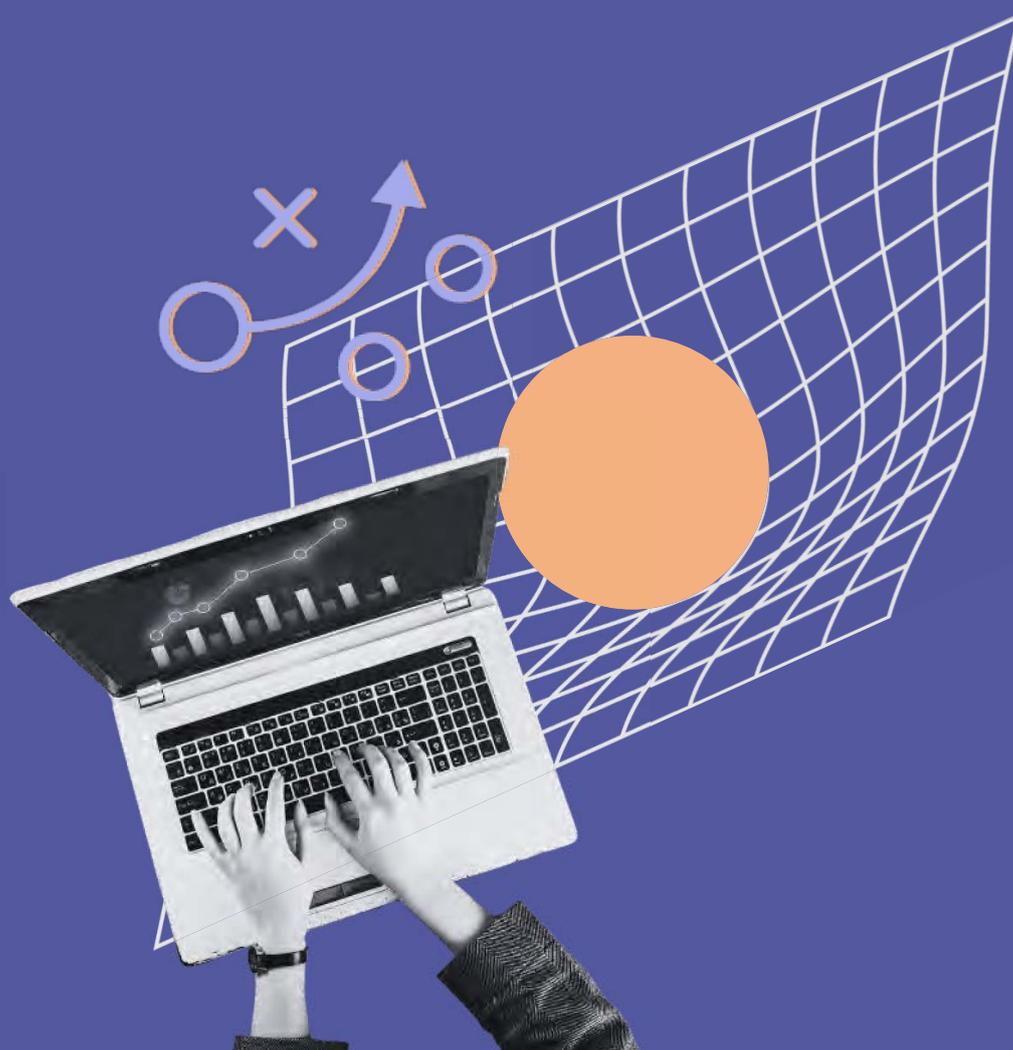
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Acknowledgements

Foreword

Audrey Azoulay
Director-General of UNESCO

Artificial intelligence is yet another revolution in the digital transformation that is changing the face of the world. This rapidly expanding technology has deep implications for the ways we understand and interact with our surroundings, offering tremendous opportunities but also major ethical challenges.

UNESCO is committed to ensuring that technological development benefits humanity as a whole. One way we do this is by setting ethical standards and leading international debate. Last November, our global reflections on the ethics of artificial intelligence culminated in the adoption of a Recommendation by our 193 Member States.

Another way we do this is by promoting international cooperation and collective action to close digital gaps in and between countries. This is the goal of the Broadband Commission, launched by the International Telecommunication Union and UNESCO, which gathers key actors from the public and private sectors to share knowledge, improve connectivity and strengthen digital skills.

For this publication, the Commission's Working Group on AI Capacity Building, co-chaired by UNESCO and Nokia, has focused on the key issue of capacity building for civil servants. I would like to thank the experts, academics and practitioners from across the world who have contributed their insights and expertise.

Indeed, because civil servants design and implement public policies, they must understand and be able to tap into the potential of artificial intelligence and data. In other words, they must be empowered to digitally transform institutions, understand data collection concerns and propose policies that take advantage of the opportunities offered by new technologies, while navigating the many risks and challenges they can bring. Only in this way can we ensure that technology fosters better public services, and more sustainable and inclusive societies.

It is my sincere hope that the findings and recommendations of the Working Group will help governments worldwide capitalize on the digital transformation, with the support of all digital actors. In this way, the report will contribute to the ultimate aim of both the Broadband Commission and UNESCO: to ensure that technological progress goes hand in hand with human progress.

Pekka Lundmark
President and CEO of Nokia

We live in a time of almost unprecedented instability, on multiple fronts. Supply chain disruptions, inflation, labor market gaps, protectionism and educational disparities are all damaging the much-needed post-Covid recovery – and on top of that, the war in Ukraine has threatened the global food supply, the global internet and global security.

These are delicate and fast-moving issues. Good policy making and execution has the potential to improve all of them, not least by creating an environment in which businesses and other actors are empowered to seek novel solutions.

AI can give governments the best chance of making (and civil servants the best chance of implementing) effective, innovative policies that fulfill the UN's Sustainable Development Goals. The basis of good policy making – gathering data, forming an evidence base, forecasting outcomes and analyzing different solutions – directly overlaps with what AI does. The challenge and the opportunity are directly aligned.

This report, which I was honored to co-chair alongside Ms. Audrey Azoulay of UNESCO, outlines the skills and competences that policymakers need to make the most of AI and digitalization.

We found that civil services must commit to challenging old, comfortable habits. They must talk to the right people to understand what digitalization is. They must eliminate risk-averse policymaking models that stifle innovation and impact. And, at a leadership level, they must create a psychologically safe environment in which staff are empowered and trusted.

But the report also demonstrates that AI is not simply an issue for policymakers alone. Those of us who work elsewhere in the digitalization ecosystem – in business, in academia, or in the social sector – must also recognize our roles as partners. As the most basic starting point, we must ensure that the AIs that we develop are appropriate for the public sector to use. Specifically, they must be trusted, transparent and secure, and developed and deployed in collaboration with partners. We must continuously correct algorithmic biases and keep the performance of our products under constant scrutiny.

None of this is impossible. As this report makes clear, using AI to improve the performance of civil services and policymakers may be a challenge, but it is entirely achievable as long as the will, the tools and the research are there.

I would like to thank everyone who participated in the development of this paper. Your work has provided the basis for a genuine consensus on AI capability-building in the public sector. Now we need to take the next step together.

Executive Summary

Digital transformations are continuously changing how people live, work and function in their societies. These applications of technology can be noticed in education, transportation, data storage, communications and healthcare, among other fields.

The development and use of digital technologies is also impacting how governments operate and function. Digital transformation, including artificial intelligence (AI) adoption, has become one of the highest priorities for public organisations. For instance, governments are increasingly trying to digitize their services through technology because of growing public expectations.

But today, some governments are asked to do more: to create an enabling environment in which green, inclusive, equitable digital transformation strengthens democratic societies and economies. Several studies have indeed revealed critical digital competencies gaps in the public sector, including in the Global South. It is therefore extremely important to identify and address those digital transformation gaps and to succeed in the public sector, as a catalyst of change for societies and economies in digital age.

While there is a growing literature on the types of digital competencies that public sector officials need, there is an unmet need to develop comprehensive digital competency frameworks that can:

1. clearly identify the internal challenges a government faces in its digital transformation journey;

2. propose specific competencies that can address those challenges, and:

3. take into account some specificities of the Global South.

The AI and Digital Transformation Competency Framework unpacks the major AI and digital transformation competencies needed in the public sector. The framework aims to provide guidance not just for civil servants, but for international organisations and regional and national actors to support capacity development.

The Artificial Intelligence and Digital Transformation Competency Framework includes three major Competency Domains:

1. **Digital Planning and Design**
2. **Data Use and Governance**
3. **Digital Management and Execution**

The competency framework also includes five complementary Attitudes that enable civil servants to pursue digital transformation effectively:

1. **Trust**
2. **Creativity**
3. **Adaptability**
4. **Curiosity**
5. **Experimentation**

Each Competency Domain is structured around three Proficiency Levels: Basic, Medium and Advanced, and includes an 'AI-specific level' that aims to identify and unpack the major AI elements.

Finally, this report puts forward some general recommendations for all stakeholders as follows:

General Recommendations

1. **Raise awareness** of the competencies needed by civil servants to success-fully implement digital transformation in government and to create an enabling environment for digital transformation in society through improved digital governance

2. Support governments in **contextualization and adaptation** of AI and digital transformation competencies for civil servants based on analysis of capacity-building needs at individual, team, department, and government levels

3. **Enable capacity building** by making learning resources and training content accessible openly accessible that can be used, tailored and adapted at the national level to train civil servants to acquire relevant competencies

4. Support governments in **monitoring the impact** of capacity-building initiatives on digital transformation-related outcomes in the public sector

5. **Foster cooperation** between international, regional and national organisations, including in civil society, that support the training of civil servants, to facilitate knowledge exchange and mutual learning

Recommendations for Governments

6. Governments should take a **holistic approach** when using the framework, first developing a digital strategy at country level, then a digital action plan to strengthen the digital competencies included in this framework

7. Governments should start to **test this framework** by including the development of capacity-building programs and trainings in digital projects and initiatives, while assessing vendor lock-in risks by offers from private and other actors

Recommendations for Academia

8. Universities can leverage this framework to **establish curricula** and interdisciplinary programs for developing AI and digital transformation-related competencies

Recommendations for the Private Sector

9. Private sector can collaborate with governments to **implement capacity-building initiatives**, and by contributing expertise and knowledge based on experience with digital transformation.

Introduction

Digital transformation, including artificial intelligence (AI) adoption, has in recent years become a mantra for public organisations; governments are increasingly digitizing their services using technology to better understand and respond to the needs of the public.

For digital transformation[1] to succeed, governments need to change the way they function, take a whole-of-society, inclusive approach – their governance models, structures and organisations need to adapt to the new challenges and opportunities posed by the development and use of digital technologies. At the same time, governments face new and complex challenges that are difficult to diagnose and predict, which puts additional pressure on the public sector.

Research shows[2] that there are important gaps[3] in digital competencies within governments and that these gaps appear to be wider in the Global South. It is argued that, in many cases, failures of digital transformation projects are due not only to a lack of IT infrastructure and appropriate policy framework, but also to a lack of appropriate digital competencies within government and the difficulty of applying those competencies effectively. As a result, governments worldwide are paying attention to the types of competencies instead of knowledge, skills and attitudes that civil servants need to effectively use digital tools, develop and implement digital transformation projects, and address complex governance challenges.

Scope of the Report

This report presents a competency framework for civil servants on AI and digital transformation, and recommends ways to implement it to support related capacities in government.[4] The research for this report was guided by the following question:

What competencies need to be developed for public-sector officials to effectively design and implement digital and AI transformation initiatives in government, and to create an enabling environment for digital transformation in society?

The report provides an overview of the major digital competencies[5] for public sector officials when dealing with digital transformation. The competency framework provides guidance for civil servants, but also for international organisations and research centers to develop curricula and provide a basis for the development of action plans and strategies on digital competencies (see Recommendations).[6]

This document does not aim to undertake an in-depth diagnostic assessment of capacity gaps in gov-

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1. In this publication, digital transformation is understood as the process of accelerated development and pervasive use of digital technologies that generates new opportunities and challenges for sustainable development. In this specific context, it also refers to "the process of using digital technologies to create new – or modify existing – work processes, the culture of an organization and, at the highest level, a country's digital enabling environment (policies and regulation)."

2. Dener, Cem; Nii-Aponsah, Hubert; Ghunney, Love E.; Johns, Kimberly D. GovTech Maturity Index: The State of Public Sector Digital Transformation. (The World Bank, 2021).
   https://openknowledge.worldbank.org/handle/10986/36233.

3. The OECD Digital Government Index highlights that talent gaps remain, and that the absence of skills among digitally savvy civil servants can hamper their effective and coherent implementation of digital government policies, and that this is blocking progress. The World Economic Forum also reports that skill gaps in local labor markets, and the ability to attract the right talent, are the biggest barriers to the adoption of new technologies (World Economic Forum, 2020).

4. The report has been developed through literature review, key informant interviews (KIIs) and a consultation process.

5. See definitions of digital competencies, which go beyond the use of technology, in the glossary.

6. The framework provides civil servants with competencies as a 'menu of options' that can support digital transformation and digital governance initiatives through further contextualization based on the needs of the government.

ernments, or to analyze the underpinning elements at societal level that also influence AI and digital competencies, such as having the appropriate information and communication technologies (ICT) infrastructure.

Target Audience

The target audience of this report includes:

- **Senior civil servants** in the executive branch of government (policymakers, i.e. directors, managers) that drive the digital transformation agenda and digital governance initiatives. This framework should be used as a 'menu of options' that illustrates the major competencies needed for digital transformation to succeed.

- **Mid-level managers and civil servants** that are involved in digital transformation projects and digital governance initiatives. Although the framework advocates that all civil servants, regardless of their role, should acquire a basic knowledge and understanding of the competencies presented in the report.

- **Individuals** from international organisations, the private sector, academia and civil society who work on public-sector digital-transformation initiatives.

Organisation of the Report

The report is organized as follows:

1

The first section presents the framework, which is divided into three competency domains.

2

The second section discusses the challenges and opportunities of digital transformation in government and anchors the competencies identified in the framework within this context.

3

The third section puts forward recommendations to operationalize the framework.

The report includes boxes and case studies.[7]

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7. While the boxes aim to provide an overview about a subject, case studies are deeper descriptions.

1

Digital Competencies in Government

Digital Competencies in Government

The development of digital competencies has become one of the top priorities of many governments worldwide (European Commission, 2020).[8] There is growing evidence that the success of digital transformation projects in countries and in government rely heavily on the competencies of public sector officials – their capacity to develop enabling frameworks, to anticipate technology trends, to mitigate the ethical- and human rights–related risks, to understand the development of digital platforms, and to work effectively with chief technology officers (CTOs) and third-party vendors.[9] There is increasing demand for positions within government at the intersection between technology, public policy, and human-centered design.[10] In fact, many organisations and governments are advocating for all public-sector officials to develop basic digital competencies.[11] This section briefly discusses the trends related to digital competencies in government and presents the competency framework in its three competency domains. Each competency is accompanied by a justification, definition, proficiency levels and examples.

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8. There is a growing literature on the digital workforce and its impact on the economy, e.g. Digital Skills: Frameworks and Programs (World Bank, 2020): 'A digitally competent workforce can help strengthen the foundational pillars: the installation of the digital infrastructure (for example, connectivity and data repositories) that is most relevant for Africa, the growth of digital entrepreneurship (for example, incubators and e-commerce, that shapes digital industries, and the development and use of digital platforms and digital financial services (for example, e-signatures and digital payments). Moreover, a digitally competent workforce, comprising a large majority with basic digital skills and a critical mass of skilled personnel and advanced specialists, can help to extend the application of digital tools and processes in a wide variety of sectors, such as the informal service sector, agriculture, energy, transportation, health and education, to name a few.' European Commission. "Shaping Europe's Digital Future." Published February 2020. https://ec.europa.eu/info/sites/default/files/communication-shaping-europes-digital-future-feb2020_en_4.pdf.

9. The World Economic Forum also reported that skills gaps in local labor markets and an ability to attract the right talent are the biggest barriers to the adoption of new technologies (WEF, Future of Jobs 2020 Report).

10. https://www.gov.uk/government/collections/digital-data-and-technology-profession-capability-framework

11. For instance, OECD OPSI states that 'for a modern 21st-century public service, officials should have at least some level of awareness of these six areas to support innovative activities in the public sector.' https://oecd-opsi.org/work-areas/innovative-capacity

Digital Competency Frameworks in Government

As an entry point for digital capacity building, many governments, international organisations, think tanks and universities have developed competency frameworks, courses, and syllabi[12] that aim to provide the foundations for training public sector officials on digital transformation.[13]

The competency framework was developed through analysis of the commonalities identified in those frameworks analyzed for this report, and digital-transformation syllabi already developed by training institutions and universities, and an analysis of some of the gaps in these frameworks when mapped to the competencies needed for digital transformation and digital governance initiatives as identified through stakeholder consultations, cases studies and interviews.[14]

The analysis identified the following common competencies in the existing frameworks it analyzed:[15]

- **Digital leadership**
- **Digital literacy**
- **Data-driven approaches**
- **People-centricity**
- **Problem identification**
- **Open data**
- **Artificial intelligence**
- **Iteration-enabled improvements to product and service development**

In addition, some of the emerging competencies that are also fundamental for the digital era include systems thinking (the ability to understand the properties and dynamics of complex systems)[16] and strategic foresight (the ability to anticipate future developments, problems and unexpected events).

The competencies analyzed as part of the research for this report[17] can be broadly categorized into three domains matching the set of requirements in digital transformation and digital governance initiatives:

1. **Digital Planning and Design** *including problem identification and agile strategy*
   Concerns the development of a vision for designing and implementing inclusive digital transformation projects or policies, while identifying and better understanding the problems civil servants face in their work related to digital transformation.

2. **Data Use and Governance** *including data-driven policymaking,acquiring basic digital skills, and respecting privacy and security*
   Concerns the development of the understanding that civil servants should have regarding the importance of data (how to use, analyze, share and govern it) as well as its potential risks.

3. **Digital Management and Execution** *including iteration and agile execution*

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12. See the annexes for the list of those sources.

13. Scholars at Harvard Kennedy School state that 'our competencies attempt to define, at the highest possible level, the new baseline skills all public service leaders should have, regardless of their other capabilities, and regardless of their role in public service leadership. The fundamental skillsets and ways of thinking necessary to successfully leverage this new world of data are different from the skillsets demanded in the past.'
https://medium.com/digitalhks/teaching-policy-people-to-code-at-the-harvard-kennedy-school-93dcefc42b7b14

14. See Annex for a summary of the consultations.

15. These are most commonly and frequently mentioned in the documents analyzed by this study.

16. This is a basis for designing digital transformation projects involving work on complex systems.

17. For more information, see the comparative table. https://docs.google.com/spreadsheets/d/1IMwBLpJEWMoKl6frVNo_bvUH3x7k2J3KNouHRGumwL0/

Concerns the need for civil servants to incorporate management practices that enhance the likelihood of success of digital transformation initiatives.

These domains are interlinked and complementary: civil servants need to identify and understand the complexity and interconnectedness of problems they face, to:

- develop adaptable visions and strategies;
- possibly take advantage of data to apply digital solutions; and
- manage and implement the process in a flexible, agile fashion.

The proficiency levels under each competency enable governments to customize and tailor the competencies required by all civil servants, and those relevant only to civil servants performing specialized functions.[18] In this regard, it is important to underline that the literature on competencies in government shows that public sector officials are not expected to be experts on certain technologies, but to:

1. mainly understand new technology trends;
2. have a basic understanding of some
3. leverage these technologies in their work; and
4. provide direction for digital governance initiatives.

For instance, figure #1 shows different areas where civil servants, rather than becoming technology specialists, need to understand the impact of some of these technologies on society and address them through different policy tools.

Figure #1.

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

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

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

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18. The literature review shows that some frameworks try to discuss both. This framework does not use technical and non-technical terminology on purpose – the proficiency levels indeed highlight a progression from basic (less technical) to advanced (more technical). "The OECD Framework for Digital Talend and Skills in the Public Sector." OECD. Published 21 June, 2021.

Structure of the Competency Framework

The competency framework is structured as follows:

a. Three Competency Domains:[19]

1. **Digital Planning and Design**
   This competency domain enables civil servants to understand the complexity of today's problems, anticipate unexpected events, and recognize strategic opportunities to use digital solutiowns and develop strategies and vision.

2. **Data Use and Governance**
   This competency domain enables civil servants to understand the fundamental role and value of data, as well as the inherent risks, and the ability to use, analyze and share data, taking into consideration ethical, privacy and security concerns. This domain is fundamental for civil servants to be able to address governance challenges and meet the public's growing expectations, while at the same time use data effectively and responsibly.

3. **Digital Management and Execution**
   This competency domain enables civil servants to understand innovative project-management and collaboration practices. It involves the application of a new set of working methods, approaches and tools to use data and technology to address complex problems, and to foster new modalities for civic participation in digital transformation and digital governance.

b. Five Attitudes

Five complementary attitudes that enable civil servants to pursue digital transformation effectively. These attitudes are trust, creativity, adaptability, curiosity and experimentation.

c. Three Proficiency Levels

Each competency domain is divided into a set of skills with three levels of proficiency:

1. **Basic**
   Broad understanding and knowledge of a subject and theme and the ability to carry out certain basic tasks related to the subject.[20]

2. **Intermediate**
   Good understanding of a subject and theme and the ability to carry out more advanced tasks related to the subject. Capability to deal with and provide guidance to others on different tasks related to the subject.

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19. As explained in section 2, this framework adopts a comprehensive approach to digital transformation, which goes beyond the mere understanding and use of ICT tools.

20. This framework suggests that all civil servants should have this level of proficiency for all the skills identified, regardless of their role in public-service leadership. The framework does not advocate that all public managers and civil servants should become specialists; rather, it suggests that all civil servants should have a basic understanding of those skills and what they entail.

3. Advanced

Advanced understanding and knowledge of a subject and theme. Demonstration of applied approaches, tools and methods related to the subject and ability to coach other people. Also, the ability to embed the specific skill and related practices across the organisation and to coach others to do so.[21]

AI-Specific

The competency framework also includes AI-specific competencies that aim to identify and unpack the major AI elements: an enhanced understanding of AI (including anticipation of ongoing technological developments), identifying and specifying problems where it is important to use AI technologies to improve services or processes, by also addressing security and privacy concerns.

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d. Examples of Competencies in Action

For each competency and related level of proficiency, the framework presents illustrative examples using a 'persona' within the government.

Note:

i. The competencies are complementary to each other and some strongly overlap (e.g., problem identification is strongly related to people-centricity).

ii. The competencies presented in the framework are not directly aligned to roles, as each competency may apply to several roles. For instance, a developer may need to draw skills from data use (belonging to Competency Domain 2) as well as user research (belonging to Competency Domain 3).

Civil servants need to ***understand the impact of technologies*** rather than becoming technical specialists

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21. At this level of proficiency, the framework also identifies some examples of roles within the government having or requiring this level of proficiency or technical expertise.

Figure #2.

The AI and digital transformation competency framework

Competency areas and skills

Proficiency

Attitudes

AI-Specific

ADVANCED

MEDIUM

BASIC

1. Digital Planning and Design

Problem identification and solutions Identify problems in which digital technology might be part of the solution

Systems thinking Understand how problems are connected in systems

Strategic foresight Anticipate problems and unexpected circumstances

Agile strategy Ability to plan initiatives while remaining flexible and adapting to unexpected circumstances.

2. Data Use and Governance

Digital literacy Understand emerging digital technology and its applications

Data-driven decision-making Mine, analyze and use data in the decisionmaking process of public policies

Open data and open government Capacity to effectively create and use open data

Privacy and security Knowledge of potential breaches and how can they affect government and society

Legal, regulatory and ethical frameworks Capacity to adapt and change existing legislation to emerging technologies. If needed, to create tech-friendly legislation

AI fundamentals Understand AI systems to a basic level

3. Digital Management and Execution

People-centricity Ability to take into high consideration the user experience and needs on digital public policies and technologies (users being both citizens, companies and public servants)

Iteration Learn and accept mistakes as part of the digital project cycle

Agile execution Capacity to formulate technical, logistic and strategic requirements for public digital projects and execute them (including agile procurement)

Digital leadership Ability to develop a vision for digital

Understand the complexity and interconnectedness of problems

Take a holistic and long-term view, and use simple tools to anticipate, identify and solve problems

Master approaches, tools and methods to anticipate, identify and solve complex problems

Identify and specify problems where AI is important, and anticipate future technological developments of AI

Understand and use simple digital tools, and understand the implications of using data

Integrate digital tools into government systems, and understand the concrete implications of using data

Create and edit digital content, exploit, analyze and share data, and develop legal frameworks and systems that take into account privacy and security

Understand AI systems and master knowledge about the latest AI technologies

Understand agile management techniques and collaboration

Make use of simple agile management techniques in designing and developing projects

Understand how to incite, organize and manage the digital transformation process

Master, design and use specific agile management techniques, forge solid partnerships, and develop prototypes

Trust

Creativity

Adaptability

Curiosity

Experimentation

Attitudes

An attitude is a learned tendency or readiness to evaluate things or react to ideas, persons or situations in certain ways, either consciously or unconsciously. Attitudes are underpinned by values and beliefs and have an influence on behavior. These five attitudes will enable civil servants to pursue digital transformation effectively.

Five complementary attitudes that enable civil servants to *pursue digital transformation effectively*

- ○ Trust
- ○ Creativity
- ○ Adaptability
- ○ Curiosity
- ○ Experimentation
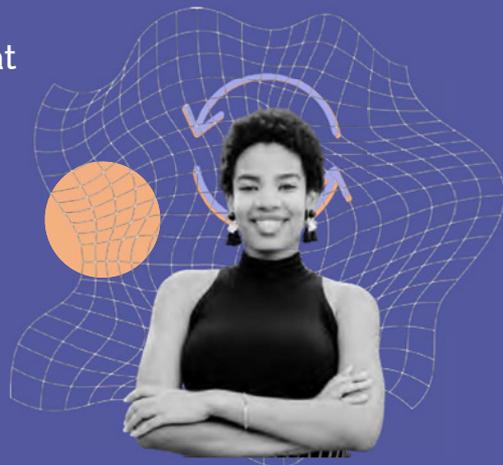
Trust

Justification

When developing and implementing digital transformation projects in the public sector, it is essential to share information and data and to be able to work effectively in teams, for which trust is necessary.

In order to excel in their domains, it is fundamental for organisations to build trust among employees. Employees in high-trust organisations are more productive, have more energy at work, collaborate better with their colleagues, and stay with their employers longer than people working at low-trust organisations. They also suffer less chronic stress and are happier with their lives, and these factors fuel stronger performance.

This attitude also pertains to the potential role that data can have around trust in civil service, as poor analysis and poor data quality can lead to a breakdown of trust.

Description

Trust enables civil servants to:

- communicate and share data or information with colleagues
- communicate honestly while also demonstrating respect
- listen to others
- admit mistakes to others

- Civil servants are inclined to work on a digital solution with colleagues as they share information and communicate effectively with them.

- Civil servants are inclined to build long-term relationships built on trust. They can identify, analyze, manage and monitor relationships with and between stakeholders. They can clarify mutual needs and commitments through the consultation and consideration of impacts.

- Civil servants understand the role that data and AI play in improving (or damaging) trust of the public in the civil service.

Creativity

Justification

Creativity, as an attitude, is key for innovation in both the public and private sectors. It is also an important attitude for civil servants working on digital transformation, enabling them to overcome obstacles related to innovation, iteration and problem solving. It can lead to original thought and knowledge, which have the potential for idea generation.

Description

Creativity enables civil servants to:
- find innovative ideas and solutions
- overcome barriers and challenges
- build on other peoples' ideas

Examples
- Creative civil servants have the confidence to develop ideas and solutions on a digital transformation project. They investigate (digital) patterns and trends to resolve problems creatively, including consulting specialists when required.

- Creative civil servants contribute to the work of their team on a digital undertaking, building on people's ideas and motivating them. They creatively facilitate conflict resolution within teams and manage changes to service, configuration items, organisational change, and associated documentation.

Adaptability

Justification

There is a strong need for civil servants to be able to adapt quickly to unexpected events and circumstances. At the same time, digital projects require them to test ideas and solutions during implementation to meet the public's needs. It has never been more important to adapt policies, deliver cross-agency programs, and work effectively in teams, doing so better, faster, and with tightening budgets. It is a daunting task, even for resolute public servants and mission-driven entities.

Description

Adaptability enables civil servants to:
- adapt and change the focus, approach, and activities of projects by potentially challenging the status quo and established narratives
- work flexibly and recover from failure, which can be quite common in digital projects
- question existing rules and processes when trying to overcome obstacles
- respond quickly to unexpected situations

Examples
- Civil servants with adaptability, working on developing a digital ID system, effectively use an iterative method and flexible approach to enable rapid delivery, while addressing human-rights concerns.

- Civil servants with adaptability can put to use their user-design skills, adapting their own approach quickly as they test the digital solutions that have been developed based on users' needs.

Curiosity

Justification

A very important attitude when it comes to innovation and digital transformation is curiosity. The complexity of challenges, along with the emergence of new technology, push civil servants to explore new approaches, find new solutions, and learn from others, making a curious mindset

very important. Part of being curious is adopting a mindset of continuous learning – being able to absorb and use new ideas and identify limitations.

Description

Curiosity enables civil servants to:

- apply ideas across divergent fields, improve upon the ideas of others, and synthesize ideas
- look for solutions applied in other countries and engage with external stakeholders

Examples

- Curious civil servants facilitate workshops to discover and explore new ideas and approaches on digital transformation, using, for example, large-scale methods such as crowdsourcing and text mining to gain insights.
- Curious civil servants identify innovative solutions to complex (digital) problems by interacting with actors in other countries.

Experimentation

Justification

For digital transformation to succeed, civil servants should cultivate a mindset of openness and experimentation. One of the most important (internal) barriers to public sector innovation is a lack of both experimentation and calculated risk-taking. Hence, experimentation is an important attitude for digital transformation as it enables civil servants (within certain calibrated limits) to take initiative and to find and test solutions. This requires a culture of taking responsibility for making mistakes.

Description

Experimentation enables civil servants to:

- take moderated and calculated risks when designing and developing digital transformation projects
- being open to the possibility of 'failing' and accepting mistakes

Example

- Civil servants manage risks as well as take calculated risks when working on a digital product, allowing them to focus on outcomes and test solutions. They develop ambitious visions and strategies. They get buy-in from the organisation and team, and can translate the vision into prioritized and deliverable goals.

Three domains in which civil servants need to acquire skills for *digital governance initiatives*

- ○ Digital planning
- ○ Data use
- ○ Digital management
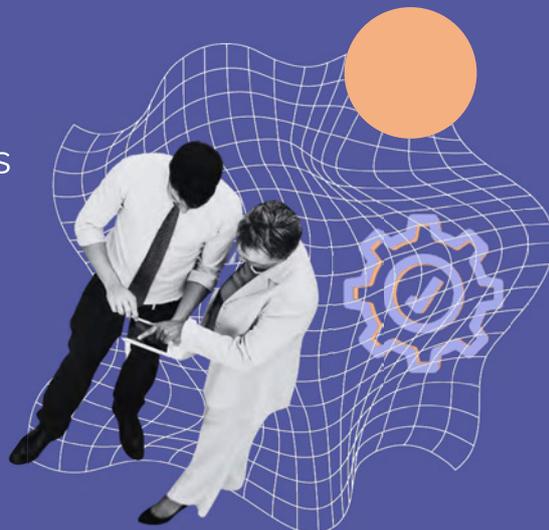
Competency Domain 1

Digital Planning and Design

Digital Planning and Design enables civil servants to understand the complexity of today's problems, anticipate unexpected events and recognize strategic opportunities to use digital solutions and develop strategies and vision.
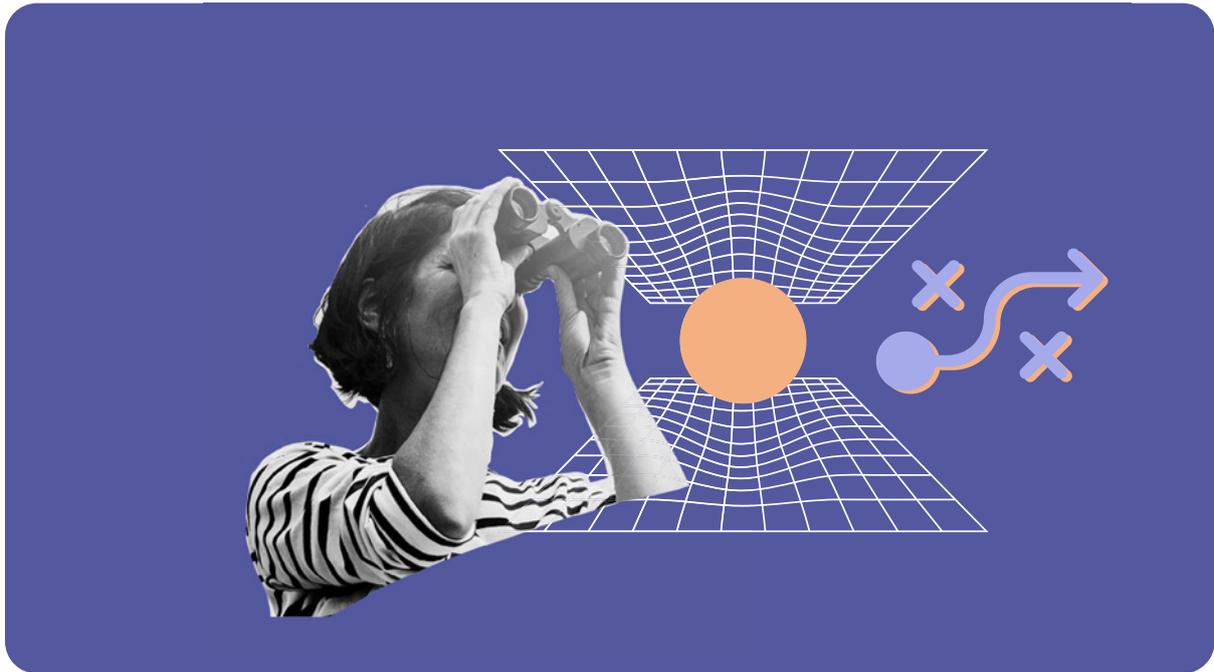
Systems thinking

Justification

The complexity and interconnected nature of problems (including the use of technology) facing governments requires civil servants to understand and approach challenges through the lens of systems thinking; complex problems are non-linear. Public administration systems based on a command-and-control model have proven to function well in stable systems with linear cause-and-effect relationships; however, they do not work well when dealing with complex problems and emerging technologies. A systems-thinking approach is needed in the public sector as governmental work impacts a wide range of stakeholders differently.

Description

Systems thinking is about:

- understanding and being aware of the complexity of problems
- understanding the level of interconnectedness of problems and solutions; solving one problem within a system will influence other elements as well

Links to Other Competencies and Attitudes

This competency is related to **adaptability** and **curiosity**, as civil servants need to be open to new and diverse ideas, and to doing things in new ways.

Proficiency Levels and Corresponding Examples

Basic Level
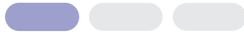
Demonstration of:

- understanding and awareness that the problems governments face are complex and interrelated, and that digital transformation is a multifaceted process

Examples

- Civil servants have a basic understanding of what systems thinking means and its importance. For instance, they understand that a digital project on reducing waste should look at waste as a 'system'; and so investigating different elements of the system, such as industrial packaging, consumer habits, government controls, etc.

- Civil servants have a basic awareness of the importance of assessing options (and their implications) in order to identify solutions, always keeping the broader perspective and impact in mind, and appreciating how current, short-term outcomes are driven by long-term strategy and vision.

Intermediate Level

Demonstration of:

- understanding the complexity of problems and the interconnectedness between them

- using available information from varying sources or consulting others as necessary

- taking a holistic and long-term view of challenges and opportunities

Examples

- Software developers in the government can build and test simple interfaces between systems, or work on more complex integration as part of a wider team.

- Civil servants working on a project related to mobility can look at it as a 'system' by engaging with various stakeholders (e.g. municipal traffic planners, health researchers, micromobility startup representatives, etc.) to identify possible entry points where solutions could be used.

- Civil servants can participate in a 'sense making' exercise, which aims to illustrate the strong linkages between work in one department and in other departments.

Advanced Level

Demonstration of:

- using and applying a range of tools for systems thinking into policy and project interventions

- understanding and articulating the projected direction of the government, and considering the complexities of how changes might impact people, structures and processes within the department

- evaluating how other government units have implemented a new approach, to gain perspective on how doing something in a new way can increase productivity or reach goals faster

- fostering systems thinking throughout the organisation

Examples

- Specialists in a government innovation lab can deploy systems-thinking (i.e. sense-making) tools to show the interconnectedness of subjects, e.g. they can show how the portfolio of digital projects in the organisation is strictly connected (the digital initiatives are linked to each other as they identify similar and complementary problems).

- Civil servants use systems-thinking approaches such as the 'vanguard method'[22].

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22. The Vanguard approach to systems thinking is a methodology for change and improvement that engages the organisation. Any change is based on an understanding of demand from an "outside-in" or customer perspective, identification of the value work, adoption of relevant measures, then designing out waste within key processes. People who do the work must be engaged in these activities. The results: better service, reduced costs and improved morale. For more details see https://www.taylorfrancis.com/books/mono/10.4324/9781482278446/freedom-command-control-john-seddon

Demonstration of:
- combining systems thinking not just in terms of the service, but also in data-related aspects. This requires understanding which data are being used for AI services, from where they come, their risks and limitations, and how to ensure they are high quality
- having a strong awareness of which components build up the AI system, and what is the desired output of the AI

Examples
- Civil servants acting as data engineers could be responsible for the design and construction of data flows for AI projects. To do so, data engineers need strong knowledge of data integration, data modeling and data management to ensure the data used in AI projects are of high quality.
- Civil servants should be capable of reflecting on the consequences of the application of AI technologies in a complex social setting. In doing so, they should be capable of identifying negative feedback loops of the AI system and the environment in which it operates

Problem identification and solutions

Justification

Good practices in developing projects, programs and policies require civil servants to understand a problem before developing solutions. This is key for identifying entry points for specific problems and appropriate solutions.

Description

Problem identification and solutions is about:
- understanding the problem in depth and being able to know and use tools and approaches for identifying the root cause of the problem by using simple tools (e.g., problem trees) incorporating the perspective of the user and the people with lived experience of the problem (i.e., through ethnographic research techniques)
- applying critical thinking to solve a problem

- deciding on courses of action and implementing the solutions developed to overcome a problem and constraints

Links to Other Competencies and Attitudes

This competency is strongly related to people-centricity and iteration, as it should enable civil servants to understand a problem by interacting with beneficiaries to develop solutions that are tailored to suit their needs. It is also related to creativity.

Proficiency Levels and Corresponding Examples

Basic Level

Demonstration of:
- awareness that the solutions they develop address specific problems faced by the users or beneficiaries of digital services
- understanding that each problem can be unpacked into different sub-problems and can have different entry points for developing solutions

Example
- Directors in the government needing to develop a public financial management project understand how important it is to first focus on identifying and articulating the problems the project should address before thinking about possible solutions.

Intermediate Level

Demonstration of:
- using simple diagnostic techniques to understand problems and find their possible causes
- using simple techniques for developing innovative solutions
- awareness of how new digital technologies can address problems

Example
- Civil servants conduct a detailed analysis of

the problem before assuming that it can be addressed by a technology.

Advanced Level

Demonstration of:

- mastering and applying specific approaches and tools to unpack problems and identify root causes
- applying ideation methods and techniques
- examining how new technology can address persistent problems
- coaching team members on how to identify problems and root causes

Example

- Mid-level managers in the Ministry of Justice working on a project on access justice by deploying a digital platform can deploy a problem-driven iterative approach (PDIA) to:
  - *identify the underpinning problems;*
  - *identify possible entry points to the problems; and*
  - *develop a digital platform based on the needs of the public.*

AI-Specific

Demonstration of:
- ability to identify and specify problems where AI technologies can provide a solution
- understanding of the underlying datasets available and whether they are appropriate to be used for the purposes of AI
- awareness of the risks of using AI technologies, and ability to develop ways to mitigate them (including understanding the limitations of the application of AI systems, and their use in decision-making and to provide evidence for policy-making)

Example
- Civil servants propose to optimize a process with AI technology after identifying that it is well suited for automation – it is a standardized process and happens regularly – and poses possible risks

Strategic foresight

Justification

The problems civil servants face are complex, of unclear nature, and impact many stakeholders. Strategic foresight helps to anticipate and address rapid change and uncertainty, supports innovation by revealing options for experimentation, and helps in futureproofing by stress-testing existing or proposed strategies. In particular, technological improvements change today's landscape continuously – strategic foresight is particularly important as a way of: understanding how technological trends can impact societies, and developing projects or policies as anticipated in response to them.

Description

Strategic foresight is about:
- developing 'big-picture thinking'
- spotting patterns and trends to understand the strategic drivers of digital transformation and informing decision-making based on them

Links to Other Competencies and Attitudes

This competency relates to trust. For governments hoping to foster a culture of foresight, there needs to be a shift towards learning capture and knowledge transfer with anticipatory thinking occurring at every level of public administration, from front-line service delivery to top-level decision-making.

Proficiency Levels and Corresponding Examples

Basic Level

Demonstration of:
- understanding and appreciating the unpredictability of complex challenges (especially those where technology can play a role) and the frequency of unexpected events and crises
- recognizing that knowledge and practice are not fixed in a constantly changing world
- using simple approaches such as 'horizon scanning' and 'looking outwards' at the trends and drivers that are currently shaping the world, including those within or outside of a given context

- Civil servants participate in a training and acknowledge that strategic foresight could be of importance to resilient policymaking. This could take the form of anticipating developments that can have adverse impacts, or considering the impacts of current and future crises on relevant megatrends and emerging issues. For instance, they understand that by using strategic foresight they could better analyze the role of digital technologies in achieving climate neutrality, reducing pollution, and restoring biodiversity.

Intermediate Level

Demonstration of:

- applying tools and methods to find and understand signals of change in the present, and their potential future impacts
- interpreting data and formulating versions of the future by applying a combination of foresight techniques and practices

Examples

- Civil servants and their colleagues use collective intelligence to anticipate developments and prepare for new opportunities and challenges earlier and more effectively.
- Civil servants understand that the wider digital economy and advances in technology can have an impact on a government context.

Advanced Level

Demonstration of:

- understanding the patterns and trends, especially of big strategic drivers of the digital era
- thinking laterally to apply learnings from other geographies or sectors
- applying tools that can help better anticipate changes that could appear in the future, revealing options for experimentation with innovative approaches, and testing existing or proposed strategies and policies
- developing dynamic policy recommendations that spur action from decision-makers based on

scanning and interpreting data while also understanding the policy impact on populations, social groups such as women or youth, and society at large

- embedding strategic foresight in the entire governance architecture, including policy analysis, engagement and decision-making

Examples

- Directors in government use strategic foresight tools (i.e. scanning the horizon for emerging changes, analyzing megatrends, and developing multiple 'what-if' scenarios), anticipating how key emerging technologies could develop, the effects they could have on all spheres of life, and how to seize upcoming opportunities.
- Policymakers working on an education policy use strategic foresight by identifying opportunities and threats that may arise in the coming years and decades, as well as possible strategies to deal with them.

AI-Specific

Demonstration of:

- being aware of the current state of the art solutions available and research of AI technologies, their current capabilities, and limitations, as well as the potential future development of AI technologies
- anticipating future developments of AI technologies, which could be deployed by the organisation
- drafting an AI strategy catered to their own organisation, highlighting key strengths and challenges for using these technologies

Examples

- The Chief Information Officer of a public administration creates an internal AI strategy, which outlines the opportunities and challenges for the organisation when designing, developing, and integrating AI-enabled digital government transformations and AI governance

Agile strategy

Justification

The challenges faced by the public sector are complex and hard to predict. Thus, the public sector should develop a vision that is flexible enough to accommodate changes and revisions during implementation; the shocks of the COVID-19 pandemic, for instance, underlined the importance of adaptive policies, delivering cross-agency programs, and working effectively in teams – and doing so faster and better, often with reduced budgets. This also refers to the necessity of feedback loops in policy cycles to develop more adaptable, flexible government strategies.

By using agile methods, changes can be anticipated at a very early stage or considered by rapidly changing the initiatives project/policy successful and high-quality services/policies can be achieved faster. 71% of organizations[9] have adopted agile planning methodologies, and 60% of those companies increased their profits after doing so.

Description

Agile strategy is about:
- planning long-term visions, plans, projects and initiatives, while considering flexibility and adapting to unexpected circumstances
- adapting rapidly during implementation given unexpected changes

Links to Other Competencies and Attitudes

This competency is linked to the adaptability civil servants need to have when working on digital transformation. It is certainly linked to agile execution as well. However, it focuses on the development of a vision that is flexible, while agile execution focuses on implementation of the vision.

Proficiency Levels and Corresponding Examples

Basic Level
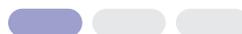
Demonstration of:
- understanding and appreciating the importance of flexibility and adaptability in designing and developing a digital transformation

Example
- Civil servants participate in training and acknowledge that developing a digital strategy in the government requires more flexibility and adaptability than in the past.

Intermediate Level

Demonstration of:
- using simple agile management techniques to design digital initiatives
- understanding the difference between traditional planning (waterfall) and agile planning, and the benefit for public sector to adopt the latter
- breaking down large projects into more manageable tasks, which are completed in short iterations throughout the digital project cycle

Example
- Civil servants work in a team and use simple agile techniques to develop a project by using 'scrum'[23] – they develop a backlog where the team lists all the activities to carry out and they also prioritize with the other colleagues the most important tasks.

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23. For more information on 'Scrum' as an agile methodology, please see: https://hbr.org/2016/05/embracing-agile

Advanced Level

Demonstration of:

- deploying agile strategy techniques and coaching others to do so

- clearly linking the strategy and vision to reduce blocks and barriers to their objectives

Examples

- Agile coaches teach team members in a government department how to use agile continuous planning to estimate multiple sprints of backlog, and uses this estimation to debate priorities and scope.

- Minister decide to use Objectives and Key Results (OKR) to create an agile strategy (objectives are goals, whereas key results are ways to measure them through specific iterative activities).

- Directors in the government deploy the Scaled Agile Framework (SAFe) for incremental planning to review capacity, plan sprints and understand team dependencies.

AI-Specific

Demonstration of:

- applying agile development processes to ensure sufficient early testing of AI

- avoiding a large-scale waterfall project when developing and implementing experimental AI projects

Examples

- Civil servants leading an experimental AI project to explore organisational possibilities identify early in the process that the organisation does not have a sufficient level of readiness for the project, as much of the data needed is not available. Through an agile process, they can adjust or even cancel the initiative before significant costs are incurred.

Competency Domain 2

Data Use and Governance

Data use and governance represents a combination of competencies that enable civil servants to understand the fundamental role and value of data and its inherent risks, and the ability to use, analyze and share it, taking into consideration ethical, privacy and security concerns. This domain is fundamental for civil servants to be able to address governance challenges and meet the public's growing expectations from governments while at the same time use data effectively and responsibly.
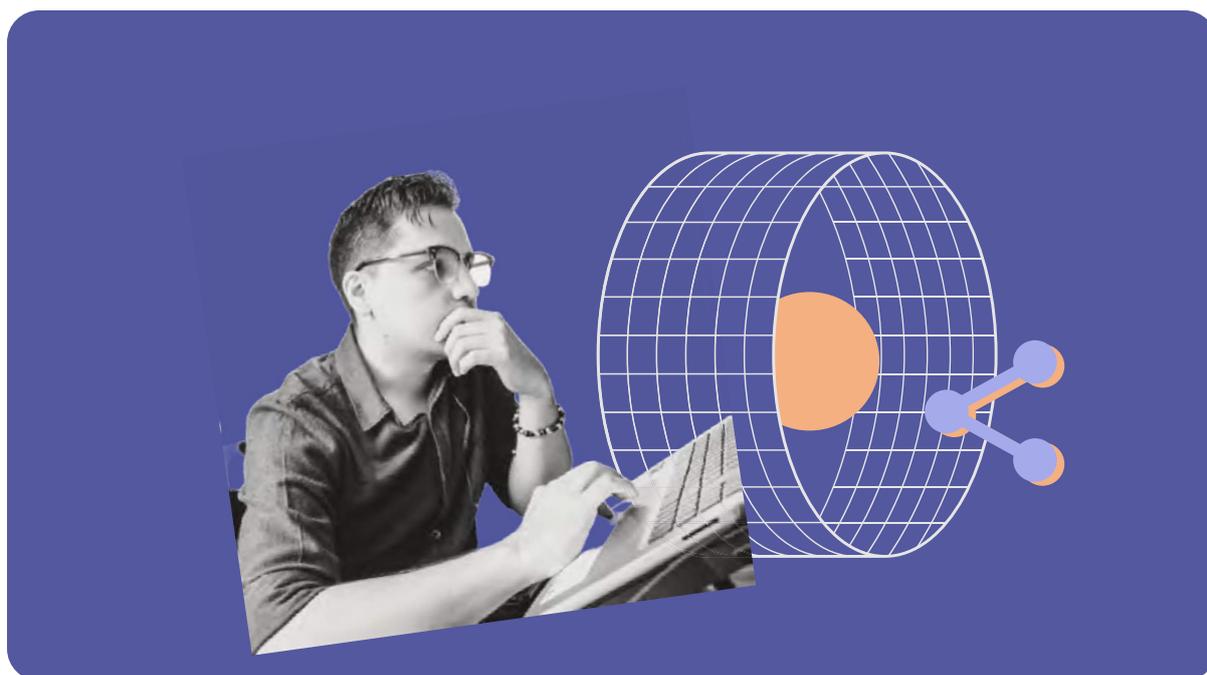
Digital literacy

Justification

Given the disruptive impact of digital technologies in society, governments' role in meeting public expectations, managing increasing pressures on budgets and responding to new policy issues has become challenging, as digital disruption means constant change and rethinking ways of operating to deliver public value in the public sector.

Digital literacy for the public sector has become one of the top priorities worldwide – civil servants need to be able to use ICT tools to improve internal processes, deliver better services, and respond to the public's changing needs. It is also essential for understanding complex, socially relevant phenomena such as global economic and financial interdependence, social inclusion, migration, or climate change.

Description

Digital literacy is about:

- confidently and critically using ICTs to address the needs of the public

- addressing problems through the use, analysis and interpretation of data that measure underlying phenomena

Links to Other Competencies and Skills

This competency is linked to other competencies such as problem identification and solving, data use, privacy and security but also trust and curiosity.

Proficiency Levels and Corresponding Examples

Basic Level
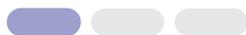
Demonstration of:

- recognizing and understanding the use of established and emerging digital technologies in the public sector
- acknowledging that digital technology facilitates both administrative work inside government and interactions with the public
- recognizing the difference between analog and digital work
- using simple digital tools

Examples

- Civil servants can use a computer confidently, safely and effectively, including turning on the device and entering the account information needed, using software to prepare documents and presentations, create and edit images, audio and video, and navigate web browsers and internet search engines.
- Civil servants understand that data are (or have the potential to be) constantly created through any interaction between a user and a service.

Intermediate Level

Demonstration of:

- ability to instruct others on the use of digital technologies
- explaining the reason and benefits for using digital technologies to improve government processes or service delivery, and advocate that it is required for future government

Example

- Civil servants use and analyze data with spreadsheet software and use performance metrics, and can explain this approach to colleagues.

Advanced Level

Demonstration of:

- creating and editing digital content internally and externally (e.g. using social media)
- exploiting and interpreting data to make informed decisions and deliver assigned tasks
- analyzing new digital technologies and comparing their effectiveness
- adapting such technologies to solve challenges, considering the contextual framework of the country
- visualizing data through static and dynamic tools

Examples

- Civil servants can work with coding languages such as Python to develop and create digital content themselves or in collaboration.
- Civil servants use software such as STAT to analyze and interpret data.
- High-level civil servants manage and monitor the building of a public digital system that can collect large volumes of data.

AI-Specific

Demonstration of:

- advanced understanding about the working of AI systems (e.g. neural network vs automated tasks)
- recognizing and detecting where AI systems are used, and demonstrating proactivity in improving how to work with them (e.g. transparency advocate)
- being able to publicly support the explanation of how AI systems may not provide the correct answer
- complementing the weaknesses of AI with creative and critical human thinking (moving the effort to the creativity and decision making to compensate the most weak and dangerous aspects of AI)

Example

- Civil servants working with a predictive system that classifies people based on their potential needs are aware of the system's pitfalls and when it is prone for errors and regularly detect faulty recommendations that are reported to the development team who can further improve the accuracy of the system.

Data-driven decision-making

Justification

The public sector worldwide has put relevant (big) data as key elements of digital government strategy globally. The availability of digitally generated data and creation of computational algorithms to analyze it provide new ways of solving complex problems and delivering services. In this sense, governments want to put data at the core of digital transformation.

A data-driven public sector (DDPS) recognizes that data is an asset, core and integral to policy-making, service delivery, organisational management, and innovation.

Description

Data-driven decision-making is about:
- understanding, analyzing, organizing, using and sharing data
- using data to respond to problems more efficiently and effectively
- using data to promote evidence-led policymaking
- understanding, interpreting and using data to make informed decisions
- embedding a data culture in the organisation

Links to other competencies and attitudes

This competency is linked to **trust** of other people in the organisation, because an exchange of data and information is key. It is certainly linked to other competencies such as **data literacy** and **privacy and security**.

Proficiency Levels and Corresponding Examples

Basic Level
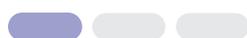
Demonstration of:
- understanding the relevance and impact of data on decision-making and policymaking, and the opportunities of using data in government
- being aware of the risks associated with the use of digital technologies for social wellbeing and inclusion, as well as the environment
- being aware of data protection standards, and potential risks related to data protection and privacy

Example
- Civil servants acknowledge the importance of data and trust its use for decision-making in public policy over conditional knowledge, or in conjunction with existing experience.

Intermediate Level

Demonstration of:
- performing simple activities through the availability of government data with the objective of addressing the needs of the public
- identifying processes and tasks where data can add value
- ensuring the creation of interoperable data sets that can be shared across the organisation
- reusing data made available by others for relevant work tasks
- focusing on creating data-driven solutions which do no harm

Examples
- Civil servants aid their organisation by finding specific challenges that can be addressed using data.
- Public officials engage diverse stakeholders to create solutions and boost the importance of data collection as a vital part of any public or private organisation.

Advanced Level

Demonstration of:
- acting systemically upon government data resources with the objective of addressing the needs of the public
- supporting development of a data strategy to improve service delivery
- representing and advocating for data-driven policymaking
- establishing a data culture in the organisation

- being aware of the data value chain and how to manage each step

Examples

- Civil servants are entirely capable of making decisions based on data to inform public policies, digital transformation, or decision-making processes. They understand the relevance of high-quality and trustworthy data sources, which enforce the integrity of data use in the public sector.

AI-Specific

Demonstration of:

- understanding the potential of existing data in the organisation for the development of AI systems, including data integrity, completeness, representativeness, usability, as well as the condition of the collection

- acting on this potential of data available. This includes having an awareness of potential biases in it that could affect AI development

- supporting the collection, organization, and understanding data for the use of AI applications in alignment with responsible and ethical principles

Example

- A Chief Data Officer can differentiate and create usage for predictive, descriptive data use. They have the knowledge and expertise to use and manage the organisational data according to policy and regulation. They further educate their colleagues on this topic.

Open data and open government

Justification

Governments are launching open government data (OGD) portals that enable data to be accessed and used by everyone. This not only contributes to data-based decision-making, but directly influences public trust, confidence, and satisfaction with government, because OGD enables the public to monitor performance and facilitates data-based solutions and services (and co-creation of services). The common objective

is to ensure that data is owned and used by the public, fostering a better life through public engagement with government and technology. This dimension also relates to the right of access to public information (RTI).[24]

Description

Open data is about:

- understanding the importance of ownership and transparency when it comes to data

- creating open mechanisms, frameworks and standards for data while respecting human rights, evidently privacy

Proficiency Levels and Corresponding Examples

Basic Level

Demonstration of:

- understanding the importance of open government standards, principles and transparency for the benefit of the public

- following OGD standards to ensure the accessibility of governmental and ownership of public information, and promote trust based on the reliability of such data

Examples

- Civil servants understand the meaning and value of OGD in the government, and in the wider ecosystem.

- Civil servants can structure their database following OGD standards.

Intermediate Level

Demonstration of:

- ensuring (online) access and reliability of data from a public institution

understanding global goods, open source and open government policy

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24. The RTI is a component of the fundamental right of freedom of expression as set forth by Article 19 of the Universal Declaration of Human Rights (1948), and the subsequent International Covenant on Civil and Political Rights.

- Data managers regularly publish data on a government portal.

- Civil servants are capable and willing to publish their internal data in an open and machine-readable format online, preferably in an organized open data platform.

- Civil servants see the value in publishing open data sets, and thus take great care in maximizing their usability and quality, while respecting privacy and preventing possible misuse.

Advanced Level

Demonstration of:

- formulating the necessary mechanisms, frameworks and standards related to open data to ensure and guarantee accountability and that data as an economic asset is used for the public good

- being an advocate for open data and open government

Examples

- An open data officer regularly publishes data on a government portal in real time and ensures the quality.

- A senior public manager actively promotes and shares successes of opening organisational data to other public administrations. Many private organisations recognize this open policy as a best practice and have been able to make better services and products for their customers. Other public administrations ask the manager's opinion on how to make their data more open.

AI-Specific

Demonstration of:

- providing high value open datasets for external organisations to use in AI development

- using published open data in AI systems to avoid recollection of data

- reusing and actively sharing AI components developed by their own and other public administrations

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Example

- Civil servants are organizing data collaboratives with external companies in which sensitive data (from public and private institutions) is shared in a privacy-respecting manner. By collaborating, both organisations gain insights into a social issue and can use better AI systems to help mitigate concerns.

Privacy and security

Justification

The public sector's ability to deliver high-quality services, develop well-targeted policies and ensure efficient government depends on the effective use of knowledge, information and data – including people's personal information (such as tax returns, welfare benefits, law enforcement records, driving license information, among others). Handling this data raises many human-rights issues, including about privacy and the balance between individual rights and the common good.

With more data around the world and in the public sector, there is a potential risk for uses of digital technologies that violate human rights, basic principles of information privacy and security through unregulated access to personal data stored in different nodes of the global network (hacking, for instance, is a growing challenge). The public sector holds a huge amount of data, which sometimes (such as in the case of health records) is very personal and needs to be treated sensitively.

Whereas privacy mainly concerns the protection of one's own information and that of others, identity management refers to being in control of one's online profile, and security relates also to a person's awareness of how online actions and behavior can put both at risk.

Description

Privacy and security is about:

- understanding the basic issues, concerns and threats around privacy and security

- effectively managing information shared online using tools (navigation filters, passwords, anti-virus and firewall software) to avoid dangerous or unpleasant situations, or to maintain a level of anonymity

- designing government strategies and policies to integrate and address privacy and security concerns

Proficiency Levels and Corresponding Examples

Basic Level
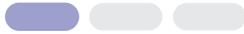
Demonstration of:

- recognizing the importance of privacy and security issues and threats
- recognizing the importance of how strengthening privacy and security can enhance the use of personal data and deliver better public services
- understanding the difference between privacy and security issues
- understanding and using simple digital security protocols regulated by the government for public administration activities
- understanding privacy principles and data minimization

Examples
- Civil servants understand the importance of following rules on data protection, confidentiality and ethics when using government data.
- Civil servants understand key issues regarding the security of data and individual privacy when developing a digital ID system.

Intermediate Level

Demonstration of:

- using available data in the most efficient and effective way, while respecting privacy and security concerns
- adopting the least intrusive approach that enables the public sector to improve services and efficiency without requiring more data or impacting personal privacy
- complying with basic organisational procedures surrounding privacy in line with data protection standards

Example
- Civil servants use simple tools and methods to comply with data security, such as ensuring the security of their password. They receive training on data security and privacy, and follow the rules they learn.

Advanced Level

Demonstration of:

- detecting and reporting cyber- and data-related incidents, identifying affected systems and user groups, and triggering announcements and alerts to relevant stakeholders to efficiently resolve the situation
- understanding and creating legislative frameworks that protect data privacy and security
- providing more public choice in the management and use of personal data, which are used to deliver digital public services
- ensuring that where data is used or shared without the consent of the individual there is openness, transparency and consultation in the policy-making process, which strikes a balance between individual rights and the wider public interest. Relying on established data protection mechanisms is advised.

Examples
- Lead developers in the government comply with information security guidelines and design a service with security controls embedded, specifically engineered as mitigation against threats. They ensure compliance with the principles of digital citizenship in an inclusive and widespread manner, activating all the initiatives useful for making rights practicable (digital identity).
- High-level civil servants spearhead the adoption and implementation of a privacy policy.

AI-Specific

Demonstration of:
- ensuring that data used to train AI systems is secure and protected from tampering
- being aware of the privacy implications of AI systems during and after development, including considering possible reinforced privacy-reducing feedback loops due to AI
- understanding and applying principles of data minimization for AI projects
- following and adhering to relevant privacy, data protection and AI-related legislation
- ensuring the robustness of AI models to cyberse-

curity attacks

- monitoring AI systems for adversarial use with awareness of the latest trends in abusing AI systems, and monitoring system performance over time

- deploying privacy-enhancing AI learning methods, such as federated learning to minimize privacy violations

- An IT staff member in the government monitors the IT infrastructure and the performance and behavior of the AI systems in use by the public administration. If any of the AI systems appear to malfunction, the IT staff member can evaluate and audit the system and identify the root cause of its poor performance. In addition, they can retrain the AI system after a period to ensure that performance remains optimal.

Legal, regulatory and ethical frameworks

Justification

The emergence of digital technologies presents a challenge for the public sector, with legal, regulatory and ethical frameworks needing to be revised to consider these elements and innovations.

Description

Legal, regulatory and ethical frameworks are about:

- understanding if a digital transformation initiative conforms to existing human-rights standards and legal frameworks, or operates in a legal vacuum that requires the enactment of new laws

- drafting and implementing legal and ethical frameworks that take into consideration digital technologies and their impact on societies

Proficiency Levels and Corresponding Examples

Basic Level

Demonstration of:

- understanding the importance of considering legal aspects when integrating digital technologies in the public sector

Examples

- Civil servants can help the public to understand the right to privacy under legal frameworks regulating technology.

- Civil servants can help to assuage people's fears about new digital technologies by raising awareness of the legal frameworks that protect their rights.

Intermediate Level

Demonstration of:

- understanding the legal implications of digital technologies, and scenarios in which a revision of applicable legislation may be necessary

Example

- Civil servants can raise concerns about existing legal frameworks to relevant parties, such as legislators or administrators, who can adjust them accordingly. Civil servants understand when a law or policy regulating a technology may need to be revised to be restrictive.

Advanced Level

Demonstration of:

- anticipating legal implications of emerging technologies

- identifying and acting upon the necessity of creating new or changing existing regulations, or to consider the possibility of not regulating

- assessing the necessity of a permissive or precautionary approach while creating tech legislation

Examples

- Legal officers in a government department stay up-to-date and informed about emerging technologies, enough to be able to predict how they might need to be regulated as they become more widespread.

- Civil servants draft a legislative framework that takes into consideration the emergence of a new technology.

AI-Specific

Demonstration of:

- understanding the ethical and legal implications of the development and use of AI technologies
- assessing AI initiatives on their legal and ethical suitability prior to development
- leveraging knowledge in suggesting that legislative changes to old laws that are hindering the digital government transformation
- being aware of the possibilities in existing legal framework to trial, experiment or use innovative procurement mechanisms

Examples

- An expert on ethics, cybersecurity, and privacy concerns can conduct data impact assessments, privacy assessments and AI ethical impact assessments before, during and after development of AI systems.

AI fundamentals

Justification

Having adequate internal expertise on AI technologies is crucial to initiate, develop and use these technologies in public administration. Without an awareness of AI, or the ability to work effectively with these new technologies, it is likely that AI will not be successfully adopted in the organisation.

Description

AI fundamentals are about:
- being aware of the opportunities of AI technologies and where they could be used in different work
- knowing the risks and limitations of AI technologies, such as algorithmic bias, threats to human rights, poor explainability and performance issues
- reviewing, evaluating and developing AI systems alone or in collaboration with external partners

Proficiency Levels and Corresponding Examples

Basic Level

Demonstration of:

- understanding what AI is and how it differs from other technologies
- having a basic awareness of the opportunities of this technology for the organisation

Example

- Civil servants understand the difference between futuristic AI technologies and those AI systems that are currently available.

Intermediate Level

Demonstration of:

- having a more advanced knowledge of what AI is, how to potentially apply this technology in their own working environment
- discussing the implications of this technology in a meaningful way
- contextualizing AI to initiate new projects leveraging AI tools
- awareness of the potential environmental damage caused by AI technologies

Example

- Civil servants can consider several prerequisites and outcomes when applying AI, such as which data might be needed, the potential effect of AI, and the value of the system versus the possible financial cost.

Advanced Level

Demonstration of:

- interpreting, evaluating and understanding the decisions made during the development of AI technologies
- reviewing, managing and understanding the design considerations of the AI system

- recruiting and assigning the right people and skill-sets to AI projects

Example

- A data scientist working in a public administration can use data to address problems faced by the organisation using various analytical techniques, such as machine learning.

AI-Specific

Demonstration of:

- mastering knowledge about the latest AI technologies to develop, interpret, evaluate, maintain, and implement AI systems
- working and integrating AI technologies to their best possible extent
- adopting additional activities to ensure AI risks are minimized, such as calculating for algorithmic bias, introducing AI transparency mechanisms and accountability

Example

- A Chief Data Officer is responsible for managing AI-related initiatives and capacity-building exercises in an organisation.

Competency Domain 3

Digital Management and Execution

Digital Management and Execution concerns the need for civil servants to incorporate management practices that enhance the success of digital transformation initiatives. This includes managing and implementing projects and policies in an agile and collaborative way
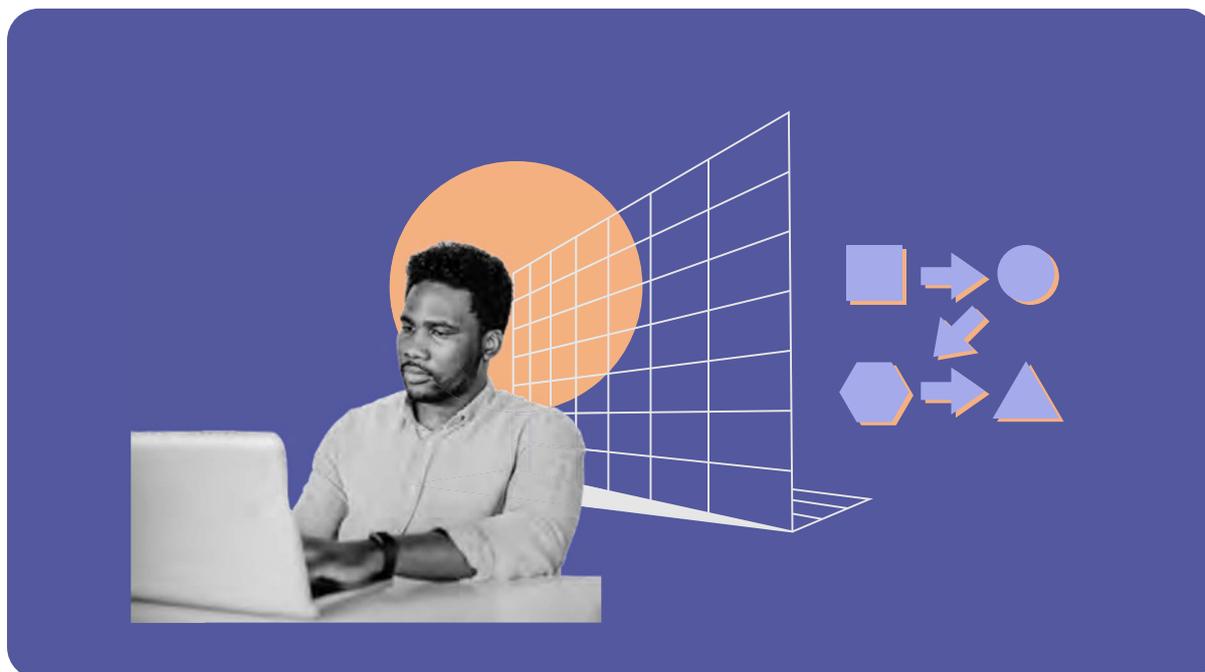
People-centricity

Justification

The idea of engaging with the public to get feedback on service delivery is not new. However, it has become a fundamental element of the work of many governments worldwide. Moreover, there has been a clear shift from just interacting with the public to understanding needs, to even co-designing services with them. Indeed, the consensus is that by taking a people-centric approach to policymaking and service delivery, governments can rebuild trust in public administration, improve the effectiveness of public action, and better respond to the global and domestic challenges.

The use of the term 'people' encompasses both users and 'non-users' of digital services (people that may be left out of the digital transformation process – for instance in some cases women, youth and marginalised groups, yet should be considered in the development of digital transformation and digital governance initiatives).

Description

People-centricity[25] is about:

• developing services and policies by focusing on understanding people's needs

• considering the access, responsiveness and quality of service delivery when interacting with people

• taking into consideration the public and private experience and needs of users in digital public policies and technologies ('user' understood as both citizen and public servant)

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25. See here for UNDP's new Digital Standards - https://www.undp.org/digital/standards - which also describe people centricity.

Basic Level
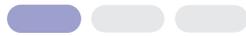
Demonstration of:

- understanding that the needs of users must be researched and gathered from users themselves, without assuming user needs
- an interest in, and ability to, gather user feedback

Example

- Civil servants understand the importance of identifying the needs of users better when reengineering a service, before making it digital.

Intermediate Level

Demonstration of:

- getting involved in user research and testing, sitting in, or conducting interviews, workshops and observations
- using a variety of methods to record and display the results of user research (images, videos, and written notes from users)
- conducting user research to gather, analyze, validate and prioritize users' needs; testing services to assess how well they meet needs
- regularly referring to identified users' needs and assess the project's current progress to make sure that needs are being met

Examples

- Civil servants use simple techniques to test services with users to assess how well they meet their needs.
- Mid-level managers in the government develop a 'customer mapping journey' to deconstruct 'user journeys' by considering the experience of users at every step in their utilization of the service.

Advanced Level

Demonstration of:

- considering new user needs (by regularly testing, revalidating and identifying) throughout the development and delivery of the project
- ensuring that every stage of the project includes user testing
- interacting and working with specialists in user-experience and interface design to develop systems that are human-centered
- interacting and working with specialists in behavioral sciences to use psychological and sociological techniques to deliver public policy outcomes (i.e. 'nudging')
- using participatory approaches to design, develop, test and implement projects that involve users in production and decision-making, resulting in co-ownership of the output
- representing and advocating for user-centric tools and techniques

Examples

- A software developer in the government: can collaborate with user researchers and represent users internally; understand the difference between user needs and the desires of the user; can champion user research to focus on all users; can prioritize and define approaches to understand the user story and guide others in doing so; and can offer recommendations on the best tools and methods to be used.
- A service designer uses a range of research methods (questionnaires, in-depth interviews, workshops, ethnographic observations) to obtain insights about users when trying to improve the patient experience in a public hospital.

AI-Specific

Demonstration of:

- working with the users of the AI system to ensure that the performance and the output matches the users' needs
- including the public in the development and monitoring of AI systems to find potential biases and other risks in developing and using AI technology
- using of AI technology to improve the user-centricity of government services rather than making them less accessible

- Civil servants can identify the main stakeholders for developing and realizing AI-enabled initiatives, such as other internal departments, agencies, institutions or companies with relevant data or skillsets.

- Public managers are aware that many of the organisation's clients have difficulty accessing the website online and prefer to visit in-person. Considering the specific needs of their constituency, rather than moving forward with a project that places a chatbot on their website, they support the development of an on-site robot to answer basic questions from the public, ensuring more people will be interacting with the AI system.

Iteration

Justification

Most commonly, iteration is associated with modern software development practices where new features or updates to functionality are released when they are ready, rather than a "big bang" approach that releases many new or updated features simultaneously.

However, this has also become important in the public sector for designing and developing digital transformation projects – it is indeed crucial to test the solutions and products developed as part of those projects through iteration and experimentation. This competency encourages civil servants to take small, calculated risks in the development of digital transformation projects. The iterative practice is composed of multiple skills, such as managing innovation projects, using prototypes to explore approaches, and conducting tests and experiments.

Description

Iteration is about:

- improving what is currently available, and using incremental, often rapid approaches in the development of a project, product or service, while reducing risks

- accepting mistakes as part of the project cycle and learning through them

Proficiency Levels and Corresponding Examples

Basic Level

Demonstration of:

- understanding the importance of iteration and rapid feedback loops – allowing new ideas to be tested on a small scale before reaching a wider level of implementation – and the importance of incremental development approaches, where each stage of a project builds on the preceding one

- understanding how prototypes can be used to bring abstract ideas to life, and provide a tangible example of how something might work in practice

- understanding how tests and experiments can examine what works and what does not.

Intermediate Level

Demonstration of:

- developing simple prototypes that help the visualization of products and services and in the identification of potential difficulties

- making use of simple agile techniques such as time-boxes, retrospectives, and product backlogs to manage workload

- ensuring that projects include sufficient time and resources for testing and evaluation across different stages of the project cycle

- using approaches such as sandboxes, prototyping or piloting to create small-scale experiments of new ideas

Advanced Level

Demonstration of:

- using formal iterative methodologies to deliver a digital project

- developing prototypes that can be implemented with users to test feasibility

- using randomized tests to evaluate approaches, such as A/B testing or randomized control trials

to gain evidence about what works

- using iterative project management methodologies to allow small-scale testing of several different approaches
- using experimental evaluation methods to assess which approaches to take forward

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AI-Specific

Demonstration of:

- regularly testing the performance of the AI system across time, especially post-adoption
- developing proofs-of-concept and pilots to have a clearer understanding of the potential benefits of AI systems
- acknowledge mistakes coming from the AI system throughout the project cycle and learn from them

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Agile execution

Justification

Agile execution becomes essential when designing and developing digital transformation projects. This applies to the public sector, as collaboration, adaptability and flexibility should be integral parts of implementing projects to deliver digital services. Indeed, when working on digital transformation, effective collaboration – and not working in silos – becomes extremely important.

Every aspect and element of the government system needs to be taken into account and have the same level of adaptability – for instance, when developing a digital transformation project in different parts of the country, procurement needs to be flexible enough to allow changes during implementation to test an adapted service or product with different users.

Description

Agile execution is about:
- understanding, using, and applying agile management techniques
- communicating and collaborating effectively with other departments, ministries, or external partners
- considering the organisational structure and finding ways to overcome bureaucracy to focus

more on outcomes than function and traditional approaches

Links to Other Competencies and Attitudes

This competency is also related to several attitudes, as described above. Applying it is only possible in an environment conducive to experimentation and learning.

Proficiency Levels and Corresponding Examples

Basic Level

Demonstration of:

- understanding that for effective digital transformation, new management and organisational practices need to be adopted by the organisation, including those related to procurement and budgeting
- understanding the importance of internal and external communication and collaboration

Examples

- Civil servants acknowledge that digital transformation is not only about technology; but also about changing the way of working and collaborating.
- Civil servants understand the meaning of 'agility' in government and how important it is to use agile execution.

Intermediate Level

Demonstration of:

- participating in simple agile management events during execution of a project or program
- using simple agile techniques during execution of a project or program
- understanding the implications of using agile execution for the new way of working and structure of the organisation, particularly for procurement and budgeting

Examples

- Civil servants apply agile practices in the execu-

tion of their digital transformation project, including daily stand-up meetings.

- Delivery managers in the government learn and start applying agile and lean practices in their department.
- Procurement officers try to find ways to apply agile procurement to their department.

Advanced Level

Demonstration of:

- mastering, designing and using specific agile management techniques, such as project planning, product roadmap creation, release planning, sprint planning, daily stand-ups, sprint review and retrospective, one-to-ones, and end-of-the-week emails
- forging internal and external partnerships and coalitions
- deploying agile coaches to support work by using the available expertise to help teams emphasize performance over process, build organisational agile capabilities, and accelerate transitions
- advocating agile approaches in the organisation
- partly restructuring the organisation or department based on outcomes and not expertise
- fully understanding the concrete implications that using agile execution means for changing the way of working and the structure of the organization (for procurement, and budgeting)

Examples
- CIOs in the government promote experimentation and agility by coaching others and creating a conducive working environment.
- Civil servants use agile methodologies to foster better and streamlined decision-making, improve productivity, enable more resilience and flexibility, and support a sense of purpose and empowerment.
- A director in a government department creates a cross-functional team of experts in transport planning, data engineering, operations, customer service and marketing, for a digital transformation project for mobility. The head of service design is an expert and advocate for agile management approaches, continuously reflecting and challenging their team.

AI-Specific

Demonstration of:
- applying agile management techniques in AI-related projects
- being cooperative and supportive with external partners
- utilizing innovative public procurement methods for AI systems
- mastering market feasibility before procuring AI systems
- managing and evaluating the offers of external parties on the performance, rigor and security of available AI systems
- sharing data with external parties

Examples
- Procurement officers are actively engaged in pre-market studies with technology companies to get a good understanding of what AI technologies are currently capable of, and which suppliers would be able to provide such technologies. By engaging with the market quickly, they can test the technologies and request proofs of concept before making a final procurement contract.

Digital leadership

Justification

Digital transformation best practices from the private sector show the importance of digital teams having the right environment to work, with structure and discipline, and freedom to experiment and test. Developing an inspiring vision and the right 'culture' is at the core of digital transformation. It should be developed by all civil servants who work in teams to contribute towards shaping an environment conducive to innovation. Digital leadership is especially nurtured by those who can create the right environment, motivate employees, and establish digital teams. Digital transformation should be led by teams that are able to innovate and iterate even more than in other sectors.

Description

Digital leadership is about:

- empowering teams in the government by creating enough room for members to take initiative, test and experiment with a common vision
- creating a user-driven service vision
- understanding how technology can feed user needs

Proficiency Levels and Corresponding Examples

Basic Level
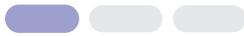
Demonstration of:

- being aware of the importance of leadership for digital transformation
- understanding the importance of shaping the right environment and having space so that digital transformation initiatives can be designed and developed

Example

- Civil servants in the government understand the importance of leadership techniques and tools that are key for digital transformation to succeed.

Intermediate Level

Demonstration of:

- understanding and using methods to structure teams and empowering them to experiment
- understanding that everyone, regardless of job function or position in an organisation, is important and needs to be empowered to raise issues at early stages and bring forward ideas to achieve overall goals (within the limits of the organisational structure)

Example

- Associate delivery managers understand and know how to build successful digital delivery teams and can explain this to peers: how to maintain, influence and motivate a team, give and receive feedback, and mediate. This is key for digital transformation projects as iteration, experimentation and collaboration are the basis for their success.

Advanced Level

Demonstration of:

- shaping an appropriate environment for teams to succeed in their digital transformation objectives
- creating a culture that empowers teams, encourages experimentation (including taking calculated risks), incentivizes collaboration, and measures team performance
- influencing and motivating others by defining a vision and clear objectives, and structuring the team while allowing them to test and experiment
- linking the use of technology to a value proposition for service delivery

Example

- Design-method professionals develop a digital lab within a government department to encourage innovation.
- The heads of service design in the government develop a clear vision and goals for the team, and coach members on how to achieve them in an effective way; they can make decisions that set precedents for others to follow.

AI-Specific

Demonstration of:

- encouraging AI-enabled innovation in the organisation and supporting change with AI technologies
- identifying skillsets and competencies needed for specific AI projects
- supporting training and educational opportunities that provide staff with an AI-related skillset
- understanding and anticipating AI risks

Example

- A public leader sets up an AI learning day for their department, in which staff members are exposed to the opportunities of AI technologies and are encouraged to highlight situations where AI technologies could be a solution. For the best ideas, the public leader procures the needed funding to test whether the idea is feasible.

2

Challenges and Opportunities of Digital Transformation in Government
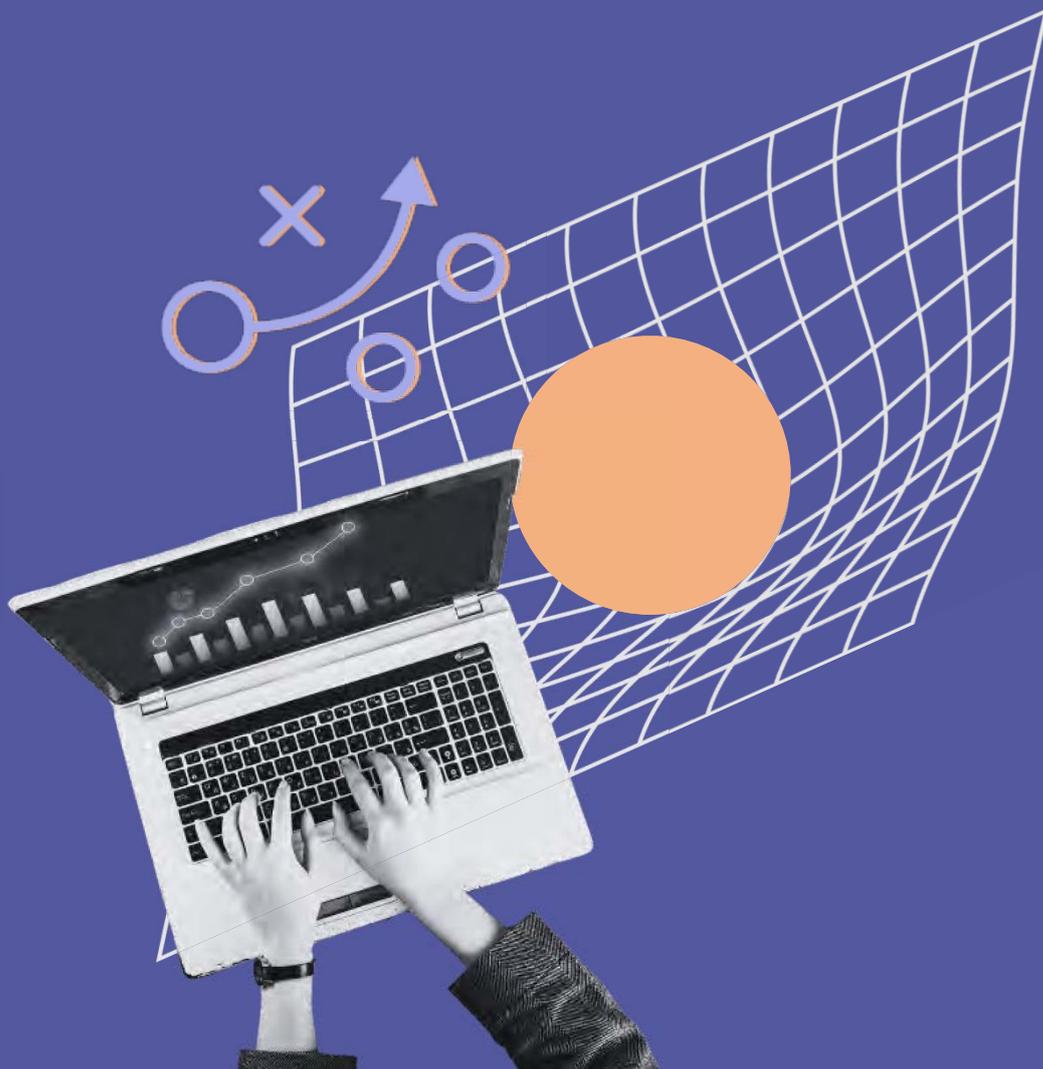
Challenges and Opportunities of Digital Transformation in Government

The exponential growth of digital technologies have changed the way in which societies, as well as entire economies, function, "including their structure, how production is carried out, the breadth of consumer choice, the nature of labor markets, and the need for new skills".[26] Companies have expanded into the digital field with the promise of scalable software and other solutions complementing the traditional, non-scalable business model of consulting. For instance, in the pharmaceutical and medical industry, companies have invested heavily in digital solutions given the labor-reducing impact that robotics, software-guided medicine and AI-supported diagnostics can have on services.

These digitally transformed services[27] have a proven potential to enhance health outcomes by improving medical diagnosis, data-based treatment decisions, digital therapeutics, clinical trials, self-management of care and person-centric care, as well as creating more evidence-based knowledge, skills and competence for professionals to support healthcare.[28]

Digital transformation requires governments to rethink the ways in which they have functioned so far and to take into consideration a new set of digital principles and standards. According to the OECD, a "business as usual" approach to technology that reinforces existing internal government processes only leads to failed projects and public criticism.[29].

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29. Read the OECD Digital Government Policy Framework here: https://www.oecd.org/gov/digital-government/Recommendation-digital-government-strategies.pdf

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Box #1.

OECD Digital Government Policy Framework

1 Digital by design

Establishing clear leadership, paired with effective coordination and enforcement mechanisms so that 'digital' is not only a technical topic but a transformational element for rethinking and reengineering public processes, simplifying procedures, and creating new channels of communication and engagement with public stakeholders.

2 Data-driven public sector

Recognizing data as a strategic asset and establishing 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 reuse.

3 Government as a Platform

An ecosystem of guidelines, tools, data, standards and common components that equip teams to focus on user needs in public service design and delivery.

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26. Reljic et al. (2019) - Digital technologies, employment and skills, Reljic, Jelena; Evangelista, Rinaldo; Pianta, Mario (2019), LEM Working Paper Series No. 2019/36, Scuola Superiore Sant'Anna, Laboratory of Economics and Management (LEM), Pisa

27. These services are often based on technologies such as the internet of things, virtual care, remote monitoring, artificial intelligence, big data analytics, blockchain, smart wearables, platforms, tools enabling data exchange and storage, and tools enabling remote data capture and exchange, and sharing of relevant information across the health ecosystem creating a continuum of care

28. See here: Global strategy on digital health 2020-2025, p.8. Available at: https://www.who.int/docs/default-source/documents/gs4dhdaa2a9f352b0445bafbc79ca799dce4d.pdf

4 Open by default

Making government data and policymaking (including algorithms) available for the public, within the limits of legislation and in balance with the national and public interest.

5 User-driven

Awarding a central role to people's needs and convenience in the shaping of processes, services and policies, and by adopting inclusive mechanisms for this to happen.

6 Proactiveness

To anticipate people's needs and respond rapidly so that users do not have to engage with cumbersome processes associated with service delivery and data.

Source:
Source: (OECD, 2014).

Commonly agreed definitions of digital transformation in the public sector focus on elements of 'transformation', highlighting how a change in a government's way of working and functioning is necessary for the public sector to succeed. **Box #2** presents different definitions of digital transformation. For UNESCO, digital transformation is the process of accelerated development and pervasive use of digital technologies that generates new opportunities and challenges for sustainable development. In this specific context, it also refers to "the process of using digital technologies to create new — or modify existing — work processes, the culture of an organization, and at highest level, a countries' digital enabling environment (policies, regulation)"

This section discusses the challenges and opportunities of digital transformation in government and anchors the competencies identified in the previous section within these challenges and opportunities. Illustrative examples and case studies help situate these challenges and opportunities within past or ongoing digital transformation processes in governments.

Box #2.

Definitions of digital transformation

Public Digital

Digital transformation is the act of radically changing how your organisation works, so that it can survive and thrive in the internet era.

https://public.digital

Gartner

Digital transformation can refer to anything from IT modernization (for example, cloud computing) to digital optimization, to the invention of new digital business models.

https://www.gartner.com/en/information-technology/glossary/digital-transformation

OECD-OPSI

Digital transformation refers to a process of adoption of digital tools and methods by an organisation, typically those that have either not been including the digital factor as part of their core activities, or have not kept up with the pace of change in digital technologies.

https://oecd-opsi.org/guide/digital-transformation

Mergel, Edelmann & Haug, 2019

Digital transformation is a holistic effort to revise core processes and services of government beyond the traditional digitization efforts. It evolves along a continuum of transition from analog to digital to a full-stack review of policies, current processes, and user needs and results in a complete revision of the existing and the creation of new digital services. The outcome of digital transformation efforts focuses among others on the satisfaction of user needs, new forms of service delivery, and the expansion of the user base.

https://www.sciencedirect.com/science/article/pii/S0740624X18304131

Opportunities of Digital Transformation in Government

Digital transformation can help advance the achievement of the Sustainable Development Goals (SDGs)[30] [31] [32]. Digital government can act as an enabler of sustainability, equity, and social inclusion[33].

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Box #3.

COVID-19 accelerated digital transformation

The COVID-19 pandemic certainly highlighted the importance of public organisations undertaking digital transformation. Indeed, it accelerated the process itself, pushing governments into unprecedented challenges of data management, policy formulation and public inclusion in a short period. At the same time, it has shown that such crises can put further pressure on governmental institutions regarding how appropriately and quickly they respond to urgent and uncertain situations. According to OECD, 'complexity and uncertainty are now the norm; they are contexts, not just risks. The world seems to operate by a new set of rules that are difficult to observe directly'.

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Information exchange between governmental or-

ganisations (G2G), between business and government (B2G), as well as between governments and citizens (G2C), can support the formulation and monitoring of policies to achieve the SDGs[34].

Strengthening Public Services and Governance

Digital transformation in the public sector is fundamental to meet the growing needs of the public for service delivery and to improve their experience. Delivering digital services to citizens has become one of the top priorities worldwide with increasing evidence about the positive impact of digital transformation on public services provision.

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Box #4.

Digital transformation in the public sector in Ukraine

In recent years, Ukraine has heavily invested in the digital transformation of its public sector. This work has been channeled into the development of the Diia app, which gives Ukrainians access to twelve services and nine digital documents, including an ID card, foreign biometric passport, student card and driver's license. This has been implemented thoroughly, as the digital documents have the same legal force as their physical counterparts, and can be shared digitally. Beyond the digital transformation of personal public services, Ukraine has also digitized many processes for business owners, including the fastest business registration in the world (30 minutes to found a limited liability company) and has initiated an e-residency project to allow foreign citizens to run a business in the country without being residents (Ukraine Now, 2022)[35].

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30. Read about Corbett and Mellouli's work here: https://onlinelibrary.wiley.com/doi/abs/10.1111/isj.12138

31. Read about Medaglia and Damsgaard's work here: Medaglia, Rony and Damsgaard, Jan, "Blockchain and the United Nations Sustainable Development Goals: Towards an Agenda for IS Research" (2020). PACIS 2020 Proceedings. 36. https://aisel.aisnet.org/pacis2020/36

32. Read about Nishant et al.'s work here: Nishant, Rohit & Kennedy, Mike & Corbett, Jacqueline. (2020). Artificial Intelligence for Sustainability: Challenges, Opportunities, and a Research Agenda. International Journal of Information Management. 53. 10.1016/j.ijinfomgt.2020.102104.

33. Elsa Estevez, Tomasz Janowski, Electronic Governance for Sustainable Development — Conceptual framework and state of research, Government Information Quarterly, Volume 30, Supplement 1, 2013, https://doi.org/10.1016/j.giq.2012.11.001.

34. Tomasz Janowski, Implementing Sustainable Development Goals with Digital Government – Aspiration-capacity gap, Government Information Quarterly, Volume 33, Issue 4, 2016, Pages 603-613, https://doi.org/10.1016/j.giq.2016.12.001

35. Read about Ukraine's digital transformation https://ukraine.ua/invest-trade/digitalization/

Examples of the benefits of digitl transformation for the public can be found around the world from local administrations to national governments. For example, digital transformation efforts in the State Court of Justice in Sao Paulo, Brazil, which included the deployment of a digital solution and training of 50,000 employees, has accelerated the processing time of new cases by 87% – people now only require two minutes to register their information (as compared to 21 minutes before the digital deployment). Similarly, citizens in Grand Rapids, Michigan, United States, are now able to access most information across public utilities departments with a call to one single number, or a visit to the website through a new customer relationship management process and analysis tool, saving US$1 million in the first 18 months.

Box #5.

Digital technology to provide access to clean and affordable energy

Nearly 800 million people are without access to reliable and affordable electricity. Rapid advancements in AI, blockchain, IoT, advanced materials for solar panels and (specifically lithium-ion) battery technology means that renewable energy mini-grids are now potentially the cheapest solution globally. Emerging technologies have huge potential to accelerate electrification, particularly in areas with fewer centralized network power grids, including Africa. A Kenyan company, Power-Gen Renewable Energy, for example, has installed solar-powered mini-grid projects with battery storage across Kenya and Zambia, providing electricity to rural areas at rates equivalent to current spending on kerosene. AI and advanced technologies can optimize decentralized energy systems worldwide. For instance, DeepMind and Google started applying machine learning algorithms to 700 megawatts of wind power capacity in the central United States, wind farms that collectively generate as much electricity as is needed by a medium-sized city.

Source:
https://www.deepmind.com/blog/machine-learning-can-boost-the-value-of-wind-energy ;
https://www.weforum.org/agenda/2019/09/technology-global-goals-sustainable-development-sd gs/

Responding to Complex Governance Problems

Digital transformation has become an important instrument for public sector organisations to solve complex problems. These problems range from widespread environmental degradation and global warming to rising socioeconomic inequalities and an increasing threat of pandemics. While civil servants have in the past dealt with problems by developing single interventions, they now face complex problems that are extremely difficult to diagnose and whose solutions need to take into account the interconnection between many layers of the same problem.

There is a growing body of literature showing that government-developed digital solutions can positively influence the SDGs. For example, digital technologies can be used to support activities associated with high emissions, such as oil and gas extraction and increasing consumption greenhouse gas (see **Box #5**), and on waste management (see **Box #6**).

Box #6.

Digital technology to solve waste management in Kenya

Efficient waste management has long been a problem in Kenya, with mountains of waste continuing "to grow everywhere over the years". T-Bin, short for Tech Bin, is a new system of waste management combining solar energy, AI, automation and other new technologies that seeks to solve this problem. The T-Bin features twin LCD screens that inform the public of the importance of separating waste, and how to dispose of it responsibly. T-Bin also serves as a free public WiFi hotspot and has a solar-powered light to keep users safe. Its creators envision T-Bin to be used in a variety of urban public spaces, green spaces, schools, hospitals, government institutions, bus and railway stations, restaurants, malls, stadiums, and all outdoor business premises. Projects such as this demonstrate the way that technology can serve as a solution to persistent issues.

Source:
https://www.urbanet.info/t-bin-revolution-waste-management

Artificial Intelligence as a Tool to Address Challenges in the Public Sector

Artificial intelligence (AI) technologies have caught the interest of the world for their potential to transform societies. They are defined here as "systems which have the capacity to process data and information in a way that resembles intelligent behavior, and typically includes aspects of reasoning, learning, perception, prediction, planning or control" (UNESCO, 2021)[36]. What makes AI distinct from other emerging or traditional information technologies is its capacity to learn from previous examples captured in digital data, leading to the creation of accurate predictions based on existing data rather than pre-programmed rules. Furthermore, unlike previous technologies, of particular interest is the capacity of AI to conduct tasks previously been expected to require human intelligence. As a result, AI technologies are increasingly used for perceiving, listening, finding patterns in data, predicting or even acting autonomously in decision-making processes.

While on the one hand, AI is known for causing concern for its potential disruption to labor markets and causing loss of jobs, it can provide public administrations with immense opportunities in tackling current societal challenges. Digital technologies, and in particular AI technologies, are heralded as a key instrument to assist the public sector in a series of undertakings by, for instance, reducing administrative workload, and providing innovative insights on current challenges.

Of particular interest for the Global South are AI developments that can improve multiple sectors: agriculture, by combining meteorological data, satellite imagery and farm data to optimize farming activities and end hunger[37]; education, by optimizing individual learning, such as assisting in writing to improve literacy rates, or even AI

education in itself[38]; environmental protection, by using satellite data; and others.

As such, there is a great hope that AI technologies can be harnessed increasingly to meet the SDGs., similar to the enthusiasm of previous technological waves. New technologies will not enhance socioeconomic development automatically, as the impact of ICT depends on various political and cultural factors too, illustrating the importance of civil servants' competencies in shaping the broader ecosystem in which they are to be implemented.

Case study #1.

Use of AI to combat political corruption and improve service delivery in Latin America

Context

Information and communications technologies (ICT) are increasingly seen by governments, as well as activists and civil society, as important tools to promote transparency and accountability and to identify and reduce corruption. Indeed, new technologies have been used to facilitate the reporting of corruption and provide access to official information (like in the case of **Brazil**). This can help to monitor the efficiency and integrity of social services and make financial information more transparent. At the same time, AI has and is being used for delivering better services.

Solution

Brazil

One example of the use of AI technologies by non-governmental actors to reduce governmental corruption is Rosie, an AI system that analyses the public expenses of Brazilian congress members to detect suspicious spending patterns. Rosie has

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36. https://unesdoc.unesco.org/ark:/48223/pf0000380455

37. For instance, SmallFarm Land Decision Support System is a recognized promising AI application aimed to provide farmers with accurate information about their crops using AI and IoT technologies.

38. As an example, Djehuty is teaching children how to draw letters and numbers by providing personalized feedback to children https://ircai.org/top100/entry/djehuty/

been developed as part of Operation Serenata de Amor; a project managed by 600 citizens from all over the world. Rosie uses public data made available by the Access to Information Law, open data from various public administrations in Brazil, as well as publicly available information from companies.

Panama

In 2012, the National Authority for Government Innovation (AIG) in Panama launched a six-year project with the aim of providing an end-to-end experience of the justice system. This transformation involved disaggregating the existing complex process to understand the needs of the service providers and users. This made it possible for the government to effectively address individual elements related to the physical infrastructure and interactions among the relevant stakeholders from the back-office to the front public-facing office. By 2018, the judicial system effectively reduced the time involved in the Accusatory Penal System (SPA) by 96% and there was no longer any paper involved. Having such a transformative approach to end-to-end service design and delivery entails prioritizing the user experience from start to finish, and provides an aspirational model for the rest of Panama's public sector and other countries to follow.

Source:
https://www.oecd.org/gov/digital-government/digital-government-review-panama-2019-key-findings.pdf;

https://www.oecd.org/gov/digital-government/digital-government-review-of-panama-615a4180-en.htm

AI deployment by government agencies to improve operations is in its nascent phase, with emerging insights only beginning to highlight its potential. The opportunities come in the form of improvements to public service delivery, internal management and citizen-government relationships.

Regardless of the form in which AI is introduced it has proven to be useful for automating mundane tasks traditionally done by civil servants or citizens, augment decision-makers' impact by providing them with additional insights based on data, or make services better tailored to the public through personalization.

Most of the insights gained so far about administrations using AI to enforce their own operations comes from either North American or European contexts – limited examples of the use of these technologies by public administrations in the Global South exist. Several examples of AI technologies and their respective potential benefits for public administrations can be found in the table below.

Table #1.

The potential of artificial intelligence for the public sector

	AI type	Improved activity	Example
	Computer vision	Policymaking (Netherlands)	**Trash detection:** The Object Detection Kit utilizes computer vision on digital imagery to detect trash on the streets of Amsterdam municipality, enabling the early detection of garbage, and optimization of collection routes.
	Robotic process automation	Public service (Sweden)	**Automation of state benefits:** The municipality of Trelleborg uses robotic process automation for various social benefits, and the waiting time for a decision – formerly up to 20 days – has been reduced to about one day.
	Robot	Public service (Spain)	**Misty II:** A pilot project is using care robots to improve quality of life for the elderly population of Barcelona. The robots will be tasked with reminding them of appointments to take medication and act as a companion.
	Virtual assistant	Public services (Singapore)	**OneService chatbot:** In Singapore, the Municipal Services Office (MSO) and the Smart Nation and Digital Government Group (SNDGG) launched a chatbot that enables residents to easily report municipal issues via WhatsApp and Telegram.
	Predictive analytics	Public service (Belgium)	**Talent API:** The Flemish unemployment agency uses an AI system to match job seekers with personalized recommendations for jobs based on both data and historical matches, so staff members can provide tailored recommendations.
	Computer vision	Public service (Argentina)	**Pothole reporting:** In Buenos Aires, a machine-learning based tool lets the public report urban issues such as potholes to the municipality.
	Predictive analytics	Internal management (USA)	**BuySmarter:** The US Department of Health is using an AI system to analyze the administration's contract data and suggest better prices for bulk purchases.
	Audio	Internal management (Estonia)	**Hans:** Estonian Parliament uses AI system HANS to transcribe all its parliamentary systems and no longer requires stenographers. However, the output of Hans is still corrected by an editor.

Source:
Authors

However, AI is also being used by government not only to improve its operations but also to solve complex issues and challenges (see **Box #7**).

Box #7.

Using AI to avoid locust plagues

Kuzi is an AI-powered tool designed to predict the breeding and migration patterns of desert locusts across Eastern Africa and the Horn of Africa. Named for a Swahili bird known for eating locusts, Kuzi employs data from soil and satellites, meteorological observation and machine learning to create heat maps of high-risk areas and alert farmers and pastoralists 2-3 months in advance of potential locust activity. They can sign up to receive text alerts when locusts are highly likely to swarm their area, giving them notice to protect themselves and their livestock.

Source:
https://www.trtworld.com/magazine/kuzi-an-ai-powered-tool-helping-african-farmers-fight-locusts-43222

Despite the potential benefits of AI, there are also considerable human rights and ethical risks related to the use of AI technologies, which should be considered before and during the development and deployment. In response to these risks, UNESCO developed the only global Recommendation on the Ethics of AI, endorsed by 193 Member States, which with the associated tools helps address, mitigate or avoid some of the key risks to societies. The UN also endorsed a system-wide strategic approach and road map for supporting capacity development on AI ("Strategic Approach"), developed by the High-level Committee on Programmes (HLCP) under ITU's lead, to guide UN agencies towards prioritizing support to Member States, particularly developing and least developed countries, in this respect. In 2021, the UN set up an Inter-Agency Working Group on AI (IAWG-AI), co-led by ITU and UNESCO, to bring together UN system expertise on AI with an aim to harness the benefits of AI technologies while addressing the risks.

Box #8.

AI for Good

AI for Good, organized by ITU in partnership with 40 UN Sister Agencies, is the leading action-oriented, global & inclusive United Nations platform on AI. Comprising three streams (Learn, Build, Connect) and providing a unique platform that brings together governments, companies, academia and non-governmental organizations, its goal is to identify the practical applications of AI to advance the United Nations Sustainable Development.

Source:
https://aiforgood.itu.int/about-ai-for-good/

One of the first considerations is the risk that AI systems can be extremely opaque in the way they come to a decision. In particular, the inner workings of some machine learning algorithms, such as approaches based on neural networks, are difficult to explain. Other techniques used for the development of AI systems may be more transparent and explicable – but often come at the cost of predictive performance, and how explicable it is still depends on the expertise of the non-technical domain experts working with these systems. Furthermore, many AI systems are not only opaque due to the challenges of interpreting specific algorithms, but also because many are developed and sold by private companies, and thus the inner workings are often proprietary.[39] Consequently, decisions based on AI technologies may be impossible to explain to the public and policymakers, which raises concerns about accountability and transparency, considering the impact they could have on the lives of citizens. Unforeseen negative consequences of AI systems can be seen in the case of use of AI to fight tax fraud in the Netherlands, whereby some citizens were incorrectly labeled as fraudulent, before the problem was discovered and corrected[40].

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39. Busuioc, M. (2021). Accountable Artificial Intelligence: Holding Algorithms to Account. Public Administration Review, 81(5), 825-836

40. Read more: https://www.autoriteitpersoonsgegevens.nl/en/news/tax-administration-fined-fraudblacklist

Combined with this opacity is the risk that AI systems can amplify societal biases in their recommendations, with minority groups systematically finding AI systems recommending less favorable treatment. Bias could be mitigated by collecting more accurate public data, and by making datasets more inclusive and representative of the population, especially for the use of AI in the Global South where only limited data is available.

However, excessive data collection by public administrations could also threaten citizens' privacy and result in the resistance to the use of AI by government authorities,   especially if not accompanied with additional obligations to ensure accountability to mitigate bias.[41] While private organisations are known for large-scale data gathering with apparent consent, there is concern when government authorities collect and analyze data from the public.

Nevertheless, not all forms of bias[42] can be mitigated effectively by collecting more data and requiring other approaches. For instance, historical bias due to past practices in data generation and collection, and measurement bias due to the use of incorrect proxy variables to represent concepts might, in fact, get reinforced. As a result, the often-depicted narrative of providing more objective and accurate decisions due to increased availability of data is at odds with the many documented biased decisions taken or suggested by AI systems[43] that occur because of historical and human biases.

The development and deployment of AI technologies within the public sector may face ethical and legal barriers to get started or be implemented. Understanding the legal context in which the system is deployed and the limitations of the legal framework are critical to avoid systems being disbanded later by court decisions, as well as to ensure high

rates of acceptance of AI among both management and the public. While the Global South tends to have less data protection legislation, allowing for higher degrees of freedom in the use of data, this brings additional concern for introducing surveillance or potential misuse of these technologies by private and/or public administrations.

41. Refer to the UNESCO Recommendation on the Ethics of Artificial Intelligence is the first global standard-setting instrument on the ethics of AI. Further, as highlighted in https://www.brookings.edu/research/protecting-privacy-in-an-ai-driven-world/

42. Suresh, H. and Guttag, J.. 2019. A Framework For Understanding Sources of Unintended Consequences in Machine Learning.

43. Henman, P. (2020). Improving public services using artificial intelligence: possibilities, pitfalls, governance. Asia Pacific Journal of Public Administration, 42(4), 209-221.

Challenges of Digital Transformation in Government

Even if digital transformation is believed to be key to addressing some 21st century challenges, several studies have shown that many digitization initiatives – both in private and public sectors – are unsuccessful. There is a growing body of literature that shows how cultural, organisational, and structural barriers can be an important obstacle to digital transformation in the public sector. It is important to understand common digital transformation related obstacles, in order to harness this competency framework and overcome different barriers.

Cultural Barriers to Digital Transformation Initiatives in Government

Cultivating a culture of innovation and eliminating a fear of failure

Many digital transformation projects never make it beyond the conception phase due to a lack of innovative thinking within public sector organisations. Innovating upon existing processes by questioning traditional work practices or bringing up new ideas is not actively supported let alone rewarded at work. Fear of failure is considered a major deterrent in many organisations to developing digital transformation projects, because taking calculated risks (and experimentation) is a fundamental part of the innovation process for developing digital solutions (for instance, during the phases of prototyping and iteration, ideas should be tested with users). As the failure of projects can translate to the loss of resources, public officials are especially hesitant to execute projects that may require iteration and long trial phases in fear of losing career prospects or their appointment altogether.

Such fear of failure can be detrimental to digital government transformation using AI technologies, as they are still of an experimental nature. Especially with regards to their use in a public sector context, there is little known of either their positive and negative effects, or their effectiveness. A risk-averse and scarcely resourced public administration may thus find little incentive to use technologies with unknown impacts, especially if there is a strong risk of negative media reporting of mistakes. A known failure with AI technology in one area may thus significantly change the perception of civil servants if the impacts inhibit them using it themselves – even though the type of AI technology, application area and/or risks may differ from the situation involved in the failure. Furthermore, as AI systems can make mistakes as they learn, especially in early iterations, some tolerance and patience are crucial to let systems improve over time. It thus requires a strong innovator to overcome such organisational risk aversion, especially when an AI system's first results do not meet expectations.

It is important to underline that deployment of AI-based solutions should be done with adequate oversight and analysis of potential impact through risk assessments.

Evidence shows that many government executives do not promote a culture of innovation, do not structure teams accordingly, and do not let them innovate using calculated risk. According to recent research by Gartner (see **Table #2**), most government Chief Information Officers (CIOs) are exploring or deploying digital services to public and other stakeholders, yet many of the obstacles they face are nontechnical.[44] Siloed strategy and decision-making, risk-averse culture and insufficient budgets are among the biggest challenges to scaling digital solutions – and those elements can only be addressed by leaders in the organisation.

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[44]. https://www.gartner.com/en/articles/5-key-digital-transformation-challenges-government-cios-must-tackle

Table #2.

Top challenges for government Chief Information Officers (CIOs) to implement digital solutions
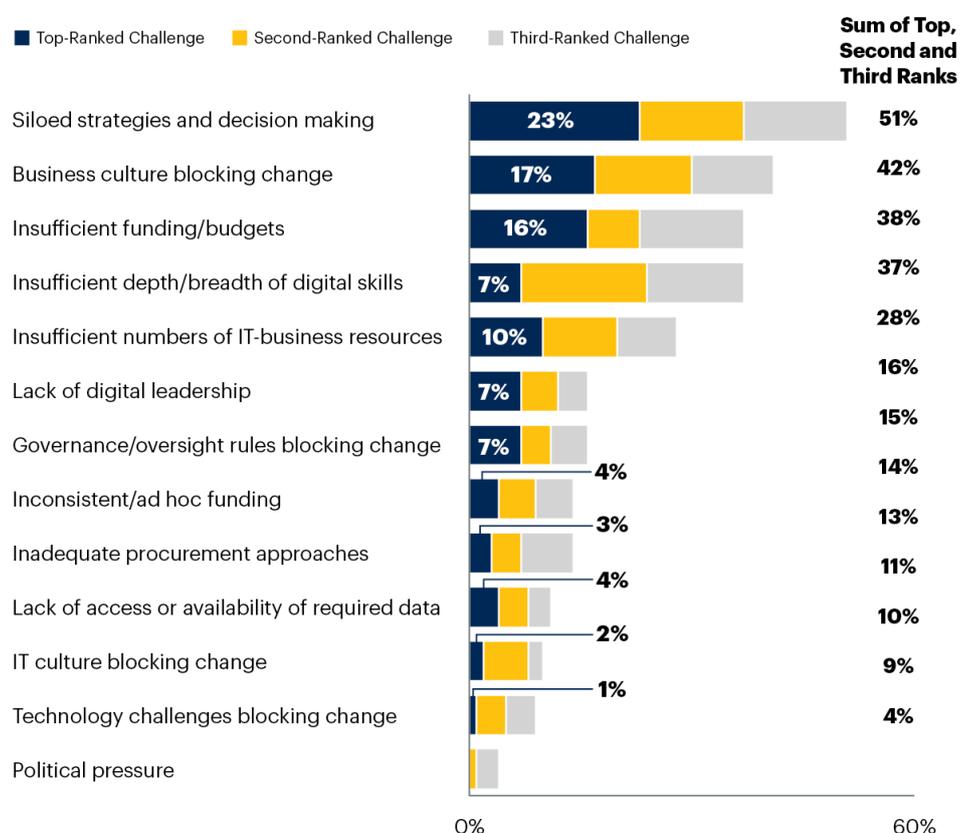
Source:
Gartner

Impacts of leadership on innovation and digital transformation

Leadership plays a major role in achieving digital transformation projects. Indeed, the way leaders shape an environment for digital teams is essential for them to be able to follow a clear vision and goals while developing, experimenting and testing ideas for achieving them. Digital leadership is thus an incredibly important key to the success of any initiative or for the completion of digital government transformation. However, an estimated 80% of public-sector leaders say they have fallen far behind private capabilities, with only 26% having the leadership to successfully execute the digital transformation strategy.[45] Digital transformation often highlights the need for new forms of leadership – with a digital mindset – to correctly guide the organisation's transformation with technology. This requires leadership to allow for faster decision-making processes and a more transparent and open form of communication, while ensuring that innovation projects are led by user needs – not institutional demands. An altruistic, transformational, entrepreneurial and network-oriented leadership style is needed (see **Box #9**).

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45. See, for instance, Tangi, L., Janssen, M., Benedetti, M., & Noci, G. (2021). Digital government transformation: A structural equation modeling analysis of driving and impeding factors. International Journal of Information Management, 60, 102356.

Supportive leadership styles for digital government transformation

Transformational

A leader seen as charismatic with a strong purpose to change the organisation and help people in it to achieve its goals. This leader can see the need for digital transformation, formulate a strategy, and motivate others to support the change. They take center-stage in digital government transformation processes.

Altruistic

A leader regarded as humble, authentic, responsible and trusted, allowing for strong relationships with members of the organisation. Through empowering staff and creating trust, what follows is cooperation, creativity and innovation.

Entrepreneurial

A leader who recognizes the need to frequently change organisational routines and behavior due to changes in the environment. This leader is often seen as being able to adapt the organisation, initiate strategic actions, change routines and mobilize key resources. Such a leader is well-versed in historical and past organisational routines and capable of using them to its advantage.

Network-oriented

Digital transformation is a holistic effort to revise core processes and services of government beyond the traditional digitization efforts. It evolves along a continuum of transition from analog to digital to a full stack review of policies, current processes, and user needs and results in a complete revision of the existing and the creation of new digital services. The outcome of digital transformation efforts focuses among others on the satisfaction of user needs, new forms of service delivery, and the expansion of the user base.

Source:
Based on Ricard et al., 2016

However, such leadership styles can often be at odds with more traditional, closed, hierarchical leadership styles commonly found in public administrations. A management supporting a rigid hierarchy, departmental silos and top-down decision-making can hinder innovation in government, or put an end to innovation that impacts their authority. On the other hand, some countries have advanced in their digital transformation journey through leadership support (see **Case study #2**).

Japan's Digital Agency as an example of strong digital leadership

Context

The Recommendation of the Council on Digital Government Strategies emphasizes the importance of leadership and political commitment for successful digital government strategies (OECD, 2014)[46]. It is vital that the highest levels of governments, whether elected representatives or their appointees, recognize the value of putting digital, data and technology at the heart of a public administration's future. Indeed, having a supportive leadership helps to sustain a government's ambition to apply digital, data and technology in transforming how they function to meet the needs and expectations of citizens and businesses. While political leadership sets the political direction and high-level vision, responsibility for implementation belongs to the civil service. Administrative and operational leadership needs to play a coordinating role, working closely with administrative leaders across the public sector to embed the importance of designing and delivering high-quality public services in the day-to-day work of the civil service

Description

Japan's Digital Agency was established on 1 September 2021, with the mission to promote the digitalization of public administrative procedures, the standardization, interoperability and coordination of data systems, and the provision of more user-friendly public services. Legal, regulatory and operational silos have been the key challenge in the digitalization of the public sector. The Digital Agency is a major economic policy priority for the Prime Minister, who personally headed the initiative as Head and Chief Minister of the Digital Agency, and appointed the Digital Minister to lead the Digital Agency's operations, along with its Chief Officer.

Source:
https://www.oecd.org/newsroom/japan-broaden-the-digital-transition-to-strengthen-economic-recovery-from-covid-19-says-oecd.htm

46. https://www.oecd.org/gov/digital-government/recommendation-on-digital-government-strategies.htm

Importance of a vision, mission and understanding of underlying challenges for digital transformation

Related to the point above on leadership, digital transformation requires leaders to develop a clear strategy and vision. This is essential for clarifying the long-, medium- and short-term goals of the organisation and how they will be achieved. Moreover, this helps employees to better understand how they are contributing to the vision, which can drastically improve their effectiveness and productivity. This holds true for public sector as well[47] as digital government strategies are critical in providing policy and planning guidance in a constantly and rapidly evolving work environment. Strategies make it possible to align goals, objectives and initiatives and are fundamental in establishing consensus and the necessary cross-government coordination for efficient and effective policy implementation. It is also important to note that as digital transformation requires flexibility and adaptation strategies need to be designed accordingly.

This is not always the case in the public sector as not all governments have developed clear strategies for their digital transformation efforts, nor do they do so when developing digital initiatives and projects. Indeed, it is often simply the lack of an internal (AI) strategy which often leads to isolated and ineffective (AI-based) digital innovation projects.[48] Often, it goes hand in hand with a lack in organisational capacity and consequently an overreliance on external partners.

More broadly speaking, the lack of clear strategy and vision on digital transformation is also linked to lack of an in-depth reflection on the problems that the government faces and wants to address – each strategy or vision should be developed based on specific challenges, problems and needs that must be articulated clearly.

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47. We conducted more than 140 interviews with public sector leaders involved in digital transformation. From the interviews emerged five factors shaping digital transformation: firstly strategy, then leadership, workforce skills, digital culture, and user focus. "The Journey to Government's Digital Transformation" (Deloitte, 2021).

48. A lack of internal strategy further leads to a lack of scaling of seemingly successful pilots – see Kuguoglu BK, van der Voort H, Janssen M. The Giant Leap for Smart Cities: Scaling Up Smart City Artificial Intelligence of Things (AIoT) Initiatives. Sustainability. 2021; 13(21):12295. https://doi.org/10.3390/su132112295.

Case study #3.

Developing flexible and adaptable strategies in Australia and Tunisia

Context

Governments and public sector organisations work on some of the world's most pressing, multifaceted and high-stakes challenges. The same pressures that affect private sector also affect public-sector organisations, many of which were suddenly faced with the same volatile, uncertain, complex and ambiguous environment while dealing with the COVID-19 pandemic, not unlike what private organisations face with the rise of disruptive online competitors. Increasingly, public servants find themselves having to be creative problem solvers while navigating hierarchical, rules-based environments and complex procurement and partnership processes, and all with public scrutiny from individuals, communities and businesses with high expectations. Agile ways of working can be transformative in helping governments overcome these challenges.

Description

Objectives and key results (OKRs) is a simple tool to create measurable goals for agile teams. It provides a framework for defining objectives, how teams will achieve those outcomes, and tracking their progress. It was developed by Andy Grove at Intel and has since been adopted by other product organisations such as Google, LinkedIn, Twitter, and Uber. An objective is a bold and qualitative goal that the company or organisation wants to achieve. A key result is a tangible and quantitative goal for how a team will achieve an objective. Often in an agile transformation, OKRs are used as a complementary goal management framework to help organisations define strategic goals and measure outcomes. OKRs are future-focused and action-oriented. Objectives define what we want to achieve and key results measure how we meet the objectives.

OKRs are sequenced and measured throughout the quarter. They help to break down ambitious goals into more manageable pieces and create visibility on what is working and what is not working in a timely manner, thus acting as a focusing tool to help organisations prioritize their top objectives. Importantly, OKRs inspire organisational convergence by combining both top-down and bottom-up approaches to goal setting. They can be defined and linked at every level in the organisation. For public-sector organisations with hierarchical structures, OKRs help rally teams behind shared goals and create early opportunities to strengthen or refocus resources on projects.

Australia: At a large Australian Government health department, teams have developed a clearer understanding of the purpose of digital projects with clearly established OKRs. The OKRs were used to guide the development of three-month roadmaps for each team, creating alignment on immediate tasks and enabling better use of each team's time and resources. The objective of using OKRs was to develop a sound strategy that could be adapted, thereby allowing flexibility in the development of the digital projects.

Tunisia: Similarly, the Tunisian Government decided to apply the OKR approach to develop a national digital strategy. According to a high-level ranking official, "It needs to be an agile strategy: scalable and contingency based, which could be adapted every three months. Therefore, we are thinking of using the OKRs."

Some countries have, however, decided to develop strategies that are at the same time flexible enough to adapt over time (see **Case study#3**).

Organisational Barriers to Digital Transformation Initiatives in Government

Impacts of rigid hierarchical structures and processes on innovation

Digital transformation requires civil servants to col-laborate systematically and effectively within government and with external actors. Take, for instance, the case of online 'one-stop shops' in government, integrating different services together to facilitate the delivery of public services. This process involves different departments, ministries and, often, different external actors (e.g. the post office) and requires those actors to effectively communicate, collaborate and share information. However, departments and ministries often work in 'silos', as the hierarchical structure is rigid and affects how civil servants communicate and collaborate. This has to do with the structure of the organisation as well as leadership and management practices. There is a body of growing evidence that government systems and processes need to be less rigid for digital transformation to succeed, and governments are increasingly trying to adopt more flexibility in designing and developing digital transformation projects.

Case study #4.

Innovative procurement and its benefits in the European Commission

Context

Traditional procurement works on legacy systems and frameworks. A lot of time is needed for each phase of the process – identifying needs, outlining a procurement plan, selecting suppliers, issuing requests for quotation (RFQ), tender evaluation, contract terms and conditions. However, digital transformation requires stakeholders to work differently as needs rapidly change, test solutions systematically with users, and collaborate even more internally and externally. This calls for a different type of procurement process.

Proposed solution

The European Commission's public procurement strategy rethinks the entire approach to purchasing, professionalizing public buyers and cutting red tape, to make public administrations more efficient, effective, and citizen and business-friendly. For instance, Horizon 2020, the largest European research and innovation program with nearly €80 billion in financing available over 7 years (2014-20), is based on open calls with the use of more flexible procurement methods implementing

6-year agile framework agreements. The potential benefits of using a more innovative approach to procurement are:

• *Reduction of preparation efforts*

• *Reduction in time to market*

• *Easier creation and comparison of multiple proposals*

• *Enhanced stakeholder accessibility and usability*

Source:
KIIs with government officials; https://www.adaptovate.com/agile/4-whys-for-agile-in-government/; https://bernardmarr.com/how-google-sets-goals-the-okr-approach/

The case of procurement in this sense is interesting as, traditionally, procurement systems may not allow a process of flexibility and testing that is necessary for designing and deploying digital solutions (see **Case study #4**).

Box #10.

The Inter-American Open Data Program to Prevent and Fight Corruption Corruption

One example of an organisational structure that has led to the success of a digital transformation project is the Inter-American Open Data Program to Prevent and Fight Corruption (PIDA), which aims to help reduce and prevent corruption through open data and the promotion of a culture of transparency. A key component of the implementation phase has been capacity-building workshops that promote the exchange of best practices and allow public servants to discuss the availability, accessibility, use and reuse of open data to tackle corruption. These knowledge-sharing workshops have empowered public officials to make informed decisions. They serve as an example of the importance of open discussion and cooperation in new digital transformation projects.

Some governments have also restructured departments and revised organisational structures to foster a culture of transparency and better use and reuse data to solve external problems (see **Box #10**).

Importance of flexibility to react to challenges and to manage talent

The fast pace of change, also related to the emergence of technology, is transforming the landscape, and organisations need to be agile and prepared to adapt to unexpected changes. The organisations that succeed in their digital transformation journey are agile at core.

Governments face, at times, difficulty to adapt policies, projects and programs and to react quickly to unexpected events as their organisation and management practices have not been geared toward dealing with challenges and problems that are complex and hard to predict. Organisations from all sectors compete globally for a limited workforce with the skills needed in digital transformation processes. Significant efforts have been dedicated to agile talent acquisition (including developing talent pipelines), compensation, management and retaining.

Governments, on the other hand, face structured human resources management processes and practices not developed for addressing the needs and challenges posed by digital transformation. Compensatory tactics such as reliance on consultancies and external personnel may pose constraints related to security, data privacy, ethics, costs, and other issues.

Structural Barriers to Digital Transformation in Government

Lack of IT infrastructure and access to data

A primary challenge in implementing digital transformation is the infrastructure gap that affects cer-

tain countries. Nearly 300 million people in Africa, for instance, live more than 50km from a fiber or cable broadband connection. Hence, the lack of widespread availability of high-speed internet remains a significant hurdle for African countries to fully harness the potential of digital transformation (World Bank, 2021[49]). To reap the benefits of digital transformation, abundant and low-cost connectivity is essential as broadband drives productivity, innovation and growth. In fact, one of the specific goals of Africa's Digital Transformation Strategy is to create a harmonized environment that guarantees investment and financing, which can be used to close the digital infrastructure gap and provide accessible, affordable and secure broadband, across demography, gender and geography.

A further barrier that limits digital transformation and AI implementation in public administrations has to do with organisational maturity related to data governance. Since emerging AI innovations are generally based on data, public administrations – as well as the ecosystem in which they operate – must have sufficient quality and quantity of data for analysis. Significant work is needed to provide public administrations with mature data infrastructure on which AI can be built, thus one of the primary goals for public administrations is to reach an adequate level of digitalization to develop this data infrastructure. Strong data infrastructure and corresponding data governance regime are the two most important building blocks, providing the technical infrastructure required to collect, store and analyze data. The project data should be available in the right quantity – as many AI systems rely on a significant volume of representative data – as well as the right quality. Strong data management practices within the organisation are crucial to allow for the right maintenance of the data used by AI systems and to create trust when other organisations share data with the institution.

It is often suggested that before any AI project gets started, a data specialist should first examine if the data, which is needed for the success of the project, is available, accessible and legal for use in the organisation. Furthermore, as one of the main benefits of the use of AI technologies is not just to analyze the internal administrative datasets, but to combine it with external data to reveal additional insights, the data infrastructure should adequately support the integration of these external sources. External data often has different standards and formats, requiring an ability to merge it. It also requires cleaning before analysis. Naturally, this means that the external dimension of the public administration is adequately digitized – otherwise, there is no relevant external data available, which may be a considerable challenge in less digitized countries.

Countries in the Global South score significantly lower in terms of government AI readiness. The required infrastructure and data to support AI development is mostly available in the USA, countries of the European Union, and China with other regions (greatly) lagging.[50] A lack of dedicated infrastructure on which to train data-intense AI applications (such as adequate GPUs) can stop most AI projects before they are considered for implementation. Furthermore, the Global South has the most people who have never used the internet. According to the Alliance for Affordable Internet, a decent internet connection is out of reach for 90% of people in low- and middle-income countries.[51] This significantly affects the representativeness of data, if it is available at all. The e-Government Development Index of the United Nations shows the differences between the Global North and Global South with regards to the previous e-Government and digitalization progress. Although this does not mean that AI projects are impossible, the framework conditions facilitating AI projects are less favorable – especially considering that even advanced e-Government countries have difficulties in integrating AI. Governments in the Global South should strongly consider whether data barriers to AI development can be overcome successfully.

50. Global government AI readiness index 2021

51. https://a4ai.org/research/advancing-meaningful-connectivity-towards-active-and-participatory-digital-societies/

49. https://www.worldbank.org/en/news/feature/2021/01/11/interview-now-is-the-time-for-africas-digital-transformation

AI and Digital Competency Gaps

Digital Competency Gaps in the Public Sector in General

As a recent report by Davenport and Redman highlights, "more than anything else, digital transformation requires talent. Indeed, assembling the right team of technology, data and process people who can work together – with a strong leader who can bring about change – may be the single most important step that a company contemplating digital transformation can take[52]).

However, the available literature highlights important digital competency gaps in the public sector, with lower-middle income countries lagging. UNESCO's Artificial Intelligence Needs Assessment Survey in Africa underlined the need for capacity building for civil servants. Of the 32 countries that responded to the survey, 22 requested initiatives for knowledge exchange concerning AI and its governance, 25 requested support trainings for government officials, and 22 requested support in the development of policies for AI.[53]

Furthermore, the newly released World Bank GovTech Maturity Index shows that 47% of countries[54] do not have a strategy to improve digital skills and that further investment in their development in the public sector is crucial to building a strong technical workforce[55].

Similarly, the 2019 OECD Digital Government Index observed that talent gaps remain, and that the absence of digital skills among civil servants can hamper the effective and coherent implementation of digital government policies, which is blocking progress. The World Economic Forum also reported that skill gaps in the local labor market and the

inability to attract the right talent are the biggest barriers to the adoption of new technologies.[56]

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52. https://hbr.org/2020/05/digital-transformation-comes-down-to-talent-in-4-key-areas

53. For more information on the Artificial Intelligence Needs Assessment Survey in Africa, see: https://unesdoc.unesco.org/ark:/48223/pf0000375322

54. The Index is based on 48 key indicators defined to collect data from 198 countries.

55. Dener, Cem; Nii-Aponsah, Hubert; Ghunney, Love E.; Johns, Kimberly D.. 2021. GovTech Maturity Index : The State of Public Sector Digital Transformation. International Development in Focus;. Washington, DC: World Bank. © World Bank. https://openknowledge.worldbank.org/handle/10986/36233

56. https://fr.weforum.org/reports/the-future-of-jobs-report-2020/in-full

There are several reasons for why there are import-ant skill gaps, including the constant revision and update of technology. A recent World Bank report highlights that reasons range from availability of knowledge to level of compensation, as well as the constraint of underdeveloped human resource management systems. The UNDP digital strategy is embedded in a broader system at a societal level. For instance, the elements depicted in the figure are also influenced by considerations such as a supportive institutional and regulatory framework, the right organisational culture, thinking in systems, proper data governance, ICT infrastructures, and so on.

Figure #3.

UNDP whole-of-society digital approach

Competencies represent only one element of the 'government system' as a whole. Like any organ-isation, the government system is built around a series of elements (people, budget, regulation, etc.). The rigidity of procurement created obstacles that hampered the implementation of the project even if some officials had acquired some important dig-ital competencies. For instance, the new digital strategy by the United Nations Development Pro-gramme (UNDP) illustrates a whole-of-society digi-tal approach (see **Figure #3**) that includes elements on developing enabling infrastructure, improving accessibility to digital connectivity and tools, and supporting people's digital capacity and competen-cies.

AI Competency Gaps in the Public Sector in General

One of the main barriers to digital government transformation (as discussed above), and especially with the implementation of AI, is the deficit of relevant skills in public administrations. Many civil servants do not have advanced IT or data analysis skillsets and, consequently, have a strong reliance on external organisations to provide the required expertise to develop AI systems. Public administrations are not the only organisations with an interest in deploying AI technologies – many private companies also see the potential value of these technologies to gain a competitive advantage and, thus, are willing to spend considerably for the services of these experts whose salaries[57] public administrations rarely can compete with. As a result, there is a lack of personnel within government organisations who are capable of developing, maintaining, training and working with AI technologies.[58]

The gap between the public and private sector salaries also makes it challenging for countries of the Global South to acquire such in-house expertise. Talented individuals who are well-versed in data analytics may, instead of working in a local administration, take a position in a well-paying technology company – possibly even in another country or continent, leading to brain drain. In addition to the gap in AI-related skillsets, a complementary understanding of how to successfully integrate AI technologies in public administrations are also lacking; these include an overall unfamiliarity of what AI technologies could mean for an organisation and how to change its technical and social elements to make the AI system compatible. This makes it challenging to implement AI in government.

However, as mentioned above, AI ability goes beyond the mere understanding and use of technology; it is related to the ability to see the potential of AI, develop and test it, and integrate the system into the organisation. This is essential for a successful digital transformation with AI technologies. Sim-ilarly, AI capacity goes beyond the technical skillsets related to data analytics (e.g. the ability to train machine-learning models), also including those needed to change the organisation in order to get the maximum value from the technology.[59] A second level of AI literacy thus means being able to use these technologies and apply them. This includes more advanced knowledge on how AI applications could or do affect lives and understanding how ethical dilemmas may appear from use of these technologies. In this case, civil servants would apply AI concepts into their own operations without necessarily developing these systems themselves. Ideally, such a level of AI literacy is needed for those working with an AI system and the management who handles integrating the system in their operations. Only in the last and most advanced levels of AI literacy are civil servants equipped with such competency to create and evaluate their own applications. Such competencies are often reserved for a specialist with a data science background and so it is unlikely that staff would operate at this level, and unnecessary. What is important, however, is that throughout the public administration, such a level of AI literacy is possessed by someone so that the administration's AI system can be properly evaluated.

Also, AI technologies have other complexities and require consideration of the government's existing capabilities because AI is typically not easy to use from the start; it requires more intra- and interorganisational collaboration, and both monitoring and adjustments over time. Indeed, developing AI not only includes the mere development of the technology but also includes an understanding of the whole organization to be able to see the potential of AI, develop the AI, test the system, and integrate the system into the organization.

Beyond that, developing AI technology should not only focus on the changes made to the existing organisational technical system, but also take into consideration the wider social-technical changes required to make maximum use of the technology. This may require changes to work processes, resources and their staff's skillsets, the organisational culture and structure, as well as interorganisational structures as a wider part of public management.

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57. This is why data scientists have been highlighted as the most wanted skillsets for companies. https://hbr.org/2012/10/data-scientist-the-sexiest-job-of-the-21st-century

58. As mentioned by Wirtz, Weyerer, & Sturm (2020), stating that the private sector has not only higher salaries but also provides more challenges and recognition.

59. See on this also Mikalef & Gupta (2021).

Integrating AI systems into work processes is where they will provide the most value.[60] Considering the difficulties many administrations have faced in integrating developed AI technologies beyond a smaller pilot or testing, the key competencies include those related to managing, maintaining and working with AI. Within this framework, the general AI competency level of the public is excluded. However, it is to be noted that a basic understanding is an important prerequisite for the acceptance of AI-enabled public services; without knowing what AI technologies can do, significant societal resistance could limit adoption and its value.

AI and Digital Competency Gaps in the Global South

Digital competency gaps in the public sector (as mentioned above) are wider in the Global South. Some research has shown that this is because lower-middle income countries tend to be lower-resource environments and the availability of digital skills is at lower levels than in North America or Europe. For instance, a recent World Bank report highlights that workers in Sub-Saharan Africa have lower digital skill levels than workers in other regions.[61]

Figure #4.

Digital skills in Sub-Saharan Africa relative to other regions
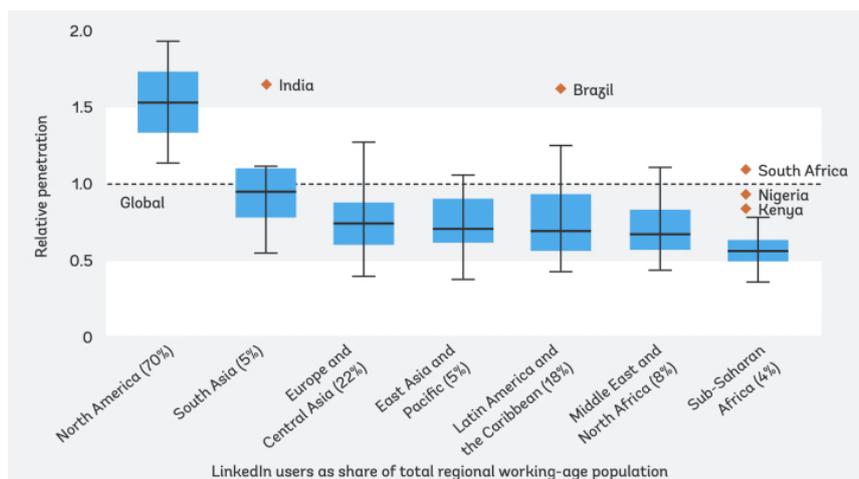
Source:
 Source: Jieun Choi, Mark A. Dutz, and Zainab Usman (eds). The Future of Work in Africa: Harnessing the Potential of Digital Technologies for All (2020); World Bank. The regional groups described in the chart refer to those used by the original source of the figure and are not as per UNESCO regions.

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60. The need for complementary organisational changes to create value with technology is generally well understood in the private sector, but frequently overlooked in the public sector. Nevertheless, research often stresses the importance of the transformation with digital transformation.
Janja Nograšek, Mirko Vintar, E-government and organisational transformation of government: Black box revisited?, Government Information Quarterly, Volume 31, Issue 1, 2014, Pages 108-118, ISSN 0740-624X,https://doi.org/10.1016/j.giq.2013.07.006.

61. Jieun Choi, Mark A. Dutz, and Zainab Usman (eds). The Future of Work in Africa: Harnessing the Potential of Digital Technologies for All (2020); World Bank

What is interesting to note here, however, is not just the lower level of digital competency in the Global South at society level but also the specific challenges that civil servants in lower-middle income countries face for designing and developing digital transformation initiatives.

Case study #5.

Digital transformation project in Madagascar

Context

The Madagascar Presidency recently developed a national digital governance strategy and created a Digital Governance Unit (DGU) to coordinate its implementation. A project was designed in collaboration with an international organisation, aiming to develop an institutional and administrative framework for inclusive access to legal identity, and technological foundations for an interoperable identity-management system. It also aimed to strengthen government capacity to deliver digital services in selected sectors. It consisted of: i) strengthening institutional capacity for multi-channel service delivery; ii) building a data and regulatory ecosystem to allow the application of the "once-only" principle across services; iii) developing the institutional framework and technological platforms to enable data exchange, digital access, payments, signatures and notifications; and iv) building infrastructure for remote work and connectivity across central government units in and out of the capital. It is noteworthy that the government decided to pursue this initiative following a visit to Estonia where its civil servants were inspired by the prospects, agile approach and benefits of the digital transformation.

Some potential challenges

The project is currently under implementation and the government is committed to its success. However, a few challenges have been highlighted from interviews with some of the key stakeholders as follows. These might be single, non-representative examples that cannot be generalized and are presented here as learning opportunities:

- *Lack of digital competency:* Some stakeholders emphasized that even if the project design is comprehensive, the government has a very low digital competency level that might create prob-

lems for its implementation, for instance, the lack of certification of competency so that civil servants can understand and master the technology required by the project.

- *Approach not adapted to context*: While the project undertook sound analysis and its design aims to solve major digital transformation obstacles (i.e. fragmentation of the digital governance system between ministries and institutions with their own ICT directorates), the approach should be more gradual. According to one stakeholder, "The project document is well done but it brings too many innovations. The government does not have the capacity to do all of these'. Another stakeholder refers to the difficulty of applying agile management techniques in an environment with a rigid hierarchy and where inter-personnel information sharing could be further strenghtened.

- *Overreliance on technology:* Some stakeholders mentioned that sometimes governments (and donors) still believe technology alone is the answer, and that one of the most important elements of digital transformation, often over-

Source:
Authors

The example from Madagascar shows that best practices from other countries cannot necessarily be adopted if not adapted to context. While the government team received training on agile techniques, it had difficulty creating an environment where sharing information and data is the norm. As such, one of the biggest mistakes a country could make is to strictly adopt a solution which works in another country without considering the local context. A common mistake amongst public officials is to consider a country to be more digitally developed than others, owing to the adoption of sophisticated digital technologies – rather than considering the contextual factors which made the solution work and relevant in the first place. Especially with new technologies such as AI, there can be a huge sense of ingenuity and desire to have state-of-the-art technologies for public administrations to be successful and effective in every context. As such, with the advance of AI technologies, public administrations may tend to copy innovative AI applications in their own administrations after seeing a successful applica-

tion elsewhere.

Although the inspiration to replicate the best practices of AI from elsewhere can be useful, public administrations – especially those with lower organisational maturity regarding data-driven working practices – should be cautious when replicating technologies from one context to another. Usually, the desire to transfer emerging innovations (e.g., AI) results from the aspiration to be seen as successful[65] without consideration of the context in which the innovation emerged. This follows the earlier tendencies of copying e-Government practices from one context to another, often with disappointing, differing or paradoxical results. Rather, understanding local and context-specific conditions are crucial to ensure value from the technology. As such, caution is needed when assuming that AI-enabled innovations can be reused in other contexts.

Firstly, as technology developed outside of the implementing organisation will be influenced by the context of the development, AI systems are extremely sensitive to how data was gathered, and generally only work in similar contexts. While the AI systems could technically be used in another country or context, the social and cultural context in which the data is collected cannot easily be replicated.

Consequently, AI systems developed in one area may perform poorly in another. In the worst case, the AI system can make discriminatory or incorrect recommendations, hence why some public administrations mitigate the mistakes made by more commonly available AI systems. The tendency for AI technologies to make such discriminatory recommendations can be seen in controversial applications of AI where the systems perform less reliably among minority groups, such as facial recognition software having difficulty detecting people of color. Replication of the development process (rather than solely the transfer of the developed system) seems necessary for AI to be applicable in other contexts, unless the model can be appropriately retuned. However, replication comes with additional challenges as it requires more expertise in AI systems.

Secondly, replicating the success of an AI-based system from one context requires a transfer of the organisational context in which it is embedded – including the human resources, ability, funding, socio-cultural traditions, administrative culture, and attitudes towards the technology. This is often very challenging and leads to failures. For instance, the performance of AI systems depends on the capacity of an organisation to use it for an appropriate problem. A recent study comparing the performance of different chatbots showed significant differences in the value provided by the technology, related to the organisational readiness to work with it, and the social-economic development of those who were interacting with it.

Thirdly, the problem for which an AI system was produced by an administration may not exist in another. AI is often developed in order to tackle a specific problem faced by a public administration and for which alternatives are inadequate. If the AI system is capable of adequately solving the problem faced by the public administration, it is more likely to be implemented. This, however, does not mean that other administrations face the same challenge, nor in the same severity. Therefore, the transfer of an AI technology from one context to another may be addressing a problem that does not actually exist. Having an adequate problem-solution fit is crucial to move forward with AI technologies.

This does not mean that there is no possibility to reuse AI technologies in different contexts. In fact, there are many AI components, such as the training data, developed models and 'sub-components' of trained systems available in completely open-source format. Public administrations could use these building blocks for their own systems,

An AI literacy taxonomy

Staff members of public administrations need to be AI literate, which includes having a set of competencies that enables people to collaborate with AI technologies, use them in the workplace but also critically evaluate them. AI literacy is based on six different levels depending on the depth of expertise. Firstly, a basic level of AI literacy ought to be required for all staff members working in a public administration eager to implement AI technologies. This includes a basic understanding of knowing and understanding AI, such as having to interpret basic techniques and concepts related to AI. Such expertise should necessarily not require any former knowledge in AI – although digital literacy and preferably data literacy is a must-have for individuals to make sense of AI.

Figure #5.

An AI literacy taxonomy

Create — **Produce new or original work** Design, assemble, construct, built and develop AI applications

Evaluate — **Justify a stand or decision** Appraise, predict, detect and justify decisions with AI applications

Analyse — **Draw connections among ideas** Organise, compare, decompose and abstract an AI problem

Apply — **Use information in new situations** Execute, implement, use and apply AI applications in different contexts

Understand — **Explain ideas or concepts** Describe, explain, interpret and demonstrate the meaning of AI

Know — **Use information in new situations** Copy, reproduce, recall and memorize AI concepts

Source:
Leung, Chu & Qiao (2021)

3

Recommendations
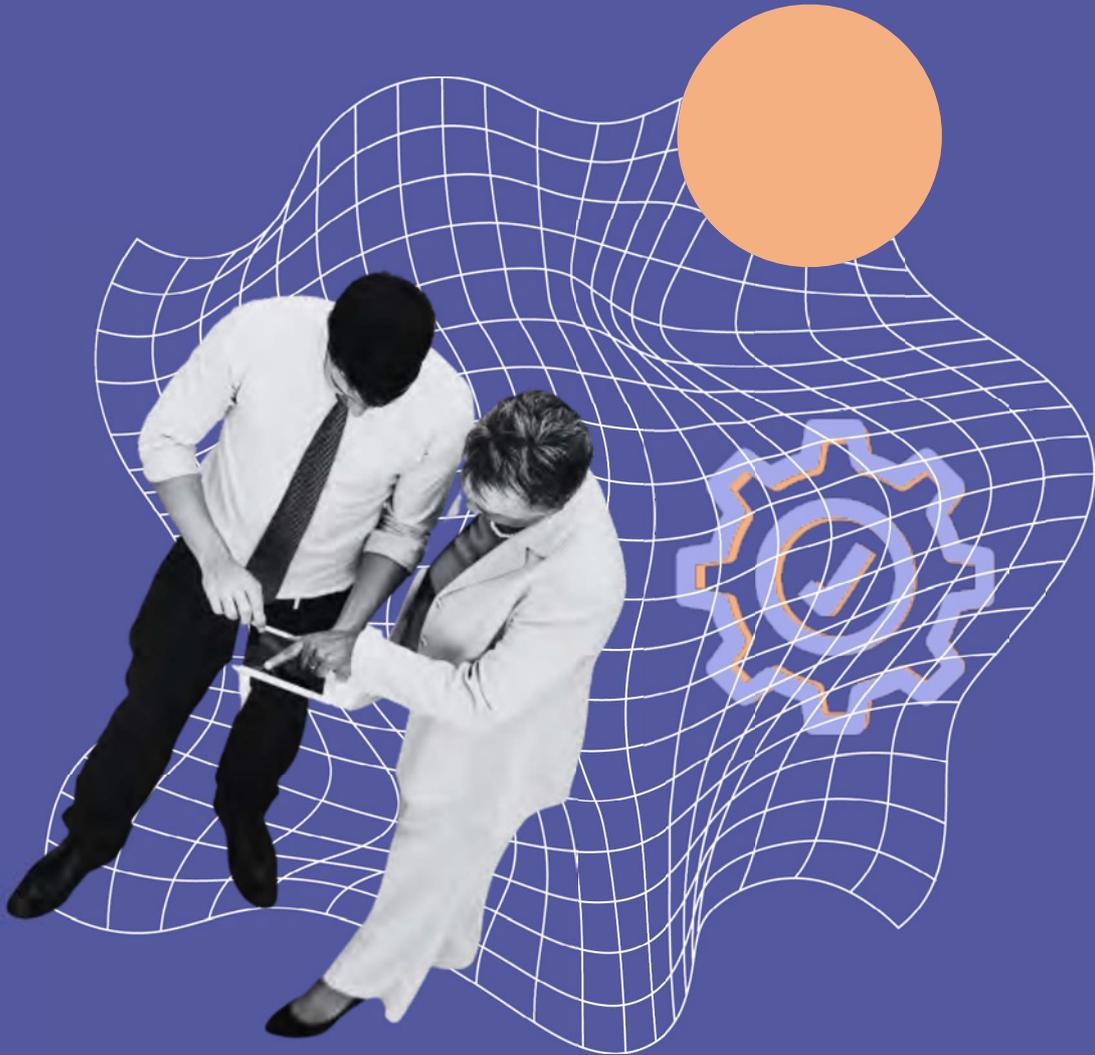
Recommendations

In light of their findings, the members of the Broadband Commission Working Group on AI Capacity Building put forward a series of recommendations for International Organisations, government, academia, civil society and the private sector.

General Recommendations

1. Raise awareness of the competencies needed by civil servants to implement digital transformation in government, and to create an enabling environment for digital transformation in societies through improved digital governance

Options for Action

1.1 Organize global, regional and national knowledge exchange and awareness-raising events around digital transformation to discuss the importance of digital competencies in the public sector, and to disseminate the framework to the target audiences.[62]

1.2 Advocate for greater coherence and coordination in digital capacity-building efforts for civil servants based on the framework, in line with the UN Secretary-General's Roadmap on Digital Cooperation[63] and the UNESCO Recommendation on the Ethics of Artificial Intelligence (2021).[64]

2. Support governments in contextualizing and adapting AI and digital transformation competencies for civil servants based on the diagnosis of capacity-building needs at individual, team, department and government levels

As this framework is meant to present governments worldwide with a usable set of AI and digital transformation competencies for the public sector, it is important to adapt it based on contextual factors. For instance, the type of digital competencies (and level of proficiency) needed can differ significantly as some civil servants may have already strengthened their digital transformation competencies. At the same time, there may be the need to develop a sequencing of the type and size of competencies countries need at different stages of digital transformation.

Options for Action

2.1 Develop a diagnostic tool for all civil servants to assess AI and digital transformation-related levels of competency at individual, team, department, and government levels to enable governments to develop capacity-building programmes as per needs and context.[65] Ensure that the tool is available as a digital public good[66] that can be easily adapted by governments for use in different languages.

3. Enable capacity building by making learning resources and training content openly accessible that can be used, tailored and adapted at the national level to train civil servants on relevant competencies

The framework provides a comprehensive overview of AI and digital competencies needed for the public sector to design and develop digital-transformation projects and policies. The resources and tools should be developed in an iterative process that involves pilot testing and learner feedback.

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62. One of the objectives would also be to demystify emerging technologies.

63. For United Nations-level efforts on Digital Capacity Building, see the UN Secretary-General's Roadmap on Digital Cooperation at: https://www.un.org/en/content/digital-cooperation-roadmap/assets/pdf/Roadmap_for_Digital_Cooperation_EN.pdf

64. https://unesdoc.unesco.org/ark:/48223/pf0000381137

65. Such a diagnostic tool should take into account the context in different countries, notably the level of digital maturity of public administration.

66. The diagnostic tool can be inspired by the Learning-Transfer Evaluation Model (LTEM), the European Commission's online self-assessment tool for digital skills. https://digital-strategy.ec.europa.eu/en/news/launch-new-european-online-self-assessment-tool-digital-skills

3.1 Develop an open learning hub that provides access to existing and new courses to enable civil servants to acquire different levels of proficiency related to AI and digital-transformation competencies.[67]

3.2 Develop an open curriculum with different learning pathways based on civil servants' needs, and the national digital-transformation context.[68]

3.3 Facilitate training for civil servants through a network of training institutions and trainers, including at the national level, equipped to support capacity building based on the competencies identified in the framework.

3.4 Identify and test models of capacity building that can help civil servants as professionals coming from diverse academic backgrounds acquire and practice the AI and digital-transformation competencies through project-based learning, on-the-job training, public-private peer learning, and hackathons with a focus on application, among others.[69]

4. **Support governments in monitoring the impact of capacity-building initiatives on digital transformation-related outcomes in the public sector**

It is important to understand the impact of capacity-building initiatives on digital transformation-related outcomes, as governments invest significant resources in training civil servants to implement digital transformation projects.

4.1 Identify, adapt and, as needed and desirable, develop qualitative and quantitative tools to measure the capacity of civil servants.

4.2 Explore collaboration with universities and research centers[70] to develop impact-measurement tools.

4.3 Research the contribution and impact that increased civil-servant capacity has on a national digital transformation journey, and share best practices.

5. **Foster cooperation between international, regional and national organisations that support, including civil society organizations, supporting training of civil servants, to facilitate knowledge exchange and mutual learning**

Options for Action

5.1 Develop a coalition of training institutions, universities, civil society organisations and think tanks to facilitate exchange of good practices on AI and digital transformation-related capacity building for civil servants[71]

5.2 Provide a platform for coalition partners to convene globally to exchange best practices and knowledge with respect to AI and digital transformation-related capacity building

Recommendations for Governments

6. **Governments should take a holistic approach towards digital transformation, first developing a national digital transformation and AI strategy, then a digital action plan on strengthening digital competencies, which are included in this framework**

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67. See for example, OER Commons, based on the UNESCO ICT competencies for teachers at: https://www.oercommons.org/hubs/UNESCO

68. See for example, Teaching Public Service in the Digital Age https://www.teachingpublicservice.digital

69. Some approaches on AI capacity building for the public sector include the following steps: i. Start by raising awareness, and organizing workshops and live demonstrations to showcase the benefits of AI to public-sector stakeholders in collaboration with global industry leaders and local innovation ecosystems. ii. Focus on a small set of high potential AI use cases across a diverse set of public-service delivery verticals, e.g. public administration, e-government and justice. iii. Deploy AI-related courses and trainings, focusing first on the uptake of short courses on applied AI competence across public-service delivery.

70. See Recommendations 7.

71. This could be done in partnership with, for instance, the GIZ FAIR Forward Artificial Intelligence for All Asia-Africa peer-learning network, or with Smart Africa's SADA (https://sada.atingi.org/)

As shown in the report, digital competencies are a crucial element contributing to the success of digital transformation projects, yet this is just one of the dimensions of the overall 'government system'. In that sense, these AI and digital transformation competencies should be integrated in a broader digital strategy.[72] Concerning AI in the public sector, it may be appropriate to start by raising awareness to showcase benefits of AI to public-sector stakeholders in collaboration with global industry leaders and local innovation ecosystems.

Options for Action:

6.1 Develop a digital transformation strategy, at national level, underpinning all the digital transformation efforts the country aims to undertake;

6.2 As part of this strategy, develop a detailed national civil-service digital competency action plan to build on this framework and inspire governments. The digital competency action plan[73] should, in principle, clearly detail: potential competency gaps (by setting a baseline); specific competencies to be developed and how to do so (i.e. upskilling); sufficient budget allocation; and a measurement matrix including results and indicators focused on digital competency building.

7. Governments can start 'piloting' the AI and digital transformation competency framework by developing capacity-building programmes and trainings as part of their digital transformation initiatives

Building on this framework, the diagnostic tool, and learning resources outlined in the above Recommendations, governments could imple-ment the AI and digital transformation competency framework in new or existing digital projects.

Options for Action

7.1 Develop new – or strengthen and adapt existing – capacity-building programmes to enhance AI and digital transformation competencies in government. For instance, in a new digital transformation project a government may want to use this framework to get a general overview of the major digital competencies; identify those that the project needs to succeed; deploy a capacity-development strategy to strengthen them.

7.2 Include an evaluation of the required competences for digital transformation to assess the feasibility and potential success of digital government initiatives before and during their launch. A stronger awareness of current limitations can lead to additional measures to ensure the value of the initiative is increased.

7.3 Allocate adequate financial resources for capacity building within digital transformation initiatives in government.

7.4 Organize AI and data hackathons, prizes and challenges to spur responsible AI adoption in the public sector supported by local actors.

Recommendations for Academia

8. Universities can leverage the framework to establish curricula and interdisciplinary programs for developing AI and digital transformation-related competencies

Universities could be inspired by this framework to develop curriculum on AI and digital transformation competencies. As research hubs, they could also undertake further research on digital transformation and capacity building.

Options for Action

8.1 Develop curricula with the aim of strengthening the digital capacity of civil servants, and also at masters level.

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72. The framework could therefore inspire the development of an action plan, yet should be part of a broader strategy.

73. Governments should certainly ensure that the digital competency plan is closely related to an effective and responsive Human Resource Management (HRM) system, as talent management is needed to underpin and support actions to build digital skills in the public sector. HRM is concerned with all aspects of managing people at work, including a range of functional areas from recruitment to retirement, and issues related to how people contribute to organisational performance and strategy. See CIPD Workforce Planning Factsheet. https://www.cipd.co.uk/knowledge/strategy/organisational-development/workforce-planning-factsheet#8035

8.2 Conduct further research on these elements linked to the framework: the factors contributing and hampering digital transformation; identification of contextual factors in the Global South that should be integrated when using the framework; investigation of further competencies that could be integrated into the framework; help define measurement tools on how to verify the increased capacity of public-sector officials; understand the possible sequence of developing those competencies (i.e. should some competencies be acquired before others for a specific country or context).

Recommendations for the Private Sector

9. **The private sector can collaborate with governments to implement capacity-building initiatives, and by contributing expertise and knowledge based on experience with digital transformation**

In many countries, the private sector and government are increasingly working together on digital transformation initiatives. This applies also to digital skills development; for instance, the private sector at times offers specific opportunities for youth on digitalization (from hiring, to providing input on curricula, taking part in setup of national qualifications framework, etc.). At the same time, the private sector is often assumed to be more advanced when it comes to digital transformation, and much can be learned on digital skill development. In that sense, a collaboration with the private sector could be beneficial for governments in terms of implementing digital capacity-building programmes.

Options for Action

9.1 Provide inspiration and guidance to the government on how to develop specific attitudes (such as culture of innovation) and skills – taking into consideration the limitations of the public sector in comparison to the private sector.

9.2 Help curriculum development based on this framework and identify other key digital competencies.

9.3 Sponsor and participate in international competitions and programs to support the development of the digital competencies included in the framework, including through hackathons, and on project learning, among others. For instance, the private sector can actively participate as mentors for teams of youth, especially girls, in hackathons hosted by the government that aim to tackle the SDGs with AI, citizen science and mobile technologies.

Box #13.

Involving Youth and Girls in Digital Transformation through Hackathons

Technovation is a global technology entrepreneurship competition that has a plug and play, evidence-based model that can be used as a foundation for hackathons. Girls work with mentors over the course of 12 weeks to go through a completely free, evidence-based, online AI-entrepreneurship curriculum. Mentors do not need to have AI experience but are invited to provide problem solving expertise as well as model lifelong learning. Some examples of apps developed by prior Technovation alumnae include:

- **India, 2015** - Clean and Green is a mobile application which helps to post photos of unclean spots in a community and share it with the Municipal corporation worker, local community leaders and citizen's group. This will increase accountability and transparency for government officials. It has features like calling, sending text messages to the municipal department, getting updates on different seasonal infectious diseases.

- **Kenya, 2017** - Reporter is a mobile application that enables individuals to report problems around their surrounding such as sewage bursts, potholes, collapsed buildings, water pollution, environmental degradation, pollution and waste management, to increase accountability and efficiency.

- **US, 2017** - Hydro Hunt is a mobile application dedicated to generating awareness about the quality of water sources, educating municipalities about sustaining a healthy water supply, and ensuring that the government continues to regulate water supplies according to the highest standards. With this app, communities are able to unify their water safety concerns, forcing their local, and in turn, federal governments to listen and take action. The everyday person can involve themselves without being an expert.

Annex

Consultation Details

Please find below a high-level summary of the global and regional expert consultations organised to discuss the AI and digital transformation-related context and competency needs in different parts of the world.

- On 25 April 2022, UNESCO, Open Knowledge Foundation (OKF), Open Data Latin American Initiative (ILDA), Paradigm Initiative and Polylat commenced a series of global and regional consultations, beginning with a workshop at the World Summit on the Information Society (WSIS) to gather multi-stakeholder feedback and shape the Competency Framework consultation process. Read more about the WSIS workshop at https://articles.unesco.org/en/articles/what-are-digital-transformation-and-competency-needs-public-sector

- On 25-29 April 2022, under the theme "Data and Digitalization for Development", UNESCO, OKF, Paradigm Initiative, ILDA and Polylat organized a roundtable to discuss digital transformation and competencies needed in the public sector at the United Nations Conference on Trade and Development (UNCTAD) eCommerce Week. Read more about the roundtable at https://articles.unesco.org/en/articles/what-are-digital-transformation-and-competency-needs-public-sector

- On 24 May 2022, UNESCO, OKF and Polylat organized a consultation with experts from Africa and Asia each to discuss AI and Digital Transformation competencies needed by civil servants in the region.

  - Read more about the consultation with experts from Africa at https://articles.unesco.org/en/articles/what-are-digital-competencies-civil-servants-africa

  - Read more about this consultation with experts from Southeast Asia at https://www.unesco.org/en/articles/civil-servant-20-brainstorming-southeast-asian-experts-digital-competencies-policymaker

- On 17 and 20 June 2022, UNESCO and ILDA organized two consultations with experts from Latin America and the Caribbean to discuss digital transformation and AI-related competencies needed by civil servants in the region. Read more about this consultation with experts from Latin America and the Caribbean at https://articles.unesco.org/en/articles/developing-digital-competencies-civil-servants-latin-america

Workshop Participants

Africa

Abdulrahman Iliya, Babawande Owolabi, Charity Johnson, Damola Sogunro, Felicia Osite, Joseph Akinbode, Oluwaseun Winsala and Rasak Obisesan from Federal Ministry of Communications and Digital Economy; Adeboye Adegoke, Amina Ibrahim Idris, Bulanda Nkhowani, Gbenga Sesan, Ihueze Nwobilor, Khadijah El-Usman, Sani Suleiman, Tosin Abolaji, Odinakachi Nwafor and Rigobert Kenmogne from Paradigm Initiative; Ahmad Yusuf, Lagos State House of Assembly; Aurelia Kamuzora, Mzumbe University; Bendjedid Rachad Sanoussi, Digital Grassroots; Charles Ikem, PolicyLab Africa; Diana Nyakundi, Lawyers Hub; Flaure Lekpeli, African Union Development Agency (AUDA-NEPAD); Florence Anyango, Centre for Intellectual Property and Information Technology (CIPIT);Jake Okechukwu, Praxis & Gnosis Law; Laetitia Badolo, Khawla Ben Aicha from Niyel; Lydienne Ntogue, Ministry of Posts and Telecommunications; Irene Kisakye, Uganda Revenue Authority (URA); Maha Jouini, Tunisia; Michael Wabugo, Uganda Registration Services Bureau (URSB); Niyi Adelami, Federal Capital Territory; Noha Fathy, Egypt; Miller Marcel Nyoh Muluem, Internet Governance Forum; Nanjira Sambuli, Carnegie Endowment for International Peace; Oarabile Mudongo, Centre for AI and Digital Policy; Olorunfemi Omotayo, Teachers' Academy Africa; Pierre Dandjinou,

Agility

A set of principles and values about project management derived from a broad range of software development frameworks, including Scrum. Those principles were popularized in the Manifesto for Agile Software Development (2001)[74] and are increasingly being adapted and used in other sectors (including in government).[75]

Artificial intelligence

Systems that have the capacity to process data and information in a way that resembles intelligent behavior, and typically include aspects of reasoning, learning, perception, prediction, planning or control.[76]

Attitude

A learned tendency or readiness to evaluate things or react to some ideas, persons or situations in certain ways, either consciously or unconsciously. Attitudes are underpinned by values and beliefs and have an influence on behavior.[77]

Civil servants

Persons employed by a government department or agency for public sector undertakings. This report uses the term *civil servants* interchangeably with others such as public sector officials, or government officials.

Collective intelligence (CI)

The enhanced capacity created when people work together, often with the help of technology, to mobilize a wider range of information, ideas and insights. It emerges when these contributions combine to be more than the sum of their parts for purposes ranging from learning and innovation to decision-making.[78]

(Digital) Competency

A competency is a set of measurable and observable knowledge,[79] skills and attitudes that allow civil servants to lead and manage digital transformation and contribute to success in a job or position[80]. A competency framework is a system that helps clarify and define those competencies that lead to a sector or organisation's success. Digital competency goes beyond technical competencies in IT, to include non-IT elements (see **Digital Transformation**).

Creativity

Traditionally seen as the ability to respond adaptively to the need for new approaches or products, and often defined as the ability to purposefully bring something new into existence. The concept has expanded and changed in recent years; a new emphasis on 'everyday' and 'social' creativity is shifting the focus from individual genius in some fields (e.g. fine arts, advanced science) to collaborative creativity in everyday life.[81]

Critical thinking

A process that involves asking appropriate questions, gathering and creatively sorting through relevant information, relating new information to existing knowledge, re-examining beliefs and assumptions, reasoning logically, and drawing reliable and trustworthy conclusions. Critical thinking calls for persistent effort to apply theoretical constructs to understanding a problem, considering evidence, and evaluating methods or techniques for forming a judgment. The cognitive skills of analysis, interpretation, inference, explanation, evaluation, and of monitoring and correct-

74. https://agilemanifesto.org

75. https://www.mckinsey.com/industries/public-and-social-sector/our-insights/better-and-faster-organisational-agility-for-the-public-sector

76. Read more about UNESCO's Recommendation on the Ethics of Artificial Intelligence: https://unesdoc.unesco.org/ark:/48223/pf0000381137

77. http://www.ibe.unesco.org/sites/default/files/resources/ibe-glossary-curriculum.pdf

78. https://www.nesta.org.uk/report/future-minds-and-machines/3-what-collective-intelligence

79. For practical reasons, the framework merges skills and knowledge. However, it adds a group of attitudes as complementary areas, as it is important for civil servants to be cognizant of these.

80. Sanghi, S. (2016). The handbook of competency mapping. SAGE Publications, Inc., https://dx.doi.org/10.4135/9789353280352

81. http://www.ibe.unesco.org/sites/default/files/resources/ibe-glossary-curriculum.pdf

ing one's own reasoning, are at the heart of critical thinking.[82]

Data use and governance

Refers to a combination of skills and attitudes that allow public officials to collect, use, organize, analyze and share[83] data and technology effectively and responsibly, following the principles of security and data protection. In this document, digital use and governance is one of the three main competency areas.

Data value chain

Describes the process of data creation and use from first identifying a need for data to its final use and possible reuse. The data value chain has four major stages: collection, publication, uptake and impact. These four stages are further separated into twelve steps: identify, collect, process, analyze, release, disseminate, connect, incentivize, influence, use, change, and reuse.[84]

Digital age

Refers to the period in human history shaped by digital information and communication technologies, in which "digital change through digitization and digital transformation has progressed so far that technologies have a formative influence on people's lives."[85]

Digital literacy

The ability to access, manage, understand, integrate, communicate, evaluate and create information safely and appropriately through digital technologies for employment, jobs and entrepreneurship. It includes competences variously referred to as computer literacy, ICT literacy, information literacy and media literacy.[86]

Digital perspective for decision-making

The ability or attitude that allows public officials to understand the complexity and interconnectedness of problems. Civil servants need to 'shift' their perspective, as challenges are more complex than before. In this document, digital perspective is one of the three main competency areas.

Digital management and execution

The ability or attitude that allows public servants to design and develop projects or policies in an agile or collaborative way. This is key when designing and developing digital transformation projects as 'new ways of working' are needed for projects to achieve their results. In this document, digital innovation and management is one of the three main competency areas.

Digital transformation

Is the process of accelerated development and pervasive use of digital technologies that generates new opportunities and challenges for sustainable development. In this specific context, digital transformation also refers to the process of using digital technologies to create new - or modify existing - work processes, the culture of an organization, and at highest level, a country's digital enabling environment (policies, regulation).

Digital technologies

A wide range of technologies, tools, services and applications using various types of hardware and software[87]. They facilitate services or activities by electronic means to create, store, process, transmit and display information. Broadly, digital technologies include the use of personal computers, digital television, radio, mobile phones and robots, etc.[88][89]

82. Ibid.

83. This is based on the data value chain.

84. https://opendatawatch.com/reference/the-data-value-chain-executive-summary

85. Jörn Lengsfeld: Digital Era Framework. 2019. Download: https://joernlengsfeld.com/url/digital-era-framework-en

86. http://uis.unesco.org/sites/default/files/documents/ip51-global-framework-reference-digital-literacy-skills-2018-en.pdf

87. Rice, Jennifer. (2003). Teacher Quality: Understanding the Effectiveness of Teacher Attributes.

88. Vuorikari R, Punie Y, Carretero Gomez S and Van Den Brande G. DigComp 2.0: The Digital Competence Framework for Citizens. Update Phase 1: the Conceptual Reference Model. EUR 27948 EN. Luxembourg (Luxembourg): Publications Office of the European Union; 2016. JRC101254

89. Tulinayo, P. & Ssentume, Peter & Najjuma, Rovincer. (2018). Digital technologies in resource constrained higher institutions of learning: a study on students' acceptance and usability. International Journal of Educational Technology in Higher Education. 15. 10.1186/s41239-018-0117-y.

e-Government/e-Governance[90]

e-Governance could be considered a broader concept dealing with the whole spectrum of networked government digital interactions – i.e. government to the public, government to the private sector, or government to companies – whereas e-Government is a narrower concept dedicated to state institutions and public e-services[91].

Emerging technologies

"A radically novel and relatively fast-growing tool characterised by a certain degree of coherence persisting over time, and with the potential to exert a considerable impact on the socioeconomic domain(s) observed in terms of the composition of actors, institutions and patterns of interactions, along with the associated knowledge production processes. Its most prominent impact, however, lies in the future and so the emergence phase is still somewhat uncertain and ambiguous."[92].

Global goods

Both nonrival and nonexcludable, and thus only those goods which cover issues that prove transborder in nature, including the environment, the prevention of communicable diseases, international trade, international financial architecture, and global knowledge for development.[93]

ICT (or IT)

Information and communication technologies (ICT) are a diverse set of technological tools and resources used to transmit, store, create, share or exchange information. These ICT tools are a subset of broader digital tools. The concept of 'digital' is much broader than that of ICT.

Knowledge

There are many definitions and forms of knowledge. It can be described as the body of concepts and factual information, including their interrelated structures and patterns, concerning the natural and social environment as well as our understanding of the world, people and society, gained through learning and/or experience. Declarative (factual) knowledge points to "knowing what", while procedural knowledge refers to "knowing how" (knowledge of specific functions and procedures to perform a process, task or activity). Other forms often considered are tacit and explicit knowledge.[94] Knowledge enables the development of skills.

Open source

Software code that is published publicly and that anyone can see, use or modify for their own needs. Developers publish their code in public repositories such as those on GitLab or GitHub, so that more people can see and interact with it.[95]

Scrum

A framework within which people can address complex adaptive problems while productively and creatively delivering products of the highest possible value.[96] Scrum originated in software development, yet it has been used in other fields including research, marketing and advanced technologies (see Agility).

Skill

"A learned power of doing something competently: a developed aptitude or ability."[97] In this document, skills, together with attitudes, are an integral part of digital competencies. Knowledge is included in the concept of skills for reasons of practical-

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90. In some cases, they could be separated from one another (Gil-García and Pardo, 2005). A possible root of the differences arises from the concepts of government and governance themselves, where government is the organisation and institution while governance refers to functionality, legal acts and policies. Despite the use of "government" and "governance" after the prefix "e-" (meaning 'electronic'), there is no real relation between these concepts and governance theories.

91. Palvia, Shailendra & Sharma, Sushil. (2022). E-Government and E-Governance: Definitions/Domain Framework and Status around the World.

92. Rotolo, Daniele, Hicks, Diana & Martin, Benjamin R., (2015). What Is an Emerging Technology? Research Policy, 44(10): 1827-1843, Available at SSRN: http://dx.doi.org/10.2139/ssrn.2564094

93. https://elibrary.worldbank.org/doi/10.1596/978-1-4648-0484-7_global_public_goods

94. http://www.ibe.unesco.org/sites/default/files/resources/ibe-glossary-curriculum.pdf

95. http://www.ibe.unesco.org/sites/default/files/resources/ibe-glossary-curriculum.pdf

96. https://www.scrum.org/about

97. https://www.merriam-webster.com/dictionary/skill

ity (a skill is a type of work or activity that requires knowledge). Skills and abilities are often used interchangeably, including in this document.

Strategic foresight

A structured and systematic way of using ideas about the future to anticipate and better prepare for change. It is about exploring different plausible futures that could arise and the opportunities and challenges they could present. We then use those ideas to make better decisions and act now.[98]

Global South

The use of the term "South" to refer to developing countries collectively has been part of the shorthand of international relations since the 1970s. It rests on the fact that all the world's industrially developed countries (except for Australia and New Zealand) lie to the north of its developing countries. The term does not imply that all developing countries can be put together in one category.
What it does highlight is that although developing countries range across the spectrum in every economic, social, and political attribute, they all share a set of vulnerabilities and challenges[99].

GovTech

An emergent innovation ecosystem in which private startups and innovative small and medium enterprises (SMEs) deliver technological products and services, often using new and emerging technologies, to public sector clients. Many GovTech companies work on challenges presented by emergent policy areas, or on problems where no solution was previously imagined as technically possible. The priorities of the GovTech ecosystem include improved efficiency and greater accountability in the public sector and its interactions with people. Building trust across the diverse stakeholders is crucial for developing a thriving GovTech industry to serve the domestic public sector and to contribute to national economic growth[100].

Waterfall methodology

A project management method with a linear approach, where each stage of a workflow needs to be completed before advancing to the next step. While there are various types of project management methodologies, Waterfall is well suited for projects where the objectives are clearly outlined from the beginning.[101]

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98. https://www.oecd.org/strategic-foresight

99. https://www.undp.org/sites/g/files/zskgke326/files/migration/cn/UNDP-CH-PR-Publications-UNDay-for-South-South-Cooperation.pdf

100. Filer, T. (2019). Thinking about GovTech A Brief Guide for Policymakers. Cambridge: Bennet.

101.https://www.forbes.com/advisor/business/what-is-waterfall-methodology/

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