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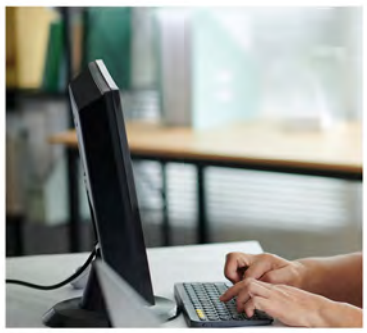
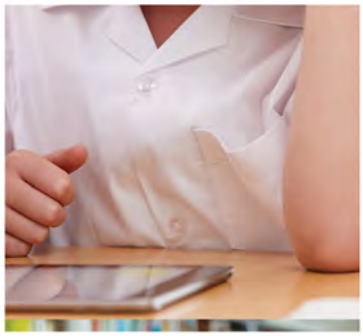
International Telecommunication Union
Development Sector

Digital Skills Toolkit

2024





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Digital Skills Toolkit

2024

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Foreword

In the rapidly evolving digital landscape of the 21st century, the importance of digital skills cannot be overstated. ITU Member States and policy-makers hold the key to unlocking their nation's potential by developing robust digital skills strategies and policies. This publication, the ITU Digital Skills Toolkit, is designed to empower you with the insights, tools, and guidance needed to navigate this critical journey.

The digital revolution offers unprecedented opportunities for economic growth, innovation, and societal development. However, it also presents significant challenges, particularly the digital skills gap that exists ranging from basic digital literacy level to the more advanced professional level. This gap poses a barrier to inclusive participation in the digital economy, leaving many citizens and employees at a disadvantage. Addressing this gap is not just a matter of equity; it is an economic imperative.

The digital skills gap is a multifaceted subject that affects individuals, businesses, and entire economies. At the most basic level, digital literacy encompasses the fundamental skills required to use digital devices and the Internet effectively. These skills include the ability to navigate digital interfaces, communicate online, access information, and perform everyday tasks such as online banking or e-government services. Despite the ubiquity of digital technologies, a significant portion of the global population still lacks these essential skills, creating a divide between those who can fully participate in the digital age and those who cannot.

There is an equally pressing need for more advanced digital skills. As technology continues to advance at a breakneck pace, the demand for specialized skills in areas such as data analysis, programming, artificial intelligence, and cybersecurity is growing exponentially. This skills gap is particularly pronounced in the workforce, where many employees find themselves unprepared for the digital demands of their roles. Bridging this advanced digital skills gap is crucial for maintaining competitiveness in the global market and fostering a culture of continuous learning and adaptation.

Furthermore, the digital skills gap has broader societal implications. Individuals who lack digital skills are at a greater risk of social exclusion, as they may be unable to access critical services, participate in digital learning opportunities, or engage in the increasingly digital job market. This exclusion can perpetuate cycles of poverty and inequality, making it imperative to address the digital skills gap as part of broader social and economic development strategies.

As our reliance on digital technologies grows, so does the importance of online safety and cybersecurity skills. Ensuring that citizens and employees are equipped with the knowledge to protect themselves and their organizations from digital threats is paramount. Cybersecurity is not just a technical issue; it is a critical component of national security and economic stability. A well-developed national digital skills framework must prioritize these aspects to safeguard individuals and national interests alike.

As necessary digital skills continue to grow in number and complexity, countries need well-structured approaches to identify current digital skills levels and gaps, and to develop effective policies and programmes to address them. The need for a comprehensive national policy framework for digital skills is therefore critical. A policy framework serves as a strategic blueprint that aligns efforts across various sectors, ensuring a cohesive and coordinated approach to digital skills development. It helps in setting clear objectives, defining standards, and allocating resources effectively.

A robust policy framework also fosters collaboration between government, industry, and educational institutions, creating a synergistic environment where best practices can be shared, and innovative solutions can be developed.

To assist Member States in this process, the ITU Digital Skills Toolkit offers a comprehensive, step-by-step guide to help you craft effective national digital skills strategies and policies. This hands-on resource is filled with practical examples and actionable insights, making it an invaluable asset for policy makers in all countries. By leveraging this toolkit, you can ensure that your nation is not only prepared for the digital future but is also a leader in the digital age.

Designed for use by policy-makers and other stakeholders, such as partners in the private sector, non-governmental organizations, and academia, the toolkit draws on the previous edition published in 2018. It has been thoroughly reviewed and updated to reflect developments in the digital era since then.

It is complemented by the ITU Digital Skills Assessment Guidebook, published in 2020, which focuses on helping policy makers identify national skills gaps and requirements. These identified gaps can then be addressed through targeted digital skills development policies and strategies. In other words, the results of a digital skills assessment exercise can serve as a concrete and necessary input into the national policy-making process covered in this toolkit.

This toolkit also serves as a contribution to the ITU-ILO Digital Skills Campaign, which is part of the ILO Decent Jobs for Youth initiative launched in 2016. The campaign aims to boost youth employment through digital skills by incentivizing and encouraging partners to commit to deliver digital skills training to young people, particularly in the developing world. So far, pledges to train more than 23 million people have been made through the campaign. This toolkit is one of ITU's contributions to the knowledge products that support the campaign, assisting stakeholders in the design and delivery of effective training policies and programmes.

I trust the ITU membership and other concerned stakeholders will welcome this toolkit as an indispensable resource, facilitating their work and encouraging them to undertake the important task of developing national digital skills policies for digital transformation.

Dr Cosmas Luckyson Zavazava
Director of the Telecommunication Development Bureau
International Telecommunication Union

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Introduction

"There is a global digital skills shortage that could mean 85 million jobs are unfilled by 2030."

World Economic Forum

"Digital skills are increasingly required in workplaces around the world. In developing countries, on average one-third of urban workers use digital technologies at work,[1] while in many developed countries, digital skills permeate work environments to the extent that they have become almost necessary for employment."

ILO ITU Digital skills campaign thematic plan, 2022

[1] World Bank Group (2016). World Development Report 2016: Digital Dividends. Chapter 2: Expanding opportunities

"Technology adoption will remain a key driver of business transformation in the next five years. Over 85% of organizations surveyed identify increased adoption of new and frontier technologies and broadening digital access as the trends most likely to drive transformation in their organization."

World Economic Forum, Future of Jobs Report, 2023

"Although Member States have primary responsibility for skills development, the EU has long recognised the challenge, and has taken a number of steps to support Member States in addressing the insufficient level of basic digital skills…In this context, the Commission defined an internationally recognised Digital Competence Framework, supported the development of national strategies on digital skills and assisted in creating national Digital Skills and Jobs Coalitions in almost all EU Member States."

EU actions to address low digital skills

Digital skills underpin nearly every aspect of work and life. People with digital skills have greater opportunities to improve their livelihoods, access a wide range of services, and enhance their quality of life. Ensuring that every citizen has the digital skills needed to thrive is the purpose of a national digital skills strategy. Countries that implement comprehensive digital skill strategies ensure their populations have the skills they need to be more employable, productive, creative, and successful while remaining safe, secure and healthy online.

Digital skills contribute to several of the Sustainable Development Goals (SDGs), from Quality Education (SDG 4) to Good Health and Wellbeing (SDG 3) to Decent Work and Economic Growth (SDG 8).

Digital skills play a critical, enabling role in achieving digital transformation. Many countries have digital transformation strategies that identify digital skills as a foundational building block across multiple priorities. A focus on digital skills can help a country achieve several goals, such as economic growth, social inclusion, civic engagement, and technological change.

Economic growth

- Employment opportunities: Most new jobs require a certain level of digital literacy, and traditional jobs such as merchants and farmers are increasingly reliant on digital skills as well.
- Entrepreneurship and innovation: Digital skills are essential for starting new businesses and creating innovations across every sector.
- Global competitiveness: A digitally literate workforce is better positioned to compete in the global economy.

Social inclusion

- Reducing inequalities: Digital skills can lift socially disadvantaged groups so that they can equally enjoy the benefits of society.
- Lifelong learning: Multiple avenues for learning ensure that everyone has the opportunity to gain new skills throughout their life.

Civic engagement

- E-government: Digital skills enable governments to create more efficient government services and enable citizens to access those services.
- Digital harms: Digital skills help citizens safeguard themselves against scams, misinformation, and other risks that can erode confidence and social cohesion.

Technological change

- New technologies: A digitally literate population allows a country to incorporate emerging technologies such as artificial intelligence, blockchain, and the Internet of Things (IoT) in ways that support economic growth, social inclusion, civic engagement and other national priorities.

The COVID-19 pandemic highlighted the importance of digital skills. Suddenly, people lacked access to essential services, children had limited access to schools, workers lacked the tools to work remotely, among many other repercussions. If there was a silver lining, it was the recognition that digital skills and digital inclusion needed to become national priorities.

Who is this toolkit for?

The Digital Skills Toolkit is a guide for governments to develop national digital skills strategies. The aim is to provide governments with step-by-step guidelines and multiple examples that cover a wide range of contexts to draw upon from around the world.

The toolkit is for all countries - those with existing digital skills strategies since technological change requires continuous monitoring and review, and those without existing digital skills strategies to assist them with a structured process for development of a comprehensive and implementable national strategy.

Most countries today are likely to have digital skills strategies under multiple government ministries and departments, such as ICT, digital transformation, education, labour, health, or rural development. This toolkit is intended to assist countries in developing a comprehensive national strategy that reforms and unites individual strategies for enhanced synergies and efficiencies.

How to use this toolkit

This toolkit provides policy-makers and other stakeholders with practical information, examples, and step-by-step guidance for developing a national digital skills strategy. It can also be used to develop policies and programmes to address specific priorities. The toolkit is divided into three sections:

Part 1: Understanding digital skills

Part 2: Developing the strategy and programme plans (with worksheets)

Part 3: Examples of digital skills strategies and programmes from around the world

Other ITU resources

In addition, there are number of complementary resources that have been created by ITU that are offered here for ease of reference.

ITU Academy – The ITU Academy is the main online gateway to ITU capacity development activities. It brings together under one umbrella a wide range of training activities and knowledge resources in the field of information and communication technologies (ICTs) and digital development.

ITU Academy Training Centres (ATCs) – The ATCs are a new programme focused on developing the capacity of ICT professionals with a focus on developing countries. Courses are delivered

online through the ITU Academy platform. Hybrid and in-person instruction is also available through one of the ATCs (currently 13).

ITU Digital Transformation Centres Initiative – The Digital Transformation Centres (DTC) Initiative, in partnership with Cisco, aims to support countries to strengthen digital capacities of citizens, particularly in underserved communities. The selected DTCs become part of a global network of institutions to accelerate the uptake of digital technologies among citizens and boost the capacity of young entrepreneurs and SMEs to succeed in the digital economy.

ITU Digital Skills Assessment Guidebook – This resource offers a practical step-by-step guide for developing national digital skill assessments. The guidebook includes steps and options for assessing existing skill levels of the population, uncovering the skills needs of industry and other sectors, and making other determinations to inform digital skill strategies.

Digital Skills Insights – An online ITU publication which puts together scholarly articles with a focus on the impact of digital transformation on capacity and skill development. It covers a wide range of topics that may help people to develop their skills, such as artificial intelligence (AI), the Internet of Things (IoT), big data, telecommunication/ICT regulatory issues, smart cities/ societies, digital competency, open source learning, and intellectual property rights.

ITU-D Digital Inclusion – This programme helps decision-makers and communities to apply the potential of ICTs to improve people's lives. It includes resources for women and girls, youth, ICT accessibility, children, older persons, indigenous people, and other topics.

ILO-ITU Digital Skills Campaign – This campaign addresses the skills gap by increasing young people's employability, creating quality jobs, and sparking innovation across all sectors in the digital economy.

ITU and SDG 4 – ITU plays a major role in supporting SDG 4 – Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. ITU is also the custodian agency for collecting data for SDG 4.1.1, based on the DigComp framework (see Chapter 2).

PART 1: Understanding digital skills

Chapter 1: Digital skills frameworks

This chapter covers the importance of using a digital skills framework when developing a national digital skills strategy, with examples that governments can review.

Countries should use a digital skills framework that best meets their needs. A digital skills framework is a structured outline that defines the skills people need to effectively use digital technologies in various contexts. It serves as a guide for identifying, developing, and assessing digital skills across different levels of proficiency and areas of application.

Digital skills frameworks are particularly important for:

- Standardization: Provides a common language and understanding of what constitutes digital skills.
- Guidance: Helps educators, employers, and policy-makers design curricula, training programmes, and policies.
- Assessment: Enables consistent and objective measurement of digital skills.
- Development: Helps people to identify and address gaps in their digital skills.

European Digital Competence Framework for Citizens (DigComp)

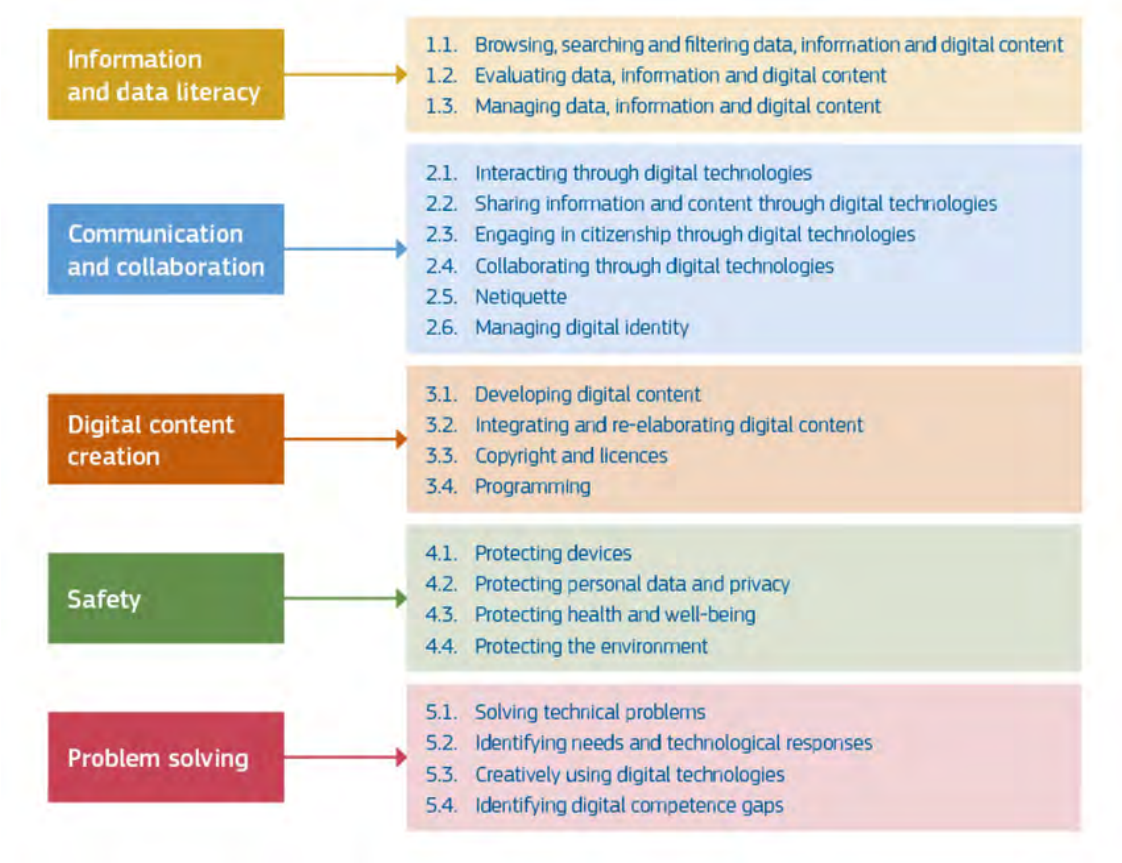
One widely regarded framework is DigComp 2.2: the Digital Competence Framework for Citizens (2022), developed by the European Commission. The framework is featured in this toolkit because it is research based, has evolved through extensive stakeholder involvement, and has gained wide popularity around the world. The current version (2.2) includes several additional resources, including:

- tools for self-reflection, monitoring and certification of digital competence;
- reports and guides for DigComp implementation;
- DigComp translations and adaptations;
- DigComp community of practice.

The 2.2 version has also been updated with examples that address misinformation and disinformation, datafication of Internet services and apps, citizens interacting with AI systems, emerging technologies, and environmental sustainability concerns. The next update is the DigComp learnings outcome project, expected in late 2025 (learn more here).

DigComp uses the term digital competence and defines it as involving "the confident, critical and responsible use of, and engagement with digital technologies for learning, at work, and for participation in society." The framework comprises five competence areas and 21 competences (Figure 1). Each competence includes a set of knowledge, skills, and attitudes, which are further divided into eight proficiency levels. Other frameworks use alternative terms – such as digital literacy, digital fluency, ICT skills, and digital skills. The ITU uses digital skills as this term has been widely adopted around the world.

Figure 1: DigComp conceptual reference model



Source: DigComp 2.2

Other frameworks

One of the chief reasons for the DigComp popularity is its broad conceptualization of what is required to be digitally competent. This stands in contrast to many frameworks that adopt a narrower definition of digital skills, typically focused on the use of software applications for instrumental purposes. These frameworks might have a role for individual projects (for example, coding camps), but for national policy setting this toolkit recommends adopting a framework with a broad definition of digital skills, similar to DigComp.

There are a number of robust frameworks that target specific groups, many of which are similar to or built upon DigComp. These frameworks can play a role in, for instance, teacher training or non-governmental organization (NGO) capacity development.

Digital competence frameworks for teachers, learners and citizens (United Nations Educational, Scientific and Cultural Organization (UNESCO)) is a database of digital skills frameworks with links to articles and thought pieces. The frameworks are categorized by target group: policy-makers, teachers/trainers, citizens, IT professionals, NGOs, curriculum developers, labour market (social) partners, and others. This resource can be used to identify complementary frameworks for specific initiatives and purposes.

Chapter 2: Digital skills for today and tomorrow

This chapter describes the types of digital skills covered in the toolkit, their importance for advancing digital inclusion and economic opportunities, related skills areas, and the dynamic nature of the digital skills field as evidenced by artificial intelligence (AI).

Digital transformation and the worldwide expansion of the digital economy and digital society require an array of digital skills to thrive in work and life. The kinds of digital skills required to succeed are dramatically different today from those required just a few years ago. The dynamic nature of technological change requires:

- governments to review and update their policies and strategies;
- schools and skills providers to update their learning resources and pedagogical approaches;
- citizens to embrace lifelong learning opportunities.

Skills for life

Everyone needs digital skills to be a full participant in the digital society and digital economy. Those with basic skills can access news and information, communicate with friends and family, join new communities, avail themselves of government, health, financial and other electronic services, learn new skills, play games, along with many other benefits. They are also better able to safeguard themselves against scams, misinformation, and other digital harms.

The goal is to ensure everyone has the opportunity to obtain basic digital skills, including those with no ICT skills and low literacy populations. While mobile phones have lowered the skills barrier overall, most people still benefit from additional skills training. This includes learning about the ways people can use their mobile phones for a wide variety of information and communication tasks.

Skills for work

More advanced digital skills can improve opportunities for success in work. Broadly, there are three categories of work-related digital skills:

1) **General digital skills**

   These are the skills expected by many professions that allow people to be productive in a variety of work settings. These skills map to higher proficiency levels in DigComp 2.2 across

all competence areas (information and data literacy, communication and collaboration, digital content creation, safety, and problem solving).

2) Domain-specific digital skills

These are the skills needed for particular *sectors*, such as healthcare, tourism, or agriculture, as well as for particular *jobs* such as accounting, data entry, or customer support. Domain skills are for those who want to work for a company (for example, hospital, hotel) and for those who are self-employed (for example, merchant, farmer). Often, the skills needed for these areas of work are focused and can be acquired through training programmes that specialize in these areas.

3) Advanced digital skills

These are the skills needed to be an IT professional, such as: programming, database management, cybersecurity, data analysis, digital design among many specialized skills. Nearly every industry employs people with such skills, from banking to manufacturing.

Artificial intelligence (AI)

Artificial intelligence (AI) has quickly become a transformative force across all sectors of society. Future impacts (positive and negative) are the subject of great interest and debate. Without question, however, is the need for people who are adept at both using AI and creating AI applications for specific purposes. Already, the use of generative AI tools such as ChatGPT or Gemini and other language models is becoming standard in many workplaces.

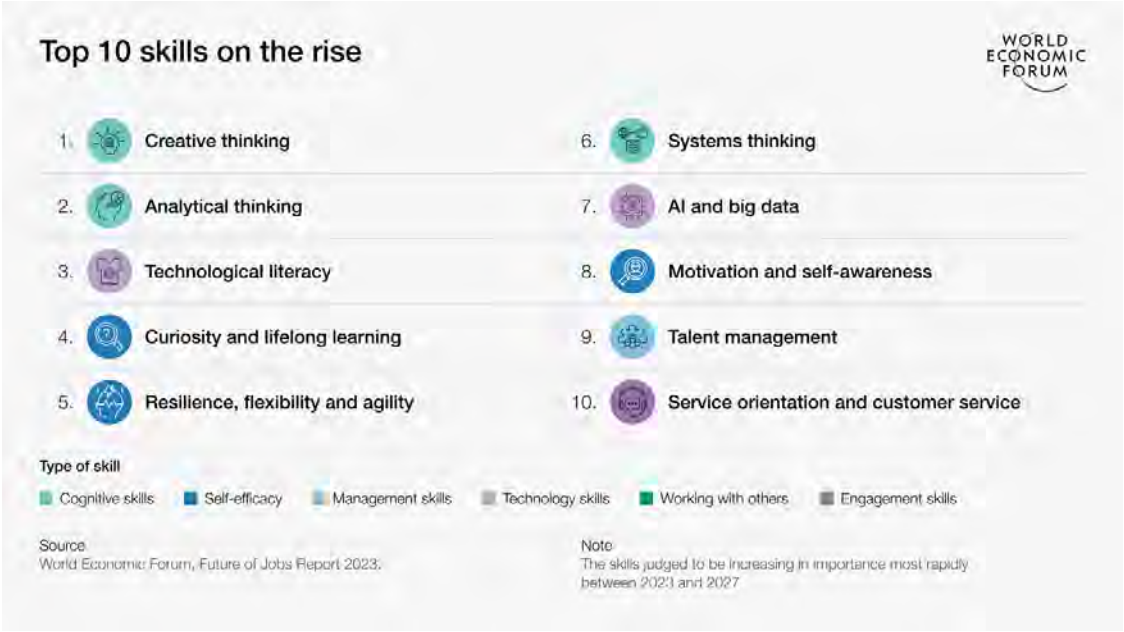
Accordingly, many frameworks are being updated to incorporate AI, including DigComp 2.2, which aims to prepare citizens not only to use AI technologies but to do so in a way that is informed, ethical, and responsible. The focus is on empowering people to interact with AI as knowledgeable users who can critically engage with the technology and its societal implications.

While most attention to date has focused on learning digital skills to use AI, the support of AI for learning digital skills is another area where innovations are expected to emerge. Staying abreast of the latest advances in AI and engaging in knowledge sharing forums and conferences should be a high priority for every country.

Complementary skills

Digital skills take their place within a broader framework of skills and competencies that are needed by people to thrive. In fact, many digital skills programmes incorporate complementary skills so that people are well prepared for the workforce. According to a 2023 World Economic Forum report, employers ranked skills such as creative thinking, analytical thinking, and curiosity as important as technological skills such as technological literacy, AI, and big data (Figure 2).

Figure 2: Top 10 skills on the rise



Source: World Economic Forum, Future of Jobs Report: 2023. Data based on survey of 800 of the world's largest employers

Digital risks

It is no longer realistic to focus exclusively on the benefits of ICTs. Recent years have witnessed a dramatic increase in digital harms: misinformation and disinformation, financial scams, cyber harassment, identity theft, digital addiction, and more. These downsides can not only harm people, they also undermine relationships, social cohesion, civic discourse, and other trademarks of a healthy society.

When developing a digital skills strategy, countries should give adequate attention to digital risks. This might include national initiatives as well as ensuring that digital risks are incorporated throughout digital skills training programmes and resources. This is another reason for selecting a digital skills framework that adopts a broad perspective of digital skills.

PART 2: Developing the strategy and programme plans

Chapter 3: Roadmap for creating a digital skills strategy

This chapter provides an overview of the basic steps covered in this toolkit that can be followed to create a national digital skills strategy, and which are subsequently developed in the Toolkit.

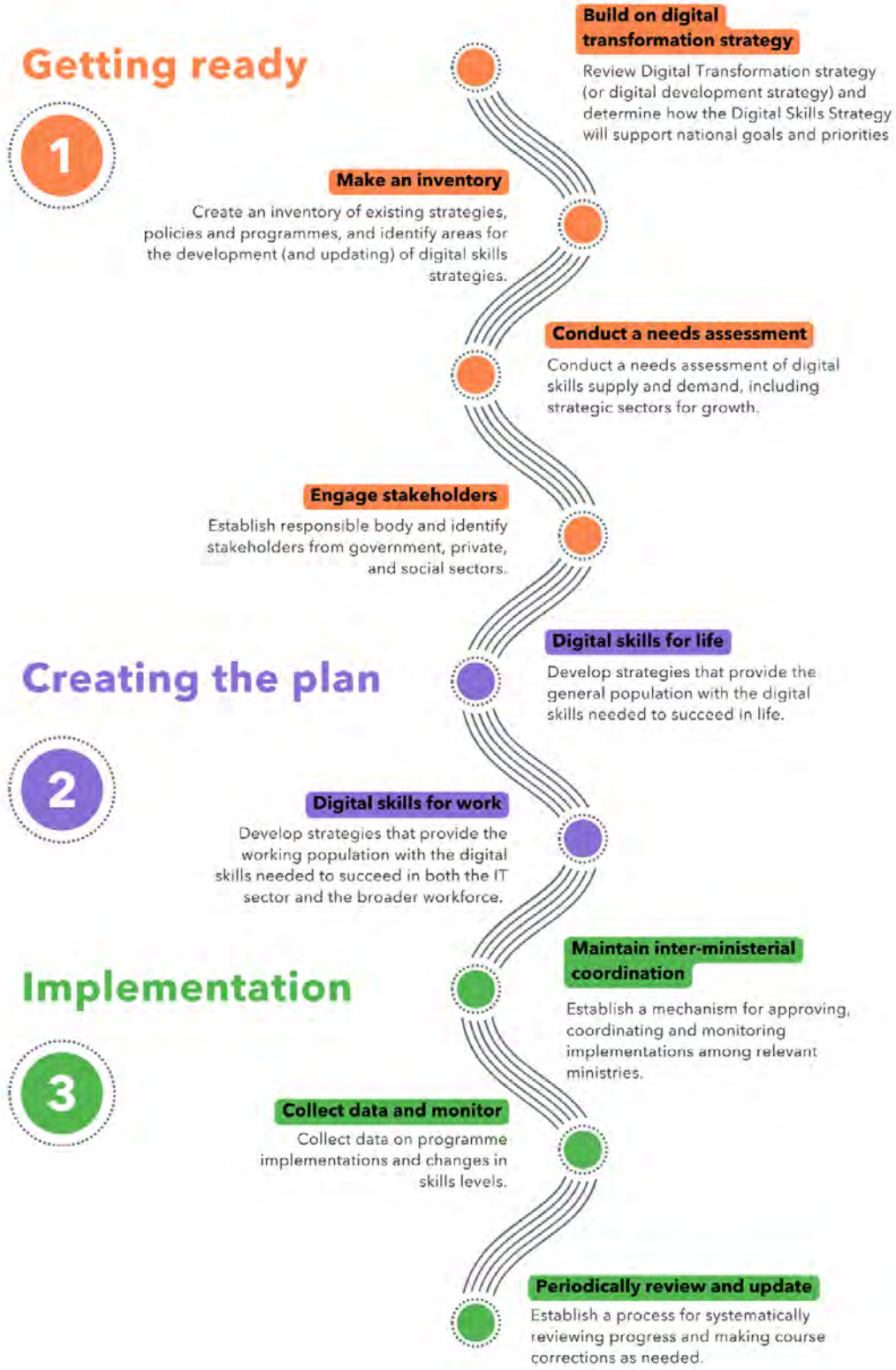
Although these points represent a summary of the content and recommendations in this report, it is recognized that this list is not exhaustive. Countries are encouraged to supplement this list with other key steps that are important in their national context. Doing this at the outset provides a clear roadmap for developing a national digital skills strategy.

Getting ready: Countries can take several steps to gather the data and information needed to develop a national digital skills strategy. Most countries are not starting from scratch. They have digital transformation strategies and/or ministerial-level strategies that address digital skills to some degree. By making an inventory of these strategies and programmes, and conducting a comprehensive needs assessment, countries can equip themselves with important insights for the planning phase. Assembling stakeholders who represent a broad cross-section of society ensures essential perspectives are incorporated into the strategy development process.

Creating the plan: This Toolkit divides digital skills into two broad categories. Digital skills for life are the skills needed by every member of society to lead a fulfilling life. Critically, underrepresented population groups require tailored strategies to ensure they benefit from digital opportunities as well. Digital skills for work are the skills needed to succeed in the workforce. This includes basic digital skills commonly found in most office jobs, skills for specific domains such as agriculture or healthcare administration, and advanced IT skills for specialized positions in industry and entrepreneurship. Digital skills strategies need to encompass elements that address both categories.

Implementation: The dynamic nature of information technology requires countries to closely monitor the implementation of digital skills programmes, make course corrections as needed, and regularly update national strategies. Programme evaluations, digital skills assessments, and ongoing participation in global, regional, and national forums are all helpful tools for enhancing a country's knowledge and global standing around digital skills.

Figure 3: Roadmap for creating a digital skills strategy



Souce: ITU

Chapter 4: Digital transformation: Building on existing strategies

This chapter describes the role of digital skills in broader national digital transformation strategies and offers a tool to create an inventory of relevant strategies and programmes as a necessary step in developing (or refreshing) a national digital skills strategy.

Many countries have digital transformation and other strategies for digital development. Digital transformation involves the integration and adoption of digital technologies across all aspects of society to accelerate economic development, government efficiency, healthcare advancements, rural development, education and skills development, and environmental sustainability, among many other areas.

> "Digital transformation affects people, firms, and governments, across countries and sectors. The development, deployment and uptake of digital technologies, including artificial intelligence and the Internet of Things, create immense opportunities for productivity, scientific discovery and climate change mitigation, public service delivery, new business models, and remote work, education and healthcare. At the same time, and to reap the benefits of these developments, countries must address their risks, including to privacy, security, online safety, digital divides, information integrity and social cohesion, and human rights in the digital age."
>
> OECD Digital Transformation

Digital skills play a central role in digital transformation. Digital skills are needed to develop, adopt and integrate information technology throughout all sectors of society. Digital skills are needed by citizens and workers to use these technologies to their full potential.

World Bank information and resources about digital transformation provides countries with extensive information about digital transformation, including publications, data, specific focus areas and more.

Step 1: Create an inventory of digital transformation and skills strategies

The first step is to review the country's national digital transformation strategy (or national digital development strategy or something similar). In many cases, this will be a collection of documents. Within the strategy, identify the role of digital skills in such areas as:

- national vision;
- core strategies;
- enabling policies;
- specific plans and programmes;
- other.

Step 2: Identify digital skills strategies within specific ministries

This step is for both countries with a national digital transformation or digital skills strategy and countries that do not have an overarching strategy. The aim is to identify digital skills strategies that exist within different ministries, such as education or rural development. Many countries have existing strategies and programmes at the ministry level that will be important to review as part of developing a national strategy.

Step 3: Conduct an assessment of digital skills strategy and programme implementations

Once the country's digital skills strategies, plans, policies, and programmes have been inventoried, undertake a review of their implementation status and an assessment of their progress. This could be a formal assessment commissioned to an outside party, an internal rapid assessment, or both.

- Are the strategies (plans, policies, etc.) fully, partially, or not yet implemented?
- What have been the main results, and do the results meet initial goals?
- What is the country's assessment of progress? What factors account for successes and challenges?

South Africa developed its National Digital and Future Skills Strategy in 2020. The strategy sets forth a vision and eight strategy elements.

In 2021, the country used the strategy to develop the Implementation Programme Guide for the National Digital and Future Skills Strategy of South Africa: 2021-2025. This document includes a set of measures, lead institutions and stakeholders, as well as the required inputs and major activities, and the expected outputs, outcomes and impact for each of the eight strategies. Similar to this toolkit, the report covers digital skills for society and digital skills for work, along with a special focus on young people not-in-employment-education-or-training (NEET)

Inventory tool

Use this tool to create an inventory of existing strategies, policies, plans, and programmes that relate to digital skills.

National digital transformation and skills strategies

Identify key government strategies and other documents that relate to digital transformation and digital skills

Strategy	Year	Responsible ministry/ government entity

Ministry level digital skills strategies

Identify key digital skills related strategies and other documents at the ministry level.

Strategy	Year	Responsible ministry/ government entity

Digital skills implementation status and assessment

For each digital skills strategy identified in the inventory process (above), state the primary goals, report on their implementation status, and undertake an assessment.

Name	*Title of strategy/plan/guideline/policy*
Ministry	*Responsible/lead ministry*
Year	*Year published*
Goals	*Primary goals*
Status	*Implementation progress*
Assessment	*Perform an assessment to identify successes, challenges, and areas for reform.*

Chapter 5: Digital skills assessments: Identifying needs and evaluating progress

This chapter describes the steps for collecting data to inform the development of a digital skills strategy. This includes identifying existing data and assessments of current or past digital skills programmes, and options for collecting data on the digital skills level of the general population.

The dynamic nature of digital technologies requires ongoing attention to market and industry trends, labour force needs, technological advances, demographic changes, and other factors that influence the development, implementation, and results of digital skills strategies. Yesterday's successes could be rendered obsolete. Future technologies require careful planning to be competitive in the global economy.

The purpose of this chapter is to provide policy-makers with guidance for:

- conducting a comprehensive needs assessment for developing (or updating) a digital skills strategy;
- undertaking focused assessments for targeted priorities;
- performing periodic digital skills assessments for measuring progress.

Much of this chapter is based on the Digital Skills Assessment Guidebook, an ITU publication that provides in-depth explanations and examples of assessment strategies.

Importance of digital skills assessments

Countries should undertake a comprehensive assessment when developing or conducting a major review of a national digital skills strategy. A comprehensive assessment is useful to:

- provide a baseline against which benchmarks can be established and progress can be measured;
- identify population groups and geographic regions that have lower digital skills levels;
- uncover the state of physical, programmatic, and human infrastructure (for example, schools/libraries with connectivity, IT courses in technical and vocational education and training (TVET) institutions, qualified instructors);
- perform a skills gap analysis based on workforce needs;
- facilitate buy-in among relevant stakeholders.

Step 1: Identify existing data

Countries should first gather data from existing sources. National statistical offices, education agencies, other national as well as international sources will yield an initial snapshot of existing data and data gaps.

Potential additional sources

Educational data:

- national curriculum standards;
- number and distribution of primary and secondary schools and their connectivity status (including whether connectivity exists for students as well as school administration);
- ICT and computer sciences degrees and courses in TVET and higher education institutions;

- distance learning institutions, degrees, and courses.

Governmental data from other departments (for example):

- public libraries (computers, connectivity, training programmes);
- health centres (e-health);
- rural/community development centres;
- e-government initiatives;
- digital skills campaigns;
- others.

Digital skills needs data:

- industry workforce surveys;
- vacancy surveys;
- market trends;
- sector studies (for example, chambers of industry, trade associations);
- international datasets and studies;
- academic research.

> The World Economic Forum annual Future of Jobs report explores how jobs and skills will evolve over the next five years. It's analysis of employer expectations provides insights on how socio-economic and technology trends will shape the workplace of the future.

The stakeholder group that is responsible for developing the digital skills strategy (Chapter 7) will be valuable when identifying relevant data sources and overseeing data analysis.

Step 2: Conduct a digital skills assessment of the general population

A comprehensive assessment of the general population's digital skill levels is an essential building block when creating a digital skills strategy and making data-informed decisions on prioritizations and resource allocations.

The selection of a general population assessment approach should be linked to a country's choice of framework (see Chapter 1).

> DigComp maintains several resources for assessment and monitoring:
>
> - DigCompSat: a self-reflection tool for the European digital competence framework for citizens;
> - Mydigiskills: digital competence self-reflection user tool;
> - Europass platform: a self-assessment tool on digital competences based on DigComp and DigCompSat.

In the digital skills strategy planning phase, a country should pursue an approach that will generate a representative picture of the entire population. The most common methods are self-assessment and knowledge-based assessment, in addition to a more targeted performance-based assessment.

Self-assessment

Measure digital skills by asking participants to rate their own level of knowledge, ability, confidence or usage:

- advantages: easy deployment and least costly;
- disadvantages: less accurate as people have difficulty assessing their own skills.

Knowledge-based assessment

Test skills using questions about factual or procedural knowledge:

- advantages: easy deployment, less costly;
- disadvantages: tend to focus more on features of the technology itself and less on how to use digital skills.

A third method may also be considered, though it is more commonly used for more targeted assessments (for example, in schools).

Performance-based assessment

Measure actual performance on digital skills in realistic scenarios:

- advantages: most valid measure of digital skills;
- disadvantages: most expensive and difficult for large-scale deployment.

Frequency

Whichever methodology a country pursues, it is important to determine the frequency (for example, annual, biannual) of repeat assessments. Many countries adopt a hybrid approach where they use an existing national household survey for a limited number of digital skills questions (self-assessment type), and also implement a more comprehensive survey at other intervals.

Step 3: Conduct targeted studies

While steps 1 and 2 can generate a broad understanding at the national level, countries may also wish to undertake focused studies that target a specific industry or other area of opportunity. These studies are important for determining feasibility, operational needs, potential impact, and other information to guide investment decisions.

Rapid assessment of digital skills gaps and the feasibility of microwork employment opportunities in Uganda, commissioned by the International Labour Organization (ILO), presents the findings of a rapid assessment conducted in Uganda to identify digital skills gaps that are hindering refugees and host communities from accessing microwork employment opportunities.

Assessment tool

Use this tool to assemble existing data, determine a national skills assessment approach, and identify other assessment needs.

Inventory of existing data

Conduct an inventory of existing data.

This should be a wide net to capture data and insights from as many sources as possible.

Title of data source	Ministry/Government agency (who produces or collects)	Purpose (what data is collected)	Frequency (yearly, every five years, etc.)	Latest report (for example, 2022)

National digital skills assessment

Develop a national skills assessment strategy.

Framework *What digital skills framework will be used?*	
Assessment type *Self-assessment, knowledge, or performance?*	
Assessment instrument *Adoption/modification of existing assessment instruments?*	
Assessment frequency *How often will the assessment be undertaken?*	
Implementation *Which ministry/government agency is responsible for implementing and analysing the data?*	

Targeted digital skills assessments

Use this when a targeted opportunity is identified.

Topic *What is the opportunity to be investigated?*	
Ministries *Which ministry/s should be involved?*	
Purpose *What are the objectives of the study?*	
Related studies *Are there similar studies that have been conducted in other countries?*	
Implementation *Which ministry or outside party is responsible for designing, implementing and analysing the data?*	

Chapter 6: Stakeholder engagement: Building broad representation

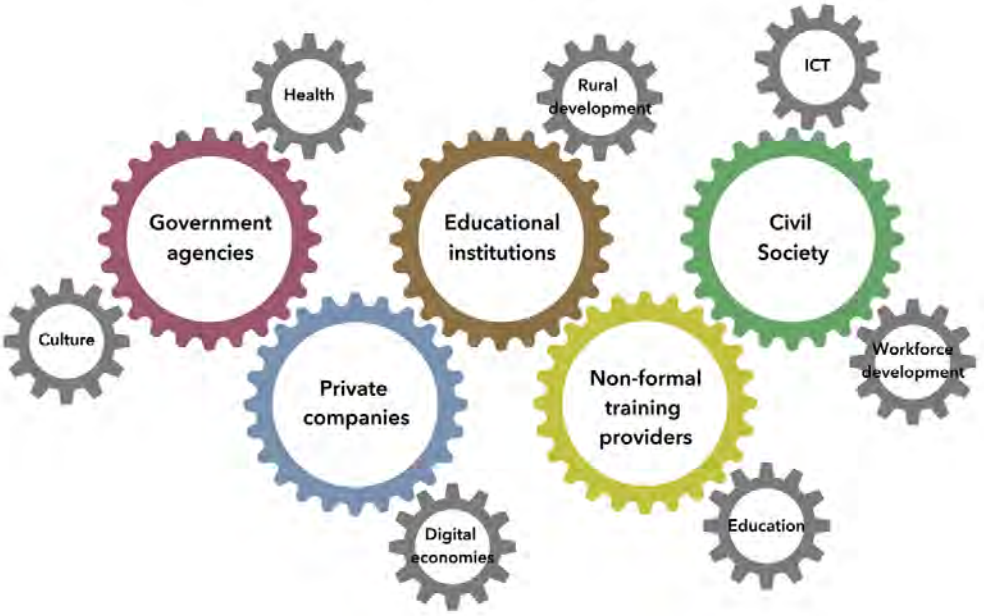
This chapter highlights the importance of building a broad group of stakeholders when developing and implementing a digital skills strategy. Since digital skills are a supporting strategy across multiple sectors and priorities – from education to rural development – engaging the relevant government ministries and outside constituencies is critical to ensure policies and plans are comprehensive and inclusive.

The inventory of existing strategies, policies, and programmes (Chapter 4) identifies the lead responsible ministries or government agencies. This chapter provides guidance on expanding stakeholders, both within and outside government.

Stakeholder engagement: aiming at building broad representation

Given the degree to which digital skills touch every aspect of work and life, the goal of many countries is to ensure that a broad and representative group of stakeholders engage in the digital skills strategy development process.

The figure below showcases the interaction of the different entities, in coloured gears, and economic sectors, in gray.



Source: ITU

Stakeholder groups

Government

Government leads and coordinates the stakeholder engagement process. Some countries have designated a specific ministry with this responsibility. Other countries have assembled a commission or established a multi-sector coalition.

Many government ministries should be involved in developing and implementing a digital skills strategy. Some of the most common departments include:

- ICT/Telecommunications/Digital Economy
- Industry
- Labour/Workforce development

- Education
- Rural development
- Culture/Public libraries
- Health
- National Statistical Offices

Government leadership is needed to mobilize relevant ministries, secure buy-in, coordinate inter-ministerial relationships, validate processes, issue and disseminate reports, monitor budgets and other resource allocations, among others.

Educational institutions: Formal sector

Public and private educational institutions play a critical role since they provide formal learning programmes and certification. This includes:

- Primary and secondary schools: Providing digital skills learning from early ages builds a strong foundation and critical thinking and problem-solving skills in addition to digital skills.
- Technical and vocational schools: Technical and vocational schools can offer focused instruction on specific applications of digital skills.
- Colleges and universities: Higher education provides advanced instruction for future IT professionals.

Representatives from associations or leading institutions should be engaged in the digital skills strategy process.

Digital skills providers: Non-formal sector (lifelong learning)

Lifelong learning demands that individuals have opportunities to acquire digital skills from outside the formal education sector. Digital skills providers can support:

- people with diverse learning goals (for example, basic skills for life, domain-specific skills for a particular industry, advanced skills for IT work);
- people living in all areas of the country, urban and rural;
- older people, women and girls, and the young;
- vulnerable and disadvantaged populations;
- persons with disabilities;
- and other hard to reach populations.

Representatives of digital skills providers should include private and non-governmental organizations, such as:

- ICT schools (chains and independents);
- mobile operators (many operators have digital skills programmes);
- corporations;
- public libraries;
- community centres;
- NGOs.

Workforce sectors

Organizations from a country's leading sectors are crucial for both identifying skills needs and offering skills development programmes. Stakeholders should represent a broad spectrum of the workforce to ensure digital skills strategies meet diverse needs. Depending on the economic composition of a country, this may include representatives from

- ICT sector/digital economy
- Agriculture
- Manufacturing
- Healthcare
- Small businesses

Mechanisms for stakeholder engagement

Once stakeholders have been identified, a country needs mechanisms by which they engage with each other, with colleagues in other countries, and with experts in the field. Accordingly, a country should:

1) Create a national level body.
2) Join regional and global initiatives.
3) Participate in other forums and conferences.

Countries that are able to take advantage of such mechanisms are likely to achieve significant benefits, such as:

- learning about new technological developments and training programmes;
- sharing best practices around policies, programmes, and training activities;
- identifying new partners;
- building campaigns;
- creating and coordinating efforts.

National: The South Africa Digital Skills Forum leads and coordinates the implementation of the national digital skills programme. It includes over 30 stakeholders across government, industry, and non-governmental organizations.

Regional: World Bank's Partnership for Skills in Applied Sciences, Engineering and Technology hosts PASET Forums in sub-Sahara Africa to build high quality technical and scientific capacity in the region.

Global: The Digcomp Community of Practice is a platform to access information on good practices, learn from peers, share resources and be informed of the latest DigComp developments and updates.

Stakeholder engagement tool

Use this tool to identify the lead ministry or other governmental entity, stakeholders from inside and outside government to participate in the digital skills strategy development process, and initiatives and forums that can inform the strategy.

Lead governmental entity

What is (or will be) the country's lead entity for developing and coordinating implementation of a national digital skills strategy?

This may be a single ministry or government entity, an inter-ministerial group, or some other entity with official responsibility.

Entity name *Ministry or inter-ministerial group*	**Description** *Mission or other relevant information*	**Year established**

Government stakeholders

What ministries and other governmental entities are (or will) have a role in the national digital skills strategy? This toolkit recommends broad representation.

Ministry name *Name of ministry or other governmental entity*	**Area** *What area does the ministry represent (for example, education, rural development)?*

External stakeholders

List industry associations, IT companies, educational associations and institutions, non-governmental organizations, and other stakeholder groups that will ensure broad representation across society in the national digital skills strategy.

Name of association or organization	**Area** *What area does the group represent (for example, IT companies, education, women and girls)?*

Forums

List forums and other initiatives for knowledge exchange, partnership development, professional development, and other digital skills efforts.

Name of forum, initiative, other	Focus *What is the focus or goals of the forum or initiative?*	Stakeholder lead *Which stakeholder/s are responsible for participating?*

Chapter 7: Digital skills for life: Developing strategies for all citizens

This chapter covers the main components of a digital skills strategy for the general population, focusing on formal education, lifelong learning, and the inclusion of underrepresented groups.

National digital skills strategies are needed to ensure everyone has the capacity to participate fully in the digital transformation of their country. People of all ages, living in all areas of a country, facing barriers, or otherwise underserved all deserve the opportunity to learn digital skills.

Step1: Develop strategies for primary and secondary education

Compulsory education remains a cornerstone of every country's digital skills strategy as it offers the most effective means to reach the vast majority of the school age population. The long history of incorporating digital skills education into primary and secondary schools offers numerous lessons for countries to reform their strategies and develop new approaches.

One silver lining of the Covid-19 pandemic was the reduction in teacher resistance to technology. Out of necessity, teachers were obliged to embrace digital tools and remote learning platforms. While the suddenness of the pandemic generated significant educational harms worldwide, many countries invested in teacher training and other measures that have paved the way for sustained attention to incorporating digital skills into the classroom.

> The UNESCO Global education monitoring report, 2023: technology in education: a tool on whose terms? provides research and insights on educational technology integration across the globe. Chapter 5 of that report is devoted to digital skills. There is also a significant body of research focused on single countries that should be reviewed when developing strategies for digital skills education for primary and secondary schools.

Success factors

The following success factors have proven valuable for many countries when developing digital skills strategies and programmes for primary and secondary education.

1. Framework
    - *Review and adopt a digital skills framework that best meets the country's needs and context*

    This report recommends reviewing the European Union's Digital Competence Framework, DigComp 2.2. It adopts a broad definition of digital skills and is gaining momentum towards becoming a global standard. Commercial frameworks and other well-known frameworks (for example, International Computer Driving License, or ICDL) tend to have a narrower focus.

2. Teacher training and support
    - Professional development: *Provide continuous professional development for teachers, focusing on both digital skills and teaching pedagogy using digital tools.*

- On-site support: *Establish support systems such as ICT coordinators or digital coaches who can assist teachers in implementing technology in their classrooms.*

Studies have found that teacher training is extremely important. Many initiatives have failed to meet expectations due to insufficient investment in teachers to fully utilize and embrace digital technology in the classroom.

3. Curriculum integration

- Subject integration: *Rather than stand-alone digital skills classes, incorporate digital skills into existing subjects such as math, science, and history.*
- Critical thinking and safety: *Teach students to critically assess and verify online information and practice safe, ethical behaviour online.*

Students learn best when digital skills are incorporated throughout the regular curriculum. Many early digital skills initiatives focused on stand-alone computer lab training by IT teachers.

The downsides of the Internet – misinformation, scams, online harassment, harmful information – have become prominent in recent years. It is important to establish a strong foundation in critical thinking and other skills that will allow young people to be safe and make positive contributions to society.

4. Localized content and language

- Relevant content: *Develop or adopt educational content that is relevant to the local context, including language, culture, and curriculum standards.*

The ecosystem of content providers and curriculum design experts has evolved significantly. While gaps remain, countries should be able to identify expertise for developing or adapting content for their contexts.

5. Parental involvement

- Parent digital skills: *Develop programmes for parents to receive digital skills training, particularly in ways that allow them to support their children's education.*

Parents often feel less confident than their children in digital skills, leading to an inability to be fully involved in their children's use of digital technologies.

6. Partnerships

- Corporations: *Form partnerships with technology companies for computer programming and other digital skills.*
- Non-State actors: *Form partnerships with NGOs, foundations, and other non-State actors that promote digital skills.*

Many software companies, mobile operators, and other IT organizations have global, regional, or national programmes that support digital skills instruction, often in coding and other IT skills to encourage student interest in future IT careers.

7. Monitoring and evaluation

- Regular assessment: *Monitor the implementation of digital skills programmes through regular assessments and feedback mechanisms. Use data to improve and adapt programmes.*
- Impact evaluation: *Measure the long-term impact of digital education initiatives on student outcomes, including academic performance, digital proficiency, and future career readiness.*

This should be linked to the framework that a country adopts.

8. Infrastructure and access

   - Reliable Internet access: *Ensure schools have reliable, and ideally broadband, Internet connectivity.*
   - Hardware provision: *Equip schools with essential hardware such as computers, tablets, and other digital devices.*

   Depending on the state of Internet infrastructure, countries may need to pursue hybrid strategies to account for both low- and high-bandwidth schools.

9. Scalability and sustainability

   - Pilot programmes: *Start with pilot projects to test approaches and identify areas that will require greater attention. Evaluate and refine these programmes before scaling up.*
   - Sustainable support: *Develop sustainable models for funding, teacher training, technical support, and other components of the initiatives.*

   Unfortunately, there is no shortage of under-achieving digital skills initiatives due to insufficient attention to testing and sustainability.

This list is not new. However, there are new best practices that some countries have pursued to achieve these priorities. As mentioned in Chapter 2 (Stakeholder engagement), there is a wide range of forums, conferences, and initiatives for countries to share knowledge and form partnerships. Engaging these communities is essential.

> The UNESCO Digital transformation in education in Asia Pacific policy brief is a guide to digital transformation in education that covers teaching, learning, and education technology.

Step 2: Develop strategy for lifelong learning

People need opportunities to learn digital skills throughout their lives. This is critical since digital technologies are constantly changing, requiring people to learn new digital skills for applications that did not exist when they were in school. There are some key benefits of non-formal lifelong learning including accessibility and flexibility, inclusivity, responsiveness, and innovative formats.

- Accessibility and flexibility: Non-formal education offers flexible learning options that can be tailored to different schedules, learning paces, and life situations. This is especially important for adults who are already in the workforce, those living in remote areas, and those who face resource constraints such as funds and time.
- Inclusivity: Non-formal education initiatives often aim to be inclusive, reaching underserved and marginalized groups. These initiatives can be tailored to meet the needs of diverse populations, including women, out-of-school youth, minorities, persons with disabilities, and indigenous groups among others.
- Responsiveness: In a rapidly changing digital landscape, non-formal education enables people to keep up with new technologies and other advances. New programmes can be introduced more quickly than in the formal education sector.

- Innovative formats: Non-formal education can employ a variety of innovative teaching methods, such as hands-on workshops, games, and other experiential learning formats. Both in-person and online programmes can meet the needs of diverse populations.

The Creative Australia digital skills programme offers workshops, seminars and other activities that focus on using digital technologies for creativity.

Public libraries

There are over 400 000 public libraries worldwide, offering an already existing channel that many countries have targeted for digital skills learning. Public libraries have many advantages:

- Government funding: Public libraries are typically supported by government budgets that cover the physical and digital infrastructures, personnel, collections, and programmes and services.
- Information professionals: Public libraries are staffed by librarians with library science backgrounds and others who have been trained to help people meet their information needs.
- Geographic coverage: Libraries are typically spread throughout the country, offering access to people in both urban and rural settings.
- Network: Most countries have a library association that serves the professional development and other needs of library workforce. Networks can be leveraged to pilot new programmes and scale those that are successful.

The International Federation of Library Associations and Institutions (IFLA) maintains a repository of stories aligned with the UN Sustainable Development Goals. Digital skills feature prominently in Goal 4 (quality education) as well as in other goals where digital skills play an important role. For example, Tunisian libraries offer digital skills courses to promote opportunities for women, and India's mobile library provides learning resources for rural students.

Community centres, NGOs, and other community-based organizations

Many countries have numerous organizations located across their territories that offer digital skills learning, or the possibility for such learning, to diverse communities. These organizations are often supported by a mix of private and public funding, including from global and regional development organizations and foundations.

The Digital Skills for Life (DS4L) program of UnidosUs (a civil rights organization) provides Latinx adults in the United States of America with digital skills training. The Spanish language curriculum is offered through a network of affiliated community-based organizations.

Step 3: Ensure inclusion of underrepresented populations

Some parts of the population in every country face barriers – economic, racial, tribal, gender, age, physical and mental, literacy, linguistic, among others. As such, it is crucial to develop digital skills programmes that target these populations and provide them with opportunities that enhance their quality of life and employment prospects.

Governments have a strong role to play in ensuring that such groups have access to digital skills programmes through levers such as:

- forming partnerships with the private sector, foundations, and international donor agencies;
- providing funding to NGOs and other community-based organizations that serve specific groups and communities;
- ensuring community centres, libraries, and other centres of learning and training have Internet connectivity;
- offering subsidies and vouchers for learners;
- developing centres of excellence;
- conducting awareness campaigns.

Digital Transformation Centres (DTCs) is an ITU initiative in partnership with Cisco that supports countries to strengthen the digital skills of citizens, particularly in underserved communities. Since its launch in 2019, over 350 000 citizens (with over 50 per cent female) in underserved communities have been trained in basic and intermediate digital skills across DTCs in 14 countries. For example, the implementation in Ghana is reaching around 25 000 women entrepreneurs, students, teachers, and marginalized groups.

This initiative is based on a public-private partnership model, exemplifying the roles of government and other stakeholders (Figure 4).

Figure 4: Stakeholder roles in the Digital Transformation Centres (DTC) Initiative

Source: ITU

Women and girls

The digital skills gap between males and females remains a pressing challenge. When women and girls have lower digital skills, their opportunities for social inclusion, educational development, and economic empowerment are limited. Web Foundation research found that low and lower-middle income countries have lost an estimated USD 1 trillion in GDP in the last decade as a result of barriers preventing women from accessing the Internet and participating online. Governments have an important role to play. This is especially important for advanced digital skill education since women and girls are often discouraged from pursuing such skills training, thereby leading to a gender imbalance in the workforce.

International Girls in ICT Day is a day set aside by ITU to celebrate girls in ICT. Since 2011, over 377 000 girls and young women have taken part in more than 11 400 International Girls in ICT Day celebrations in 175 countries.

The celebration is a result of a movement where governments, national ICT regulatory authorities, ICT companies, academic institutions, UN agencies, and NGOs plan and hold events.

Source: ITU, Girls in ICT

Rural populations

Worldwide, 81 per cent of urban dwellers have used the Internet, compared to only 50 per cent of those in rural areas, with a larger gap in low-income countries (ITU). Often, digital skills programmes in rural areas involve working with rural organizations that have or that can be provided with adequate connectivity as well.

The Digital skills and inclusion through libraries in Uganda programme is a partnership among the National Library of Uganda, EIFL, the Maendeleo Foundation (a Uganda-based non-governmental agency that promotes development through digital and job skills training), and Peer 2 Peer University. The programme organizes digital literacy training camps in remote areas, training for librarians, digital and mobile literacy training for women and youth, and other activities.

Aging populations

While many countries have narrowed the age gap it remains a challenge. Equipping elderly citizens with digital skills is important for communicating with family and friends, obtaining news and information, accessing health information, and participating in other activities and services.

Seniors Go Digital is part of Singapore's Digital For Life programme that provides older people with digital skills training at digital community hubs using digital ambassadors.

Migrants and refugees

For many reasons the number of migrants and refugees continues to grow, leaving many people in places outside of their home countries. These populations require digital skills to access critical services and integrate into their new communities.

The UNHCR Improving Digital Livelihood Opportunities for Refugees report offers insights based on 62 workshops where refugees were provided digital skills training for digital work and participated in co-creating solutions to meet their needs.

Persons with disabilities

One in six people, or 16 per cent of the global population, experiences significant disability (WHO). Providing digital skills to this group enhances their inclusion, independence, and empowerment for employment and a higher quality of life. Digital skills programmes for people with disabilities often require both assistive technologies and people trained in supporting these populations.

The Doing Digital Inclusion: Disability handbook, a publication of the Good Things Foundation in the United Kingdom, offers lessons learned and recommendations for providing digital training for persons with disabilities. The handbook includes several resources.

Youth

The global rate of people not-in-education-employment-or-training (NEET) among youth is estimated at over 20 per cent, and in low and lower-middle income countries, the lack of digital skills is seen as a factor for higher NEET rates (ILO). Youth typically exhibit greater aptitudes for learning and applying digital skills in a variety of contexts than older populations. As such, there are numerous examples of digital skills programmes focused on youth that have delivered positive results.

The ILO-ITU Digital Skills Campaign is a commitment to digital skills development for young people. Since 2017 over 23 million young people have benefited from training programmes due to the contributions of several partners, including Microsoft, HP Foundation, and Save the Children.

Low literacy populations

Countries worldwide have made great strides to increase literacy rates, with dramatic improvements in many regions. Despite this positive trend, stark disparities remain, especially in Sub-Saharan Africa and many lower income countries. Smart phones in particular have opened up opportunities for low literacy populations to gain the access and skills they need to realize livelihood and quality of life opportunities. This has led to the development of skills for mobile digital literacy.

In Senegal, the National Education Programme for Illiterate Youth and Adults through Information and Communication Technologies (or PNEBJA-TIC), launched in 2012 as a 13-year programme, is a national basic education programme for young people and adults lacking basic literacy skills that uses digital technologies. The multi-stakeholder initiative is led by the Ministry of Education section on Basic Education for Illiterate Youth and Adults in partnership with the National Centre for Educational Resources, Office of the Secretary of State for Literacy and National Languages Promotion, Regional Centres for Education Staff Training, and UNESCO.

Digital skills for life tool

Use this tool for mapping the ecosystem to reach the entire population and to develop programmes for specific groups of people within the population.

Ecosystem mapping

First, compile existing data to map the ecosystem for delivering digital skills programmes.

Formal education

Channel	Number	Distribution *What is the geographical distribution (for example, urban/rural)?*	Physical infrastructure *What is the state of computers and Internet connectivity?*	Programmatic infrastructure *What courses and degrees currently exist?*	Human infrastructure *What are the digital qualifications of instructors?*
Primary schools					
Secondary schools					

Lifelong learning (non-formal education)

Channel	Number	Distribution *What is the geographical distribution (for example, urban/rural)?*	Physical infrastructure *What is the state of computers and connectivity?*	Programmatic infrastructure *What courses and degrees currently exist?*	Human infrastructure *What are the digital qualifications of instructors?*
Public libraries					
Community centres					
Private sector					
Other					

Underrepresented populations

Population group	Size *What is the population size?*	Partners *What NGOs, foundations, and other parties address this population?*
Women and girls		
Rural populations		
Aging populations		
Indigenous populations		
Migrants and refugees		
Persons with disabilities		
Youth		
Low literacy populations		
Other		

Programme assessment

Next, perform an assessment of past and current programmes to identify achievements, challenges, and future opportunities.

Channel	Title *Title/s of assessments*	Achievements *What successes have been accomplished?*	Challenges *What challenges have been identified?*	Opportunities *What opportunities exist for future programmes?*
Formal education				
Non-formal education				
Under-represented groups				

Planning of key initiatives

Finally, develop the plan. Use this worksheet for each key initiative or element of the digital skills strategy.

Name of initiative: _____

Population *What is the target population/s (*for example, *general, youth, girls)?*	
Channel *What channel/s will people access the initiative?*	
Goals *What are the primary and secondary goals of the initiative?*	
Agency *What agency or governmental entity will lead implementation?*	
Partners *Who are the governmental and external partners (*for example, *private sector, foundations, etc.)?* *What are the roles of each?*	
Funding *Who are the funding partners? What level of funding (and other forms of support) is required?*	
Monitoring and evaluation *What is the plan for monitoring and evaluation?*	

Chapter 8: Digital skills for work: Developing strategies for professional development

This chapter covers the main components of a digital skills strategy for fostering digital skills for the workforce. It covers higher education and technical and vocational education and training (TVET) institutions, considerations for engaging the IT industry, and channels for mid-career professionals to obtain training.

Digital skills strategies can be effective for attracting citizens to pursue more advanced and specialized digital skills training. Promoting digital skills among the workforce is crucial for countries aiming to stay competitive in the global economy and to ensure that they can thrive in a rapidly changing technological landscape. The demand for workers with advanced or specialized IT skills is high across industries and in the public sector.

There is no one-size-fits-all list of digital skills for work. A merchant needs to be able to promote their goods online, take orders, and fulfil digital payments; a farmer needs to access information about crop diseases and participate in online markets; a business person needs to be adept at using productivity software, and; all companies need cybersecurity experts. As such, it is important during the needs assessment phase (see Chapter 5) to identify priority sectors for investment and develop programmes that will ensure citizens have access to the types of training that meet the diverse needs of the economy.

Digital skills by category of work

While it is impossible to specify all types of digital skills needed across all sectors, the categories of skills described in Chapter 2 offer a starting point for developing a national strategy. The three skills for work categories – *general*, *domain-specific*, and *advanced* – can be mapped at a high level to types of employment, types of skills, time required to learn the skills, channels for delivering training, and other criteria. Table 1 provides a comparison to assist in developing a national strategy.

Table 1: Comparison of digital skills characteristics, by work category

	General	Domain-specific	Advanced
Type of employment	– Company employment	– Company employment – Self-employed (for example, merchant, farmer)	– Company employment – Entrepreneur
Digital skills level (DigComp 2.2)	– Intermediate (levels 3-4) for most jobs – Advanced (levels 5-6) for higher-level jobs	– Foundation (level 2) for basic jobs – Intermediate (levels 3-4) for many jobs	– Highly specialized (levels 7-8)

Table 1: Comparison of digital skills characteristics, by work category (continued)

	General	Domain-specific	Advanced
Types of digital skills	Office productivity applications (for example, Word processing, email)	Specific computer and mobile phone apps (for example, online orders and payment, hotel reservation system, accounting software)	Programming, IT management, cybersecurity, AI
Common channels	Libraries Private training centres	Private training centres Public libraries Public-private partnerships	Higher education TVET
Typical time required	Weeks	Days/Weeks	Months/Years
Certification	Generally not required	May be required	Usually required

Step 1: Develop strategy for higher education and TVET

Higher education and technical and vocational education and training (TVET) institutions play a critical role in providing learning opportunities for advanced and specialized digital skills. From computer science to digital marketing to entrepreneurship, these institutions can offer a wide range of courses and degrees to meet learner aspirations and fill workforce needs.

The World Bank Digital Skills: The Why, the What and the How is an excellent resource with detailed guidance for preparing digital skills national action plans for higher education and TVET.

While prepared for Africa, the recommendations are broadly applicable and are aligned with this toolkit. The following recommendations draw heavily on this report.

1) *Adopt (and modify as needed) a digital skills framework and assessment strategy.*
   The UNESCO database of digital competence frameworks includes several focused on education. (See Chapter 1 above for more on this topic.)
2) *Review and reform curricular standards and programmes.*
   A common challenge is the slow pace of curricular reform and innovation. Efforts can be made to encourage the adoption of new courses and technologies.
3) *Enhance use of technology in education.*
   This includes improving technologies for teaching for both in-person and online instruction and integrating digital content from global and national sources.
4) *Ensure institutions have access to high-speed connectivity.*
   High-speed connectivity is a fundamental requirement for learning digital skills, especially when it comes to advanced skills.

Step 2: Engage IT industry

The IT sector provides substantial support for IT skills training around the world. Global as well as domestic IT firms typically view these initiatives as aligned with their business and corporate social responsibility missions.

There are different ways companies support advanced IT skills training:

Corporate initiatives: Many global IT companies have specific programmes dedicated to supporting advanced IT skills training worldwide. These initiatives typically feature:

- online and in-person learning, both self-paced and instructor led;
- free or highly subsidized courses;
- industry-recognized certifications;
- a commitment to underserved communities.

> The Cisco Networking Academy has a long history of providing advanced IT skills worldwide. It consists of both free online courses (for self-learners) and in-person instruction through a global network of academies. They partner with national and local governments, and international organizations.

National initiatives: Many countries have taken a leadership role in creating and deploying digital skills programmes for workforce development. These efforts also typically include partnerships with local and international IT companies, as well as local organizations that are positioned to deliver the training. Pursuing this as a component of a national digital skills strategy provides companies with a stronger rationale for participating and contributing resources.

> In Singapore, the TechSkills Accelerator (TeSA), a component of the country's SkillsFuture initiative, is a public-private partnership for both job-seekers and employees (for example, recent IT graduates, existing and aspiring IT workers) and employers (IT and non-IT companies that want to recruit new employees or develop the capacities of existing employees). The initiative offers numerous programmes, including:
>
> - the Career Conversion Programme to help IT jobseekers acquire new skills;
> - the Tech Immersion and Placement Programme to convert non-IT professionals into industry-ready professionals;
> - the Job Transformation Map to identify emerging trends and workforce needs.

Step 3: Identify locations and partners for community-based training

Digital skills for work strategies should ensure that training opportunities exist throughout the country. Ideally, there should be a variety of channels and physical facilities that reflect the wide range of skills needed for work advancement.

Government facilities

Government-supported facilities have the widest geographic coverage. Public libraries, post offices, community centres, agricultural extension offices, health clinics, and other existing infrastructure offer affordable and staffed facilities that are country-wide networks and reach most if not all of the population.

Different strategies exist for providing training through these facilities:

- train existing staff (for example, librarians, agriculture officers) to provide training;
- partner with an NGO or other organization that can provide the training with its staff.

Private training centres

Many countries feature numerous commercial training centres – chains and independent small businesses. These facilities primarily exist in large and medium sized urban areas, and typically offer fee-based courses.

- *During the inventory phase (Chapter 6), map the ecosystem of commercial training centres to ascertain their geographic coverage and types of skills offered. Some countries have industry associations that have this data.*
- *Consider offering vouchers or other forms of financial support to provide access to citizens without the ability to pay.*

Digital skills for work tool

Use this tool to assess the existing supply and demand of digital skills for work, map the ecosystem of training and channels and programmes, and develop plans that cover the different categories of digital skills for work.

Data and reports

First, collect existing information to inform strategy development. This may be statistical data, industry reports, assessments of implemented programmes or others.

Digital skills (supply)

What information exists about people with advanced and specialized digital skills?

Number of people with computer science degrees	
Number of people with other advanced digital skills degrees/certificates	
Job placement data of people with advanced degrees/certificates	
Other reports that provide information on the state of digital skills supply	

Digital skills (demand)

What information exists about workforce and industry needs for digital skills?

- What workforce skills are in demand?
- In what areas is there a skills gap?
- What are the future projections for workforce digital skills in the country?

General work digital skills	
Domain-specific digital skills	
Advanced digital skills	

Formal education

What is the state of formal education for advanced digital skills-related degree programmes, courses, and certificates?

Channel	Number	Distribution *What is the geographical distribution (for example, urban/rural)?*	Physical infrastructure *What is the state of computers and Internet connectivity?*	Programmatic infrastructure *What digital skills related courses and degrees currently exist?*	Human infrastructure *What are the digital qualifications of instructors?*
Universities and colleges					
TVET institutions					

Initiatives and programmes

What digital skills workforce programmes have been (or will be) implemented in the country?

Name of initiative or programme	Partners *Names of government, private sector, foundation and/or other partners.*	Digital skills category *General, domain-specific, or advanced?*	Goals/results *What are the main goals? If information is available, what have been the* **results?**

Assessment

Next, perform a comprehensive assessment based on all of the above collected information.

- What are the main achievements?
- What are the skills gaps?
- What are the main challenges and barriers to closing the skills gap?
- What approaches have been successful in overcoming challenges?
- What organizations (IT companies, others) are existing or potential partners?
- What are the recommendations of initiatives and programmes for future investment?

General work digital skills	
Domain-specific digital skills	
Advanced digital skills	

Planning of key initiatives

Finally, develop a series of key initiatives for each category of digital skills for work.

General work digital skills

Name of programme or initiative	Channel *What institutions will be involved?*	Goals *What are the main goals of the programme or initiative?*	Partners *Which entities (government, private sector, other) will be partners?*	Monitoring and evaluation *What is the plan for assessing progress and results?*

Domain-specific work skills

Name of programme or initiative	Channel *What institutions will be involved?*	Goals *What are the main goals of the programme or initiative?*	Partners *Which entities (government, private sector, other) will be partners?*	Monitoring and evaluation *What is the plan for assessing progress and results?*

Advanced digital skills

Name of programme or initiative	Channel *What institutions will be involved?*	Goals *What are the main goals of the programme or initiative?*	Partners *Which entities (government, private sector, other) will be partners?*	Monitoring and evaluation *What is the plan for assessing progress and results?*

Chapter 9: Implementation

This chapter summarizes some of the key considerations to ensure a successful implementation of a national digital skills strategy.

Part 2 – Developing the strategy and programme plans – has focused on the different elements of a national digital skills strategy. This concluding chapter shares four considerations for turning the strategy into reality. Since a comprehensive implementation guide is beyond the scope of this toolkit, the focus is on elements that are particularly important in the digital skills context.

Step 1: Establish implementation oversight

A ministry or inter-ministerial group is essential to provide implementation oversight. This could be the same members (or a sub-set of members) of the planning body discussed in Chapter 6. The dynamic nature of digital skills makes this level of ongoing commitment a necessity. Among other responsibilities, the group could:

- develop and monitor an implementation roadmap;
- maintain inter-ministerial coordination;
- establish mechanisms for approving, coordinating, and monitoring implementations among relevant ministries/government entities;
- monitor budgetary and other resource allocations;
- review implementation progress and monitoring and evaluation reports;
- make course corrections as needed.

Step 2: Measure impact

Countries should establish a frequency for measuring and assessing impact. Ideally this should be conducted annually. Again, this is likely to be more frequent for digital skills than it might be for other areas. This should include:

- general population survey to measure changes in the digital skills level of the population (Chapter 4).
- programme specific evaluations of large-scale initiatives and investments to assess impact and serve as input for future efforts.

Step 3: Update national strategy

A major update of the national skills strategy may occur less frequently (for example, every three years), but a long gap between strategies should be avoided given the pace of technological change. When refreshing and updating the national strategy countries should consider:

- updating the needs assessment (Chapter 5)
- adding new stakeholders (Chapter 6)

Step 4: Maintain active participation in forums, coalitions, and conferences

As described in 'Mechanisms for stakeholder engagement' (Chapter 7), there are a wide range of venues for stakeholders to meet, share knowledge, find new partners, hear from experts,

develop initiatives and otherwise stay up to date on digital skills developments. These venues include forums, conferences, and coalitions, among others.

The rapid growth of AI offers a prime example of the importance of continuous engagement. New developments are occurring at breakneck speed, with direct implications for digital skills programmes.

Countries are encouraged to participate in as many mechanisms as feasible. They should ask the following questions:

- In what physical and online events will key people from the country participate?
- How will insights from various engagements be shared and factored into ongoing planning?

This list of four considerations represents a fraction of the many areas that will require attention to successfully implement the wide array of initiatives and programmes that make up the national digital skills strategy. At the same time, these are critical elements and adopting them should provide governments with the information and processes needed to leverage the full range of benefits of investing in the digital skills capabilities of its citizens.

PART 3: Examples of digital skills strategies and programmes from around the world

Part 3 offers examples of digital skills strategies, initiatives, and programmes from around the world. The hope is that these serve as inspiration for countries when developing or refreshing their own strategies. The report primarily includes efforts where government is a stakeholder, as this was deemed most relevant for creating a national digital skills strategy. Accordingly, the many successful initiatives worldwide that do not involve government are not included. Although these examples have been collected from a diverse range of countries, a comprehensive search was beyond the scope of this project. Furthermore, while reasonable effort was made to ensure the legitimacy of the examples, no further assessment was conducted to gauge their quality or outcomes.

The examples are organized by category: digital transformation, digital skills initiatives, digital skills programmes for all, and digital skills programmes for work.

Digital transformation

Africa: The Digital Transformation Strategy for Africa 2020-2030. This document provides a common guide to help African leaders take advantage of digital transformation as well as minimize the associated risks. Digital skills and human capacity is one of the four foundation pillars outlined in the document.

Arab countries: National digital development reviews in 2021: Guiding template. The section on Capacity Development discusses formal education (primary, secondary, higher), lifelong learning, targeted training programmes, underserved populations and more.

Brazil: Brazilian Digital Transformation Strategy positions Education and Professional Qualifications as one of the key enablers of digital transformation. The strategy covers training for teachers and students, facilitated employment, and professional training in advanced digital skills.

Croatia: Digital Croatia Strategy is linked to the 2020-2030 Digital Agenda of Europe. The section on digital skills strategy is focused on increasing the number of ICT specialist in the labour market and highlights the need to encourage greater representation of women.

Japan: Digital Agenda 2030: This strategy contains four main themes: digital talent, industry transformation, digital government and economic renewal. The theme on digital talent focuses on strategies to increase the pool of advanced digital skills workforce such as software developers, data engineers, data scientists, machine learning engineers, product managers, and agile coaches.

Kenya: Kenya Digital Master Plan 2022-2032 has five pillars: digital infrastructure, digital services, products and data management, digital skills, digital enterprises, innovation and businesses, and

policy, legal and regulatory. For digital skills, the strategy contains 3 main outcomes: digitally enabled society, adequate and competent ICT professionals, and adequate and competent public sector ICT workforce.

Nepal: 2019 Digital Nepal Framework: Unlocking Nepal's Growth Potential contains three priority areas: talent and skills development, technology and infrastructure, and entrepreneurship. The section on talent and skills contains strategies on investing in digital education and training public servants in digital skills. The strategy contains case studies from some Asian countries.

South Africa: National Digital and Future Skills Strategy sets forth a vision and eight strategy elements for the country: basic and intermediate digital skills, building advanced digital skills, skills for industry, addressing the digital skills divide, building digital skills awareness, research and monitoring on digital skills, coordination across stakeholder groups, and funding for digital skills.

United Arab Emirates: Transformation in the United Arab Emirates 2020 contains nine areas, two of which address digital skills: digital life (for example, digital capabilities) and education (for example, distance education, smart learning in schools).*United Kingdom***:** Digital development strategy 2024 to 2030 contains four objectives, one of which is digital inclusion. Within this objective the strategy addresses basic digital skills, advanced digital skills and digital-adjacent skills.

Uruguay: Agenda Uruguay Digital 2025. The first three objectives (of 12) address digital skills: Digital citizenship (for example, formal education), Integration into the community (for example, seniors, rural populations) , and New strategies for employment (for example, career development and training, certifications)

Digital skills for life

Africa: Smart Africa is an alliance of 39 African countries committed to developing the knowledge economy on the continent. Among numerous projects, it produced a ICT Skills Capacity Building Blueprint (2021).

Asia: Go Digital ASEAN works with governments, local partners, and volunteers to deliver digital skills training to small business owners and workers. It is implemented by the Asia Foundation and endorsed by the ASEAN Coordinating Committee on Micro, Small, and Medium Enterprises, and funded by Google.org.

China: China's 2024 action plan to enhance digital literacy and skills is a joint effort of the Office of the Central Cyberspace Affairs Commission, the Ministry of Education, Ministry of Industry and Information Technology (MIIT) and Ministry of Human Resources and Social Security. Among other areas, the plan includes digital skills in schools, equal access to all citizens, digital skills for public servants, and high-level digital skills for the workforce.

Malaysia: Saya Digital, an initiative of the Malaysia Digital Economy Corporation (MDEC), an agency under the Ministry of Digital, offers several programmes for life and work. It includes Saya Digital Literacy for everyday skills, Saya Digital Freelance for income generation, and Saya Digital Career for advanced digital skills.

Philippines: The Digital Rise Program has three components, one of which is digital skills covering both elementary and secondary school. The Department of Education leads the initiative.

Uganda: The Pilot Digital Literacy Acceleration Program (2023/24 – 2025/26) focuses on strategies to improve the digital skills of workers and citizens based on four strategic areas: governance and public-private partnerships, digital literacy and skilling, access and availability, and integration of educational services and data. A governance committee includes stakeholders from government, the private sector, and development partners.

Digital skills for underrepresented populations

Many initiatives offer a range of digital skills training, from basic through advanced.

Women and girls

Global: EQUALS Her Digital Skills is a global initiative to provide digital skills training, e-skills badges and mentoring for girls. The initiative was co-founded by EY, GSMA, ITU and W4.

Global: The SheCodes Foundation provides free and fee-based courses in programming to women in developing countries. SheCodes operates in over 100 countries.

Global: Tech as a driver of Women's Economic Opportunity is a joint project of ITU, the Enhanced Integrated Framework (EIF), and the EQUALS Global Partnership. It focuses on building digital skills for women in least developed countries, with initial engagement in Ethiopia (textiles and apparel industry), Burundi (agriculture), and Haiti (textiles and apparel).

Global: Technovation is an educational nonprofit with a focus on digital entrepreneurship for girls ages 8-18. Girls work in teams to develop digital products, including mobile apps and AI projects.

Africa: The WAAW (Working to Advance Science and Technology Education for African Women) Foundation supports African women through STEM education, leadership, and entrepreneurship training.

Nigeria: The Digital Skills Accelerator for Women and Girls, of the Aid for Rural Education Access Initiative (AREAi), provides digital skills programmes for women and girls not-in-education-employment-or-training (NEET). The NGO is supported by numerous international and domestic foundations and development organizations.

South America: Laboratoria is a Latin American organization that trains women from low-income backgrounds to become software developers.

Rural

Europe: The Interreg North Sea Region, with support from the European Regional Development Fund, provides digital skills training and digital public services to support SMEs.

Aging populations

Europe: ICT4 the Elderly, co-funded by the Erasmus+ Programme of the European Union, provides best practices, an online academy, and other resources for supporting "online aging."

United Kingdom: AgeUK's Digital Champion Programme provides older people with trained volunteers and technology loans to improve their digital skills.

United States: Digital Skills Ready@50+, a program of AARP, provides digital skills and other resources for the elderly.

Persons with disabilities

Global: Internet for @ll: The ITU-D National Programme in Web Accessibility provides countries with knowledge for helping persons with disabilities. One component is a national digital training program for persons with disabilities on how to use accessible websites.

Global: An inclusive digital economy for people with disabilities, a publication of the ILO and Fundación ONCE, offers a view of digital transformation and the world of work and how it affects opportunities and challenges for the inclusion of persons with disabilities.

Global: The UNESCO Technology for inclusion (2020) report on inclusive education discusses uses of technology for learning, assistive technologies, distance and differentiated learning, and other topics.

Middle East and North Africa: The Arab Digital Inclusion Platform (ADIP) provides access to information on disability as it relates to the Arab region, including: research and resources, published by ESCWA and other regional and international organizations, laws and policies from the Arab region, toolkits to aid in the development of policies and technical guidelines on e-Accessibility, and best practices from the Arab region on e-Accessibility.

Youth

Global: The Digital Opportunity Trust (DOT) is a youth-led movement focused on underserved and disadvantaged youth. They offer digital skills along with other training to help youth become social innovators. DOT has reached over 3 million people in 25 countries, has received funding from numerous foundations and development agencies, and is active in global policy forums.

Global: The ITU-ILO Digital Skills Campaign component of the ILO Decent Jobs for Youth initiative aims to provide digital skills training for twenty five million young people by 2030 through partner commitments to engage in digital skills development for young people and other actions.

Low literacy populations

UNESCO's Digital inclusion for low-skilled and low-literate people: a landscape review explores how technology outside of the education sector can be designed to be more inclusive, accessible and usable for people with low levels of skills and literacy; the skills these people need to effectively use digital technologies; and the enabling environment for facilitating the successful uptake of digital solutions.

Digital skills for work

Europe: The Digital Skills and Jobs Coalition brings together member states, companies and organizations from across Europe to tackle the digital skills gap. It focuses on digital skills for all, digital skills for the labour force, digital skills for ICT professionals, and digital skills in education.

Australia: The Victoria State Government Digital Jobs programme focuses on upskilling mid-career professionals to transition into digital careers. It includes industry-backed training, career

coaching support, and the opportunity to apply for a 12-week paid work placement with a Victorian business.

India: The Skill India Digital Hub brings together a number of programmes to enable people to access the type of training that will help advance their careers. It includes skills courses, directory of skills centres, a job exchange and more.

United States: Social Finance, with investment from Google, partners with training providers Merit America and Year Up to offer courses in data analytics, digital marketing and e-commerce, IT support, project management, and user experience design. The program focuses on helping people from underserved communities access well-paying jobs.

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