NATIONAL PLAN FOR DIGITAL SKILLS

GOBIERNO DE ESPAÑA

AGENDA 2030

ESPAÑA PUEDE.

ESPAÑA DIGITAL 2025

Index

01

ECUTIVE SUMMARY

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With the rapid digital transformation of the economy and society, it is essential to master digital skills in order to take advantage of the economic, social and environmental opportunities now offered, in areas such as new, more accessible forms of communication and service provision, new occupational profiles, business opportunities for companies to respond to global challenges and new ways to access information, public services and economic activity throughout the country.

The exceptional situation of the COVID-19 pandemic has accelerated the digitalisation process, highlighting national strengths, but also shortcomings. Among these strengths are the extensive connectivity infrastructure that has been installed, the development of electronic administration in some key areas and the adaptability of many businesses. Weak points include continuing shortfalls in equipment and low levels of digital training among large numbers of the population. This problem is particularly acute where change is most rapid, such as the education sector and among small and medium-sized enterprises (SMEs).

The ecological transition is an increasingly important driver both of the demand for labour and of the supply of specialised digital knowledge, in all sectors. Therefore, the positive effects of the transition to a greener, more resilient economy can be maximised by simultaneously developing and integrating the 'green' skills and knowledge required by resource-efficient processes and technologies, in businesses and in the community at large.

The acquisition and development of digital skills is a key priority of the Recovery, Transformation and Resilience Plan, in which the green transition and digital transformation are both essential to economic recovery, to the creation of quality employment, to modernising productive structures and to reinforcing the social and territorial structure of the country. The latter consideration is particularly relevant to the problem of the 'empty' regions of Spain and efforts to repopulate them. These goals must be addressed via an inclusive approach, enabling everyone to benefit from digital training, but especially persons at risk of social exclusion. The transformation, moreover, must be responsible and sustainable, conducted in collaboration with the private sector and the third sector, due to the universal and transversal nature of digital skills. Education and vocational training systems must be extended to all, not only children and adolescents, but also adults seeking to obtain or reinforce digital skills, in response to new environmental and social demands.

The Plan is based on an international and European contextualisation of public policies in this area, providing a strategic framework in line with the 2030 Agenda and the Sustainable Development Goals (SDGs). This Agenda presents a roadmap for the construction of a fairer, more sustainable world and recognises the need to acquire, develop and use digital skills to help overcome poverty (SDG 1), ensure inclusive, fair high-quality education (SDG 4), achieve gender equality and empower all women and girls (SDG 5), promote decent work and sustained, inclusive and sustainable economic growth (SDG 8), build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation (SDG 9), reduce inequalities (SDG 10) and fight against climate change (SDG 13).

The European Digital Strategy recognises the need to promote the implementation of digital technologies and thus foster a fair, competitive economy, an open, democratic and sustainable society and, ultimately a better quality of life for European citizens. The 2021-2027 Digital Europe Programme focuses on strengthening Europe's capabilities in the fields of artificial intelligence, high-performance computing, cybersecurity and advanced digital skills. The European Green Deal, which was conceived as an engine for the transformation of the European economy, thus ensuring that in the coming decades Europe will become the first climate-neutral continent, has become a fundamental pillar in the immediate reconstruction of the European economy following the shock produced by the COVID-19 crisis. Success in its main areas of action will require major digital innovations, based on Big Data and artificial intelligence, together with other, specific technologies, which will all play a crucial role in overcoming the challenges to be faced. The new European industrial strategy acknowledges the importance of skills training for the ecological and digital transitions that must be undertaken, and highlights the opportunities they present for our population. For all these reasons, the European Commission is resolved to ensure that the green and digital transitions are jointly achieved and these skills reinforced, thus enabling Europe to accelerate and take advantage of the opportunities arising from this new model of society.

The Recovery Plan presented by the European Commission to address the post-COVID-19 era also emphasises the importance of acquiring digital and green skills to achieve a fair and inclusive recovery, through initiatives such as the Action Plan for Digital Education and the New Skills Agenda for Europe (featuring ten initiatives, including the Coalition for Digital Skills and Jobs).

On the national stage, digital skills training is among the ten priority targets of Spain's 2025 Digital Agenda, in order to "reinforce the digital skills of workers and the general public" and to achieve the goal that 80% of the population should have basic digital skills by the scheduled date.

Spain is reasonably well placed in rankings of the Digital Economy and Society (11th out of 28 in the global DESI index[1]). However, the situation is very uneven in terms of human capital:

- Almost half of the Spanish population (43%) lack basic digital skills and 8% have never used the internet.
- Only 4% of students obtain ICT-related degrees.
- Only 3.2% of the employed population are ICT specialists.
- The proportion of women ICT specialists has remained unchanged during the last four years, at around 1% of total female employment.

[1] The Digital Economy and Society Index (DESI) is published annually, reflecting the progress of digitalisation in each of the EU-27 Member States.

Therefore, although the situation in Spain is improving, the lack of digital skills, both basic and advanced, hampers digital transformation, in which the following challenges must be faced:

1. Ensure no one is left behind concerning inclusion in the digital world.
2. Bridge the gender digital divide, by increasing the number of women studying, graduating and working in the ICT field.
3. Ensure the acquisition of adequate digital skills for education, among teachers and students, at all levels of the education system.
4. Ensure the acquisition of advanced digital skills among the working population.
5. Ensure that Spanish companies in general, and SMEs in particular, have sufficient digital skills with which to successfully address digital transformation.
6. Ensure that Spain has sufficient training resources to meet the need for digital specialists in all areas of the productive economy (the demand for these specialists is currently growing four times faster than the supply).

The aim of the National Plan for Digital Skills is to achieve each of these goals. To do so, it provides a roadmap to identify the measures needed to ensure that all citizens have the resources needed to acquire and develop digital skills.

The Plan sets out seven lines of action and sixteen measures, aimed at improving digital skills in seven different areas: (1) digital inclusion among the general population; (2) bridge the gender digital divide; (3) digital skills for teachers and students at all levels of the education system; (4) digital skills for the working population; (5) digital skills for public sector workers; (6) digital skills for Spanish companies in general, and for SMEs in particular; (7) expand the supply of ITC specialists.

AXIS	LINE OF ACTION	MEASURE
I. Transversal digital skills	**1. Digital skills training,** with special emphasis on population groups at risk of digital exclusion	1. **National network of digital training centres, via integrated,** reference-level vocational training institutions. 2. **Massive open online courses (MOOC).** 3. **Specific actions for digital inclusion.**
	2. Bridging the digital gender divide.	4. **Programme to promote scientific-technological vocations among young people.** 5. **Programme to promote digital skills training for women and their participation in technological training itineraries.**

AXIS	LINE OF ACTION	MEASURE
II. Digital transformation in education	**3. Digitalisation of education and the development of digital skills for learning in education.**	6. **Plan for digitalisation and digital skills training in the education system,** supplying digital media to schools and students and transmitting digital skills via specific training programmes, with access to digital educational resources and developing advanced digital skills and methodologies. As a global integration measure, all schools and colleges will receive mentoring in the creation and implementation of their individual digital plans. 7. **Incorporate digital skills and programming knowledge into the compulsory education curriculum.** 8. **Create open educational resources for teaching with digital media,** to be generated by means of purpose-designed authoring tools. 9. **Digital skills vocational training plan (FPDigital),** including digital skills in the curricula of vocational training programmes. 10. **Plan to modernise the Spanish university system (UniDigital),** promoting the learning of digital skills by increasing the number of degree courses in this area and by upgrading existing ones.
III. Digital skills for employment	**4. Training in digital skills throughout the working life** (for the working population in the private sector).	11. **Vocational training programmes** to provide flexible, modular digital reskilling and upskilling. 12. **Accredit digital skills** at different levels, but especially basic digital skills, in the National Catalogue of Professional Qualifications.
	5. Digital skills training for public sector workers	13. **Digital skills training programme for public sector workers.**
	6. Digital skills training for SMEs.	14. **Digital transformation programmes for SMEs.**
IV. Digital specialists	**7. Expand the supply of ITC specialists** (via vocational training and university education).	15. **Adapt existing vocational and university training programmes,** and add new specialities focused on advanced digital skills. 16. **Programme to attract and retain experts in digital skills.**

This extensive, inclusive and multidisciplinary plan was created to address the challenges posed by the new digital society, transforming them into opportunities for growth and improvement, via the automation of jobs, the digitalisation of the business world and alternative (non-presential) approaches to teaching and learning, among other areas.

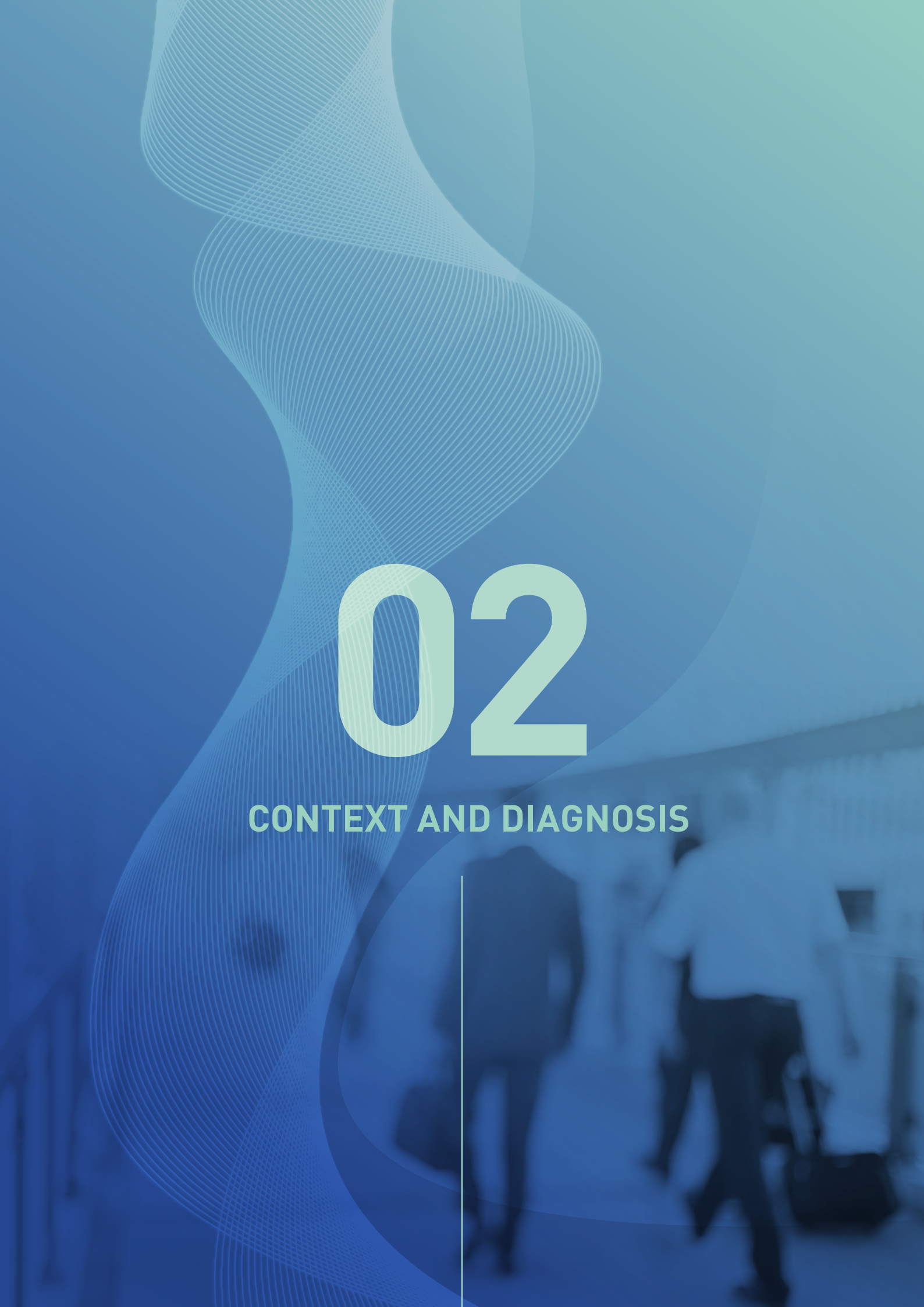
To this purpose, the Recovery, Transformation and Resilience Plan proposes a wide range of reforms, with a public investment of 3.75 billion euros during the period 2021-2023 to encourage further private investment in this area. In addition to the resources financed with the recently-established **Next Generation EU** mechanisms (the Recovery and Resilience Mechanism and REACT-EU), digital skills training programmes will be funded under the 2021-2027 Multiannual Financial Framework, and in particular through the **European Social Fund** and the **Digital Europe** programme (both of which are aligned with the 2021-2027 **Digital Education Action Plan).**

The Recovery, Transformation and Resilience Plan recognises the need to promote a coherent digitalisation plan for the entire value chain in cutting-edge sectors of the economy, taking full advantage of the synergies and opportunities offered by technological developments and new forms of data management, including projects that contribute to energy efficiency, the low carbon economy and the circular economy. These priorities are in line with the 2021-2030 National Integrated Energy and Climate Plan. In addition, tools should be developed to facilitate the conservation of natural resources, biodiversity, groundwater and the oceans, and to reinforce meteorological monitoring systems. Digitalisation can also contribute to the better management of information, to enhancing environmental understanding, to the integration and systematisation of processes, to the modernisation of management, to raising awareness of climate change and alleviating its dangers, and to the provision of comprehensive services in environmental matters. To achieve these goals, the acquisition of digital skills, in all areas of application, is of essential importance.

Effective public-private collaboration is crucial to identifying students' needs and to developing the necessary measures and projects for the skills training programmes. In addition to online and presential resources, big data techniques will be used for content analysis and to classify the training activities carried out in the workplace.

Digital skills are notoriously transversal, and this characteristic directly impacts on the policies applied in different sectors and administrative areas. In order to coordinate actions within the public sector and to promote public-private collaboration, a digital skills hub will be created, to provide a workspace, a forum for dialogue, a knowledge network and an ideas laboratory, thus fostering the dissemination of the measures and results obtained by the Plan.

Finally, **the Plan will be monitored and assessed** via a list of indicators (the DESI components) linked to those employed elsewhere in Europe, to ensure that the strategic goals are achieved. These indicators will reflect not only the outcomes of the proposed measures, but also the state of Spain's digital transformation. Once the barriers to connectivity have been overcome and universal access to electronic devices enabled, the possession of appropriate digital skills will enable the population to take full advantage of the opportunities offered. In short, the indicators will gauge the success of our transformation in becoming an inclusive, skilled, competitive and sustainable digital society.



02

CONTEXT AND DIAGNOSIS

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CONTEXT AND DIAGNOSIS

Spain is currently facing an economic and social context marked by profound, rapid and continuous digital transformation which is challenging traditional business models and the ways in which companies relate with customers, staff and regulatory bodies, within an environment featuring continuous interaction and integration with digital technologies.

Digital skills capabilities are of crucial importance in making optimum use of the opportunities provided by the ongoing digital transformation. Digital tools will have a major impact on economic growth and development, work patterns, corporate social responsibility, social inclusion (bridging gaps with respect to gender, age, origin and financial situation), and personal wellbeing. Moreover, these skills will make the population more prepared, more capable and better equipped. Agile, innovative companies will incorporate digital disruption as a driving force within their strategic outlook.

The exceptional situation provoked by the COVID-19 pandemic has highlighted the digital divide now facing many citizens, businesses and workers. The interruption of presential reaching has forced schools and colleges to launch online learning programmes, requiring not only the appropriate equipment and sufficient connectivity, but also the knowledge and skills with which to make good use of this technology. With the generalisation of lockdowns and domestic isolation, many of the activities of daily life (such as shopping, banking and even personal interactions) have come to depend on electronic means, and in many cases restrictions on physical mobility have made remote working essential. Clearly, the digital transformation is here to stay and digital skills must be employed to make it possible.

2.1. THE EU FRAMEWORK

The EU institutions recognise the importance of digital skills to facilitate living, learning and working in the knowledge society. As proof of this, Recommendation 2006/962/EC, of 18 December 2006 recognises the possession of digital skills as a basic necessity for citizens. Subsequently, the EC Recommendation of 22 May 2018 on the key competences for lifelong learning[2] recalled that digital competence is one of the eight basic skills, defining it as *"the confident, critical and responsible use of, and engagement with, digital technologies for learning, at work, and for participation in society. It includes information and data literacy, communication and collaboration, media literacy, digital content creation (including programming), safety (including digital well-being and competences related to cybersecurity), intellectual property related questions, problem solving and critical thinking". In addition, the Recommendation emphasises that key competences, of which digital competence is a part, "are developed in a lifelong learning perspective, from early childhood throughout adult life, and through formal, non-formal and informal learning in all contexts, including family, school, workplace, neighbourhood and other communities."*

[2] Recommendation 2018/C189/01 of the Council of the European Union, of 22 May 2018, on key competences for lifelong learning, OJEU C189 of 04/06/2018

The European institutions have made an important effort to establish a reference framework for digital skills that allows all member countries to develop their strategies for the acquisition and development of these skills in a systematic way. In this respect, in late 2010 the Joint Research Centre (JRC) of the European Commission launched the project "Digital Competence: Identification and European-wide validation of its key components for all levels of learners[3]" (DIGCOMP), to create a benchmark framework for digital skills among the population, following the guidelines of the European Digital Agenda and identifying the key components of digital skills in terms of knowledge, skills and attitudes.

Since then, the common benchmark framework for digital skills has been updated to include, in its most recent versions (DigComp 2.0 and 2.1, published in 2016), five areas and twenty-one competences, structured in eight levels of aptitude[4].

Table 1: Competence areas, competences and aptitude levels of DigComp 2.1.

COMPETENCE AREAS	COMPETENCE	APTITUDE LEVELS	
1. INFORMATION AND DATA LITERACY	1. Browsing, searching and filtering data, information and digital content 2. Evaluating data, information and digital content 3. Managing data, information and digital content	1	BASIC
2. COMMUNICATION AND COLLABORATION	4. Interacting through digital technologies 5. Sharing through digital technologies 6. Engaging in citizenship through digital technologies 7. Collaborating through digital technologies 8. Netiquette 9. Managing digital identity	2 3 4	BASIC INTERMEDIATE INTERMEDIATE
3. DIGITAL CONTENT CREATION	10. Developing digital content 11. Integrating and re-elaborating digital content 12. Copyright and licences 13. Programming	5	ADVANCED
4. SAFETY	14. Protecting devices 15.Protecting personal data and privacy 16. Protecting health and well-being 17.Protecting the environment	6	ADVANCED
5. PROBLEM SOLVING	18. Solving technical problems 19. Identifying needs and technological responses 20. Creatively using digital technologies 21. Identifying digital competence gaps	7 8	HIGHLY SPECIALISED HIGHLY SPECIALISED

[3] https://ec.europa.eu/jrc/en/digcomp

[4] DigComp 2.1 The Digital Competence Framework for Citizens. https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106281/web-digcomp2.1pdf_(online).pdf

Furthermore, the context in which digital skills are employed has expanded, from a generic concept based on basic digital skills for citizens, to include other, more specific ones, such as those promoted via new teaching-learning models or programmes to enhance workers' employability.

In late 2016, to unify all the digital skills-related initiatives developed to date, within an overall EU framework, the European Commission launched its "Digital skills and jobs coalition", bringing together Member States, businesses, the third sector and education professionals to work hand-in-hand to meet the growing market demand for digital skills.

For 2018 onwards, the action plan for the Coalition[5] is based on four fundamental pillars:

1. **Digital skills for all:** to ensure that all citizens are able to play an active part in the digital society.
2. **Digital skills for the working population:** including all workers, currently in employment or otherwise, to develop their digital skills and thus improve employability and the quality of work in the era of the digital economy.
3. **Digital skills for ICT professionals:** to provide technology professionals (i.e. those with university and professional training), in all sectors of the economy, with advanced digital skills.
4. **Digital skills in education:** to transform the teaching and learning of digital skills, including the training of teachers, in a lifelong learning perspective.

With respect to education, the action plan for the Coalition converges with the goals of the latest Digital Education Action Plan, approved in December 2020, to promote growth, innovation and job creation via a series of measures to help Member States address the challenges posed, in accordance with the following strategic priorities: (1) foster the development of a high-performance digital education ecosystem; (2) improve digital skills and capabilities for digital transformation.

These four fundamental pillars are complemented by the transversal approach taken in each one to bridge the gender digital gap, by increasing the presence of women in ICT-related university courses and in the world of digital work and by eliminating gender stereotypes from schools (see Annex 1 for more details on international and European contexts in this regard).

In November 2020, the European Commission officially launched the Pact for Skills[6], a key element in the European Skills Agenda for sustainable competitiveness, social fairness and resilience, which was presented on 1 July 2020. The main aim of this Pact is to mobilise resources and to encourage stakeholders to adopt concrete measures to train and reskill workers, joining forces and establishing partnerships to promote the ecological and digital transitions, in accordance with local and regional growth strategies. The Pact fosters large-scale collaborations in strategic industrial ecosystems that have been severely affected by the present crisis, and in the priority areas identified in the European Green Deal. As the ecological and digital transitions are now gaining speed, the Pact is well timed to equip European citizens with the capabilities that will be needed.

The new European industrial strategy recognises the importance of individual capabilities to the success of the ecological and digital transitions, and the opportunities these transitions will create for citizens, and puts into practice the training and reskilling that will be a vital aspect of our social market economy.

[5] https://ec.europa.eu/digital-single-market/en/news/governing-board-digital-skills-and-jobs-coalition-adopts-action-plan-boost-coalition

[6] https://ec.europa.eu/commission/presscorner/detail/en/ip_20_2059

2.2. PAIN'S 2025 DIGITAL AGENDA

In accordance with the above, **Spain's 2025 Digital Agenda, "An agenda for the digital transformation of Spain",** includes digital skills as the third of ten strategic axes aimed at promoting sustainable and inclusive economic growth. The Agenda distinguishes four types of digital skills, each targeting a different population group:

1. **Basic digital skills,** for citizens in general. The skills needed to fully participate in the digital society and to feel confident when using digital technologies to communicate, obtain information or conduct transactions such as shopping or interacting with public administrations or private companies.
2. **Advanced digital skills,** involving more complex technological activities such as sophisticated online searches, publishing digital content or programming and configuring simple digital systems. These skills, by their nature, are particularly relevant for the working population.
3. **Advanced digital skills,** i.e. specific ICT skills that enable advanced digital tools to be used. These competences are necessary to satisfy employment needs for specialists in digital technologies, in areas such as the design, implementation, operation and/or maintenance of digital systems. This group of skills includes cutting-edge technological areas such as data analytics, artificial intelligence, cybersecurity, supercomputing, quantum computing technologies and blockchain.
4. **Digital skills in education:** last but not least are the digital skills that enable lifelong learning. Digital studies during primary and secondary education and in non-specialised vocational training are needed to provide the skills necessary for full integration and active participation in modern life. These competences are particularly important because they enable citizens to update their capabilities, to develop personally and professionally and to adapt successfully to a society in constant flux.

The National Plan for Digital Skills is a vital instrument for promoting the acquisition and improvement of digital skills, among citizens in general and among workers and ICT professionals, in particular.

The fundamental aim of the Plan is to bridge the current gap in digital skills among the Spanish population. Among its specific objectives, the Plan focuses on population groups presenting the greatest deficiencies in this regard, and on particular needs in sectors such as education (concerning access to technologies, equipment facilitating teaching and learning, related methods and the development of curricula) and the labour market (where the demand for ICT specialists is increasing constantly). In brief, the Plan seeks to:

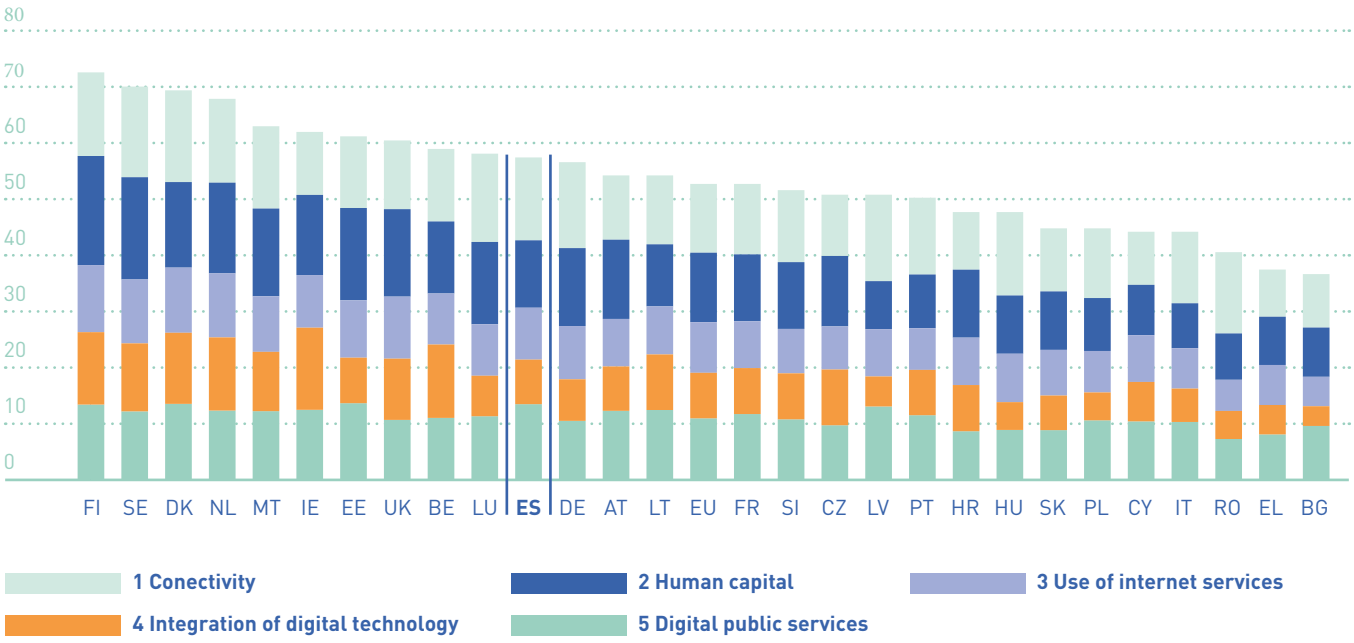
5. **Improve the basic digital skills of citizens and narrow the gaps between population groups.**
6. **Provide students with advanced digital skills and promote occupational vocations in the digital field.**
7. **Provide workers with the digital skills required in today's society.**
8. **Meet the demand for specialists in digital technologies.**
9. **Bridge the digital gender gap.**

2.3. ANALYSIS AND DIAGNOSIS OF DIGITAL SKILLS IN SPAIN

The Digital Economy and Society Index (DESI), published by the European Commission, reflects the degree of competitiveness of each EU Member State within the digital economy and society. This Index combines and summarises 44 indicators related to five dimensions: connectivity, human capital, the use of internet services, the integration of digital technology and the extension of digital public services. The latest edition was published in June 2020.

In 2019, Spain ranked 11th in this Index, among the 28 EU Member States. The corresponding data were obtained before the impact of the COVID-19 epidemic was felt, and therefore a subsequent improvement is to be expected in the dimensions of connectivity and the use of internet services.

The Digital Economy and Society Index (DESI) 2020

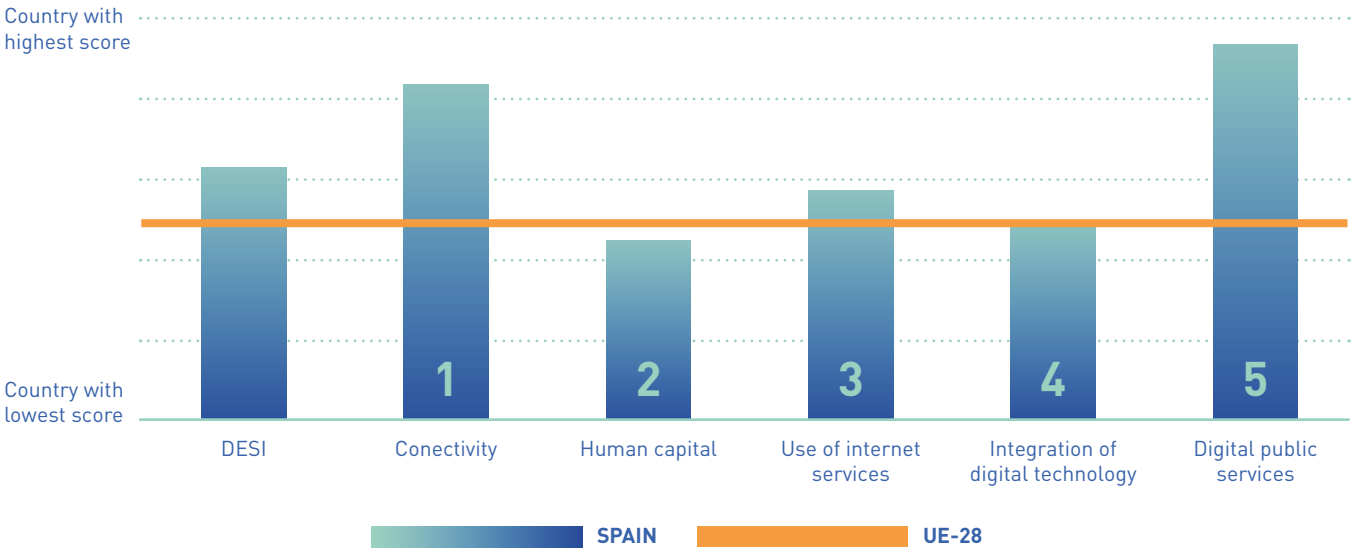


Although Spain's current position in this ranking should be considered positive, it has worsened since the tenth place recorded in the previous two years. Nevertheless, the overall score has risen by four points since 2019.

	SPAIN		UE
	Position	Score	Score
DESI 2020	11	57,5	52,6
DESI 2019	10	53,6	49,4
DESI 2018	10	50,2	46,5

Furthermore, Spain's results in each of the DESI dimensions are uneven (well above the EU average, second overall, in the development of digital public services and fifth in connectivity) and in general can be considered positive, as the DESI index has risen uninterruptedly during the last five years.

DESI 2020. Relative scores, by dimension. DESI evolution over time



The DESI dimension in which Spain performs worst is that of Human Capital, where although some improvement has been obtained, average levels of basic digital skills are still very low among the population.

Almost half of the Spanish population lack basic digital skills.
8% of the Spanish population have never used the internet.

For this reason, the main goal of the National Plan for Digital Skills, which forms part of the 2025 Digital Agenda, is to ensure that all citizens, but especially the working population, women and the elderly, acquire basic digital skills.

The following table shows that in 2020 Spain was ranked sixteenth among the EU-28 in terms of human capital, well below the EU average, although this position has improved since 2015.

HUMAN CAPITAL	SPAIN		UE
	Position	Score	Score
DESI 2020	16	47,6	49,3
DESI 2019	17	44,5	47,9
DESI 2018	17	44,9	47,6

The components of the Human Capital indicator are detailed below, showing why this parameter is the main weakness to be addressed in the digital transformation of Spanish society and the Spanish economy:

	ESPAÑA			UE
	DESI 2018	DESI 2019	DESI 2020	DESI 2020
	Valor	Valor	Valor	Valor
2a1 At least basic digital skills % of population	**55%** 2017	**55%** 2017	**57%** 2019	**58%** 2019
2a2 Above basic digital skills % of population	**32%** 2017	**32%** 2017	**36%** 2019	**33%** 2019
2a3 At least basic software skills % of population	**58%** 2017	**58%** 2017	**59%** 2019	**61%** 2019
2b1 ICT specialists % total employment	**3,0%** 2016	**2,9%** 2017	**3,2%** 2018	**3,9%** 2018
2b2 Female ICT specialists % female employment	**1,0%** 2016	**1,0%** 2017	**1,1%** 2018	**1,4%** 2018
2b3 ICT graduates % graduates	**4,0%** 2015	**3,9%** 2016	**4,0%** 2017	**3,6%** 2017

From the above data, we conclude that:

1. **Levels of basic digital skills remain slightly below the EU average.** Thus, 43% of persons aged 16-74 years lack basic digital skills (vs. the EU average of 42%).
2. **The share of ICT specialists in total employment has risen** to approach the EU average (3.2% vs. 3.9%, respectively).
3. **The proportion of ICT graduates has also increased,** and currently represents 4% of all graduates.
4. **The presence of women ICT specialists remains very low,** at just 1.1% of total female employment.

Analysis of the DESI 2020 components and their evolution since 2015 shows that although Spain's evolution has been positive, the lack of human capital skills in this area, both basic and advanced, is slowing the digital transformation of society and the economy.

This challenge has various causes and so it must be addressed via a multifaceted approach, incorporating all dimensions of digital skills:

1. **No-one should be left behind or excluded from the digital world.** Currently, 8% of the working population in Spain have never connected to the internet[7], and 45% have insufficient digital skills. Therefore, much more needs to be done to ensure that the long-term unemployed, as well as women and the elderly, who may no longer be part of the economically active population but continue to participate in society, acquire basic digital skills.
2. A closely-related topic is **the role of women and girls:** the digital divide is between ages, but also between the sexes. This challenge, too, must be addressed, by promoting women's presence in STEM-related areas of education and professional life, to bridge the digital gender gap.
3. **Digitalisation must become part of the educational and vocational training environment,** as regards access to digital media, the teaching methods applied and the curricula designed, at all levels of education: primary, secondary, vocational training and universities. Thus, digital literacy will be instilled as a fundamental human resource from earliest childhood, and the principle of lifelong learning will become a reality.
4. **Advanced digital skills among the working population** must also be generalised within productive sectors, via upskilling and reskilling programmes conducted throughout working life. It is unfortunately true that 34% of the economically active population in Spain still have insufficient digital skills and that around 40% of those lacking basic digital skills are unemployed. In this area, priority will be given to designing and providing cumulative professional training to accredit workers' proficiency in this area and from which they can benefit directly.
5. As a matter of priority, **the number of ICT specialists must be increased,** thus generating the skills needed to conduct a progressive, steady transition towards an increasingly digitalised economic environment.
6. **All companies, but SMEs in particular, must understand the need to have an online presence,** not only through a website, but also by establishing sales and marketing channels, multiple platforms, etc.

[7] https://ec.europa.eu/eurostat/databrowser/view/tin00028/default/table?lang=en

03

STRATEGIC GOALS OF THE PLAN

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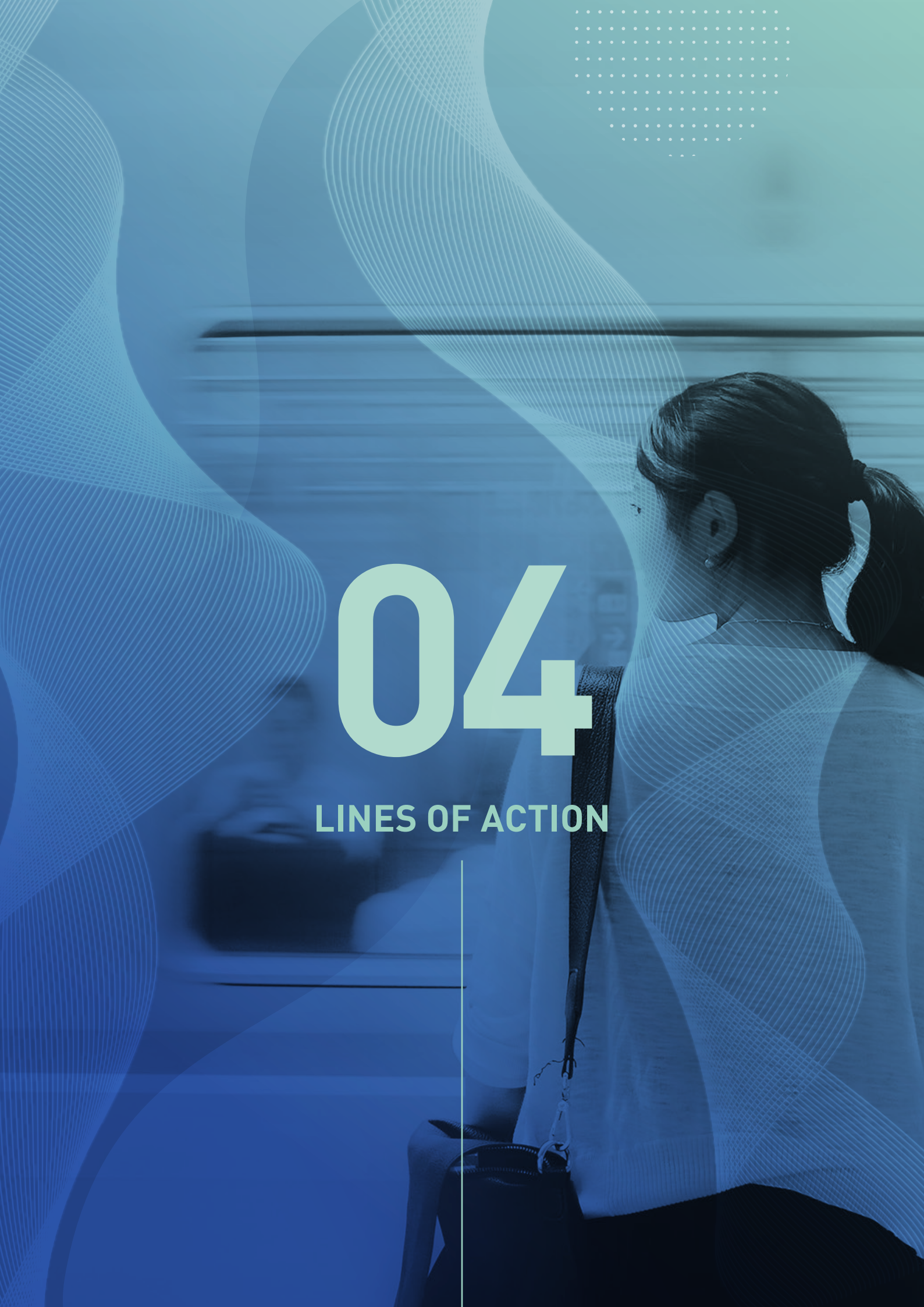
The purpose of this National Plan for Digital Skills is to overcome the challenges described above by creating and applying a roadmap to guide, identify, design and evaluate the public policies necessary for the development of digital skills of all types (basic, advanced and specialised), for all citizens, but with special attention to the needs of women and girls, the elderly and the working population (employed or otherwise). Specifically, the following areas will be addressed:

Así, el Plan Nacional de Competencias Digitales deberá:

- **Goal 1: ensure digital inclusion,** such that no-one is left behind in the drive towards digitalisation and the development of basic digital skills. At present, some 15 million people in Spain lack these skills and the Plan will focus on enabling them to become part of the digital world.
- **Goal 2: bridge the digital gender divide,** by increasing the number of female ICT specialists. In Spain, only 16.2% of these specialists (approximately 500,000) are women[8], vs. the EU-28 average of 16.5%.
- **Goal 3: promote the digitalisation of education** and the acquisition of digital skills among teachers and students at all levels of the education system. This goal is of vital current interest due to the COVID-19 crisis, which has forced many schools and colleges to adapt the format of classes to provide virtual teaching, online. In university education and vocational training, the Plan aims to increase the number of graduates in ICT subjects.
- **Goal 4: enable workers, both those in employment and those seeking work, to acquire advanced digital skills and thus improve their employability.** These skills will also enable workers to adapt to new occupational demands, as is especially the case of those affected by digitalisation and robotisation. The aim, therefore, is to increase the number of workers whose digital skills are above the basic level, and the number of persons with basic software capabilities.
- **Goal 5**: **increase the number of ICT specialists in Spain** from the present level of just 1,900,000, representing 3.2% of the total workforce. In this respect, the EU-28 average is 3.9%.
- **Goal 6: ensure that Spanish companies in general, and SMEs in particular, have the necessary skills for digitalisation.** To do so, we must increase the number of Spanish companies that incorporate digital technologies into their business affairs, in areas such as electronic information exchange, creating an active presence in social networks, using cloud computing, and facilitating e-commerce. At present, 41.2% of Spanish companies incorporate digital technologies to an acceptable level, which is in line with the EU-28 average of 41.4%[9].

[8] https://ec.europa.eu/eurostat/statistics-explained/index.php/ICT_specialists_in_employment#ICT_specialists_by_sex
WiDI, Section 3.2 ICT specialists, Females, 16 to 74 years old: Employed ICT specialists (Broad definition based on the ISCO-08 classification and including jobs like ICT service managers, ICT professionals, ICT technicians, ICT installers and servicers).

[9] https://ec.europa.eu/digital-single-market/en/integration-digital-technology



04

LINES OF ACTION

04
LINES OF ACTION

The National Plan for Digital Skills has seven lines of action, focused on four axes:

AXIS	LINE OF ACTION
I. Transversal digital skills	1. **Provide digital skills training for the general population** (with special attention to groups at risk of digital exclusion).
	2. **Bridge the gender digital divide.**
II. Digital transformation of education	3. **Digitalise the education system and develop digital skills for learning.**
III. Digital skills for employment	4. **Provide training in the use of digital skills throughout the working life** (private sector workers and the unemployed).
	5. **Provide digital skills training for public-sector workers.**
	6. **Develop digital skills in SMEs.**
IV. Digital professionals	7. **Expand the supply of ITC specialists** (via vocational training and university education).

Each line of action is detailed below, with its associated measures.

Line 1: Digital skills training for the general population

This line is aimed at equipping citizens for the digital age by achieving universal competence in basic digital skills (as defined in Spain's Digital Agenda for 2025) such that everybody will be able to communicate, shop, perform transactions and interact with public administrations via digital technologies, comfortably and self-sufficiently.

To achieve these goals, special attention must be paid to persons who currently find it most difficult to acquire digital skills, such as the elderly, those with low income levels, non-urban populations and persons with little formal education. In addition, some members of these groups, due to their age, form part of the economically active population. Therefore, this line of action will target the 8% of Spanish citizens who have never connected to the internet and the almost 20 million who lack basic digital skills.

This focus of attention will require the design of "bottom-up" measures involving proximity agents (coordinated by the Autonomous Communities and local governments), as according to international practice the local dimension is particularly important; Finland, Sweden and Luxembourg are leaders in this respect, according to the DESI 2020 index).

In many cases, the persons targeted in this line of action (pensioners aged 65-75 years, persons living in poorly-connected non-urban areas, or low-income families) will not possess digital resources such as an internet connection, tablet or laptop computer – and logically, therefore, will not have internet connectivity – and so the creation of national digital training centres is recommended. This sort of facility is essential for persons who have zero digital skills, since it offers face-to-face assistance and technical support. In addition, an online platform providing massive open online courses (MOOC) should be created.

MEASURE	KEY FACTORS FOR SUCCESS
1. **National network of digital skills training centres**	**Incorporation of Integrated Vocational Training Centres and National Reference-level Centres for digital skills training, throughout Spain.** Intergenerational or peer-to-peer knowledge transfer, coordinated by the Ministry of Economic Affairs and Digital Transformation. Support from local entities and/or regional administrations, as with the TeleCentre project[10], possibly using this network as a starting point.
2. **Massive open online courses (MOOC).**	**Via the *Aulas Mentor* programme of the Ministry of Education and Vocational Training, the design and provision of a digital skills programme suited to the needs and interests of each population group.**
3. **Specific actions aimed at digital inclusion**	**Identification by the Ministry of Inclusion, Social Security and Migration of needs, with national-scale actions conducted in collaboration with local social services.** **Collaboration with the *Aulas Mentor* programme, of the Ministry of Education and Vocational Training, to enrich the digital skills training provided in geographic areas and population groups presenting the most significant deficiencies.**.

[10]https://somos-digital.org/redes/

DIGITAL SKILLS FOR THE GENERAL POPULATION
Strengths, weaknesses, opportunities and threats

WEAKNESSES

- 8% of the Spanish population have never connected to the internet.
- 45% of the Spanish population lack basic digital skills.
- Lack of incentives for the private sector to collaborate in these initiatives.
- No overall strategic vision of initiatives spanning all levels of public administration.

THREATS

- Risk of the digital divide being widened by the rapid expansion of new technologies, which require continuous learning and adaptation.
- The dualisation of society by age and income may hamper digital inclusion.

STRENGTHS

- 91% of the Spanish population make some use of the internet, which favours informal learning networks.
- High connectivity (95% of the population have a landline or mobile telephone connection).
- Wide availability of the Aulas Mentor network of classes, part of the Ministry of Education and Vocational Training, providing non-formal learning in almost all municipalities.

OPPORTUNITIES

- Growing presence of e-commerce, popularity of social networks, high degree of e-administration.
- Informal learning networks (older people teaching other older people).
- Expansion of the Internet of Things and the proliferation of smart devices.
- Multiple international experiences inform of success and codes of good practice.

Line 2: Bridge the gender digital divide

This line of action is intended to eliminate the gender digital divide (which tends to grow as the use of technology becomes more advanced and specialised), to ensure the full participation of women in the digital society and in the digital economy, fostering training in digital skills for women and girls.

The digital gender divide arose from the tardy incorporation of women into successive waves of digital transformation, a process that began in the 1990s, when ICTs began to form part of everyday life, and continued in the first decade of the present century, when the internet was increasingly used to perform activities such as online shopping, banking operations or inter-personal communication. This use of digital resources has been accentuated with the situation generated by the COVID-19 pandemic. ICTs are now present in almost all activities of daily life. Accordingly, persons who lack digital skills are in real danger of social and economic exclusion.

According to the 2020 DESI, only 3.9% of Spanish workers are ICT specialists, and only 1.4% are women. Furthermore, while the number of ICT specialists has been increasing in the last five years, that of female ICT specialists has remained unchanged. To make matters worse, with the sustained growth of job opportunities for ICT specialists, the scant presence of women in this area reduces their chances of future employability.

This situation of inequality is compounded by the generational and social gap: the level of ICT use between women and men aged under 24 years is practically identical. From that age onwards, the gap widens, to reach a final difference of 60 percentage points[11].

The gender digital divide occurs at the intersection of purely gender inequalities with socioeconomic and generational ones. Therefore, although the measures proposed in this Plan focus on promoting the acquisition of digital skills and on fostering the presence of women in technological professions, it is clearly necessary to work in conjunction with other ministries (such as the Ministry of Equality[12], and the Ministry of Industry, Tourism and Commerce) to enhance the social inclusion and entrepreneurial opportunities of working women.

[11] "Our digital lives. Barometer of gender e-equality in Spain". April 2020.

[12] The Ministry of Equality has conducted diverse actions in this area, such as the CERES Training Programme in the fields of digital literacy and the empowerment of rural women with an equality perspective; in addition, a programme has been co-financed by the European Social Fund to train instructors in teaching rural women basic digital skills such as the use of computers, information search and e-participation from a gender perspective; the content of this training is adapted to match the interests of each group. The programme started in 2013, and since 2016 it has been carried out online. In 2020, two editions of the 100-hour online workshops were held. Since 2013, the Programme has awarded 333 Diplomas (298 to women).

MEASURE	KEY FACTORS FOR SUCCESS
4. Programme to promote scientific-technological studies	**The coordinated promotion, between the Ministry of Education and Vocational Training and the Ministry of Economic Affairs and Digital Transformation, of teacher-training actions** to eliminate gender biases and to foster technical-scientific vocations among girls. The incorporation into school curricula, from primary education onwards, of a specific professional orientation programme to encourage scientific-technological vocations. **Implementation by the Ministry of Education and Vocational Training of a communication programme, videos and mentoring to develop female role models in the world of science.** In Spain, only 18% (vs. the EU average of 21%) of university students take ICT degrees (moreover, since 2010, the number has fallen by 30%). The Ministry of Universities will collaborate with the Ministry of Education and Vocational Training to design scientific-technical vocation programmes aimed at achieving a greater balance between supply and demand in this respect, with ratios similar to those in neighbouring countries.
5. Programme to promote digital skills training for women and their participation in technological training itineraries[13]	**The coordinated promotion, between the Ministry of Education and Professional Training, the Ministry of Economic Affairs and Digital Transformation, the Ministry of Equality and the Ministry of Industry, Commerce and Tourism, of the following:** › **Specific careers-guidance programmes focused on digital projects and professions.** › **Greater visibility for the role played by digital professionals,** emphasising their contributions to society. This is a crucial issue; although few women study technology-related courses, their numbers increase when the study subject, although scientific, has a more "humanistic" or person-oriented profile, such as those offered by biochemistry, environmental engineering or bioengineering. This enhanced visibility could also be achieved by organising talks and meetings chaired by professional women with a career path in these areas, such as digital marketing, data engineering or artificial intelligence. › **Promote digital skills training for professional women in the technology sector,** in collaboration with companies, to facilitate their incorporation into digital employment. › **Launch specific programmes (such as the "Rural Woman Challenge" co-sponsored by the School of Industrial Organisation (EOI) and the Institute for Women) to promote rural female entrepreneurship,** with awareness-raising actions, meetings, mentoring, coaching and the development of an e-commerce platform. The Ministry for Universities will finance research to campaign more effectively to increase the presence of women in technical studies (in some technical areas, such as computer science, the female presence has even fallen in recent years, despite the promotional campaigns undertaken).

[13] Between 2013 and 2017, the number of ICT higher education graduates in Spain decreased by 3%, according to the Barometer of gender e-equality in Spain. Half of those enrolled do not graduate, according to the 2019 study "Situation of women in university engineering studies".

WOMEN AND GIRLS
Strengths, weaknesses, opportunities and threats

WEAKNESSES

- The number of women enrolled in technology degree courses fell by 3% between 2013 and 2017.
- Fewer than half of the women enrolled in engineering, experimental science, and architecture subjects finally graduate.
- Only 1.4% of ICT specialists are women.
- Only 20% of senior positions in large technology companies are held by women.

THREATS

- Risk of the digital divide widening, due to the rapid expansion of new technologies, which require ongoing learning and adaptation.
- Socioeconomic and generational gap, threatening the digital inclusion of women.
- The jobs performed by women are those most threatened by automation and artificial intelligence[14], since they tend to be more in support roles than development, creation or decision-making oriented (all of which are more abstract and less automatable).

STRENGTHS

- In 2015, women accounted for 40% of the research staff, and were mainly concentrated in private not-for-profit institutions.
- The presence of women in the scientific world in general (not exclusively technological) is almost equal to that of men.

OPPORTUNITIES

- European countries, its GDP will be 110 billion euros higher by 2025.
- Many associations (such as Girls in Tech, Girls Who Code and Women in Tech) are promoting initiatives to make technology attractive to girls, such as programming camps.
- The SDG4, SDG5 and SDG10 development goals of the 2030 Agenda, which have been ratified by the Spanish Government, highlight the importance of bridging the digital gender gap.

[14] "Global Skills Index, 2019.

Line 3: Digitalise the education system and develop digital skills for learning

The aim of this line of action is to ensure that all students acquire the digital skills necessary for social integration and successful career development, which will depend on their ability to make good use of advanced technologies and to keep this knowledge up to date.

In discussing measures to develop digital skills in the context of compulsory education, it should be remembered that in Spain all competences in this field have been transferred to the Autonomous Communities. However, these authorities collaborate closely with the central government in promoting the use of ICTs in schools, for example, via projects such as *Aggregate,* a federation of nodes to promote the creation and sharing of educational digital content, and programmes such as *Internet in the Classroom, Internet in School* and the more recent *Connected Schools* and *Educate in Digital.* Moreover, the educational administrations have jointly designed and implemented a Reference Framework for Teaching Digital Skills[15].

The "Digitalisation and Digital Skills Plan for the Educational System" proposes various actions to support the digital transformation of the educational system, by providing schools and students with equipment and other resources, by updating teachers' digital skills and in areas such as applying artificial intelligence to personalised education. The Plan will be implemented via several different strategies and channels. One such is the *Educate in Digital* agreement between the Ministry of Education and Vocational Training, the Ministry of Economic Affairs and Digital Transformation, and the Autonomous Communities.

However, despite the considerable work that has been done in this field, more effort and resources must be invested to successfully develop digital competence among students and their teachers, and thus ensure that good use is made of ICTs in education. For this purpose, there must be a methodological change, facilitating not only content acquisition, but also the development of skills that students will need in order to prosper within society and the job market. Although the latest generations of primary and secondary students are digitally aware and make frequent use of ICTs at home, this does not guarantee that they will be able to employ them as an instrument for developing knowledge and cognitive skills, for cultivating democratic values and making responsible use of technology.

The measures described below are based on the provisions of Organic Law 3/2020, of 29 December, amending Organic Law 2/2006, of 3 May, on Education, within the framework of the Digital Education Action Plan (2021-2027).

[15] Resolution of 2 July 2020, of the Directorate-General for Evaluation and Territorial Cooperation, publishing the Education Sector Conference Agreement on the reference framework for digital skills teaching.

MEASURE	KEY FACTORS FOR SUCCESS
6. **Digitalisation and Digital Skills Plan for the Educational System,** to provide schools and students with digital resources.	**Coordination between the Ministry of Education and Vocational Training and the Autonomous Communities to ensure:** › **The provision of digital media to education centres and students.** › **Teacher training.** Teaching basic digital skills, plus methods and advanced digital skills in education. › **Digital skills training for students,** introducing computational thinking and programming. › **The integration of digitalisation in education centres, via the Digital Plan for Schools.**
7. **The inclusion of digital skills and programming in compulsory education.**	**The integration of digital skills into school curricula from the earliest stages will enable students to acquire digital and programming skills, as a standard element of literacy** and of cultural appropriation. Moreover, it will provide an approach to digital competence via active, enjoyable methods.
8. **The provision of open educational resources to use digital media in teaching and the development of an authoring tool for this purpose.**	**The Ministry of Education and Vocational Training will supply applications, tools and curricular resources to facilitate education with digital media, for use in the school and/or at home.** Numerous high-quality Open Educational Resources will be made available to enhance teaching and learning, with special emphasis on protecting minors from the risks derived from internet use and interaction in social networks and on assuring the protection of personal data.
9. **Programme for vocational training in digital skills.**	**Coordination between the Ministry of Education and Vocational Training, the Ministry of Universities and the Ministry of Industry, Commerce and Tourism, in areas such as**: › **The design of new digital-related degrees, in accordance with the needs of the job market.** › **Teacher training in applied digitalisation,** in collaboration with the Ministry of Economic Affairs and Digital Transformation. › **The inclusion of an applied digitalisation module** in digital skills training in the study curricula listed in the Catalogue of Vocational Training degrees, at both medium and higher levels. › **The promotion of integrated and national reference-level centres in the digital sector.**

MEASURE	KEY FACTORS FOR SUCCESS
9. Programme for vocational training in digital skills.	› **Innovation-related projects between education centres and companies working in the digital field.** › **Training programmes for specialist ICT instructors in areas of greatest demand within the industrial sector** (to be coordinated between the Ministry of Industry, Commerce and Tourism, via EOI as the National Reference-level Centre, and the Ministry of Education and Vocational Training).
10. Plan for university education in digital skills	**The Ministry of Universities and the Conference of Rectors of Spanish Universities (CRUE) will work together in areas such as:** › **Providing technical resources and designing methods for education in digital skills.** › **Teacher training** › **The inclusion of digital skills training in the university and college curricula[16],** including the allocation of credits to MOOC programmes such as "Elements of artificial intelligence". › **Developing a network of centres of excellence in artificial intelligence.** › **Reducing administrative hurdles,** making it easier and faster to introduce new university degrees. › **Modifying teacher-training curricula.** New generations of primary school children should receive more STEM training and be introduced to computational thinking, from an early age. Changes to university degrees are regulated by the Ministry of Universities, which should take due consideration that only 10% of the training received in teacher-training studies is related to ICTs.

[16] There is a mismatch between the number of university graduates in the ICT field (approx. 80,000 per year) and market demands; according to the employers' association of digital technology companies, there are at least 10,000 vacancies in the technology sector, and this figure is increasing by 10% each year. Accordingly, new technical degrees should be introduced and the number of places in existing ones expanded.

STUDENTS
Strengths, weaknesses, opportunities and threats

WEAKNESSES

- 21% of students do not have advanced digital skills.
- According to ISTE , Spanish students not only score poorly in advanced mathematical and technological skills but also in problem solving, critical spirit and creativity.
- Long delays in approving curricula, in contrast to the rapidly changing state of digital technologies (especially as affects Measure 4).

THREATS

- Risk of the digital divide widening still further, according to socioeconomic level. Private-sector training is expanding faster than public education in this field, benefiting students with greater financial resources.
- Digital training is poorer in Spain than in other European countries, which may hinder students' entry into the job market and damage the competitiveness of Spanish markets.

STRENGTHS

- Students are the population group with the highest levels of basic digital skills (94.2%) and advanced digital skills (79.2%).
- There are only 2.8 students per computer in public non-university education centres, thanks to programmes such as Escuela 2.0 and Educate in Digital.
- The National Institute of Educational Technologies and Teacher Training (INTEF), the School of Computational Thought and collaborative projects with major technology companies are all driving progress in digital skills training.

OPPORTUNITIES

- Numerous European funds and programmes have been established to foster the acquisition of digital skills in education.
- The EU Digital Skills and Job Coalition strategy for the coming years emphasises the need to focus on educating young people in digital skills.

Line 4: Training in the use of digital skills throughout working life (private sector workers and the unemployed)

This line of action, in collaboration with relevant economic and social agents, will strengthen the vocational training system and enhance lifelong learning such that all workers, in employment or otherwise, can develop the digital skills necessary to become fully integrated into the digital economy. In this endeavour, the public administrations must pay special attention to rebalancing levels of digital skills between the employed and the unemployed, and between the sexes.

In the European context, the European Commission has launched its "Digital Skills and Jobs Coalition" initiative. More than 400 agencies, public and private, have joined this Coalition, which seeks to promote digital skills training in the European Union. Spain will actively collaborate to align its public policies with the EU strategic framework of action in this area.

85% of all jobs in the EU require at least a basic level of digital skills[18] and 40% of employers cannot find candidates with the necessary skills. These data reflect the present mismatch between demand and supply in digital skills; at all levels, the number of job candidates with an appropriate ICT profile is insufficient for the demand, which is growing almost four times faster than the supply, at an annual 4% during the last ten years[19]. Despite strong, sustained job growth for ICT professionals, the number of unfilled vacancies was expected to nearly double (to 756,000 people) by the end of 2020[20].

Among the factors that might account for the deficit of ICT specialists is a lack of attention to digital skills training in higher education (this question is considered in Line of Action No. 7, on universities and vocational training courses), low levels of participation by women and the prevalence of higher salaries in other European countries, which makes it difficult to retain highly qualified workers in Spain.

The measures proposed in this Plan will expand the presence of workers with digital skills. To achieve this, it is first necessary to identify specific digital skills that are imbalanced in the labour market (i.e. there is either a surplus or a deficit in supply/demand)[21]. Then, a diagnosis must be made, specific to each sector. However, although key digital skills differ from one sector of the economy to another, if modular skills training is promoted, it will always be possible to identify certain "knowledge blocks" that are common to all sectors.

In addition, it is essential to conduct training or reskilling to enable workers to adapt to the new ways of working brought about by the digitalisation of society and of the economy in general. In view of these considerations, the following measures are proposed:

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[18] World Economic Forum (2018). The Future of Jobs report.

[19] 43% of the EU population and 35% of the workforce have insufficient digital skills. In Spain, these figures are 45% and 34%, respectively. In addition, 42% of those lacking digital skills are unemployed, according to the DESI 2020 report.

[20] European Commission (2016). A new skills agenda for Europe. Working together to strengthen human capital, employability and competitiveness. COM (2016).

[21] OECD (2018), Getting Skills Right: Spain, Getting Skills Right, OECD Publishing, Paris, https://doi.org/10.1787/9789264282346-en.

MEASURE	KEY FACTORS FOR SUCCESS

11. Modular, flexible digital skills programmes in vocational training.	› **Strategic Plan to provide official accreditation of digital skills for students and workers, regulated by the Ministry of Education and Vocational Training.**
	› **The portability of learning, between employers.**
	› **Modular retraining in new digital skills.**
	› **Flexible, accessible training facilities, geographically close to the job.**
	› Actions by the Ministry of Labour and Social Economy:
	  › **Provide new skills for digital and productive transformation.**
	  › **Digital literacy programmes for the unemployed, under the Plan for the Promotion of Rural Employment (PROFEA).**
	  › **Provide a platform for self-employed workers and for the social economy.**
	  › **Digital skills training for the unemployed, focusing on entrepreneurship, rural development and bridging the gender divide.**
	› Actions by the Ministry of Agriculture, Fisheries and Food:
	  › Digital Skills Training Centre for rural workers.
	  › Digitalisation training and demonstration programme, within the framework of the National Rural Development Programme.

12. Inclusion of digital skills accreditation, at different levels, in the National Catalogue of Professional Qualifications, with special emphasis on basic digital skills	**Accreditation of digital skills acquisition by course participants, at basic and advanced levels.** This certification strengthens the learning process and facilitates the provision of course content in line with individual requirements.

UNEMPLOYED WORKERS
Strengths, weaknesses, opportunities and threats

WEAKNESSES

- In 2019, according to the Spanish Institute of Statistics (INE), 2.2 million unemployed people in Spain lacked basic digital skills.
- According to the Independent Authority for Fiscal Responsibility (AIReF), Spain invests 440 euros per unemployed person, less than a third of that spent by the other countries analysed.

THREATS

- Risk of widening the digital divide according to levels of income.
- Possible chronification of the digital divide between the employed and the unemployed. The existence of unequal starting points may seriously limit the future employability of many persons who are currently unemployed.

STRENGTHS

- The Reincorporate Plan (proposed by the Spanish Public Employment Service, SEPE), a specific training programme to provide long-term unemployed persons with basic and advanced digital skills, has achieved very promising results.
- Valuable synergies have been generated through public-private collaboration between SEPE and private companies, NGOs, European Social Fund managers and other specialised agencies.
- The number of unemployed persons with basic digital skills rose steadily from 2017 to 2019, according to INE data.
- The Ministry of Education and Vocational Training (MEFP) is applying an extraordinary financing plan for vocational training in digital skills.
- The two vocational training subsystems have been combined into a single system, managed by the MEFP, providing greater agility, flexibility and accessibility.

OPPORTUNITIES

- Cost efficiency and accessibility of training resources provided via MOOC.
- Numerous EU programmes offer funding and advice.
- Abundance of good practices combining training with advice and personalised support for job seekers.

EMPLOYED WORKERS
Strengths, weaknesses, opportunities and threats

WEAKNESSES

- In 2019, according to INE data, 6.1 million employed persons did not have basic digital skills. The risk of job loss for this reason is higher in Spain than in other EU countries.
- Only 18.5% of SMEs provide ICT training for their employees.
- According to AIREF, of the funds allocated to employment policies, only 16% are expressly provided to employed persons, companies and the self-employed.

THREATS

- In 2019, 32% of national jobs could be fully automated and another 30% partially so. In this case, in the coming decade more than half of the jobs performed in Spain will require digital skills[22].
- Companies whose employees lack digital skills will have fewer possibilities to innovate and take advantage of the digital transformation, and therefore less possibility of survival in a highly competitive market.

STRENGTHS

- Sustained increase in the number of employed persons with basic digital skills from 2017 to 2019, according to INE data. The annual growth of the workforce with basic digital skills is 1%.
- Digital transformation of the Spanish economy: by 2030, according to SEPE, 3.2 million digitalisation-related jobs will have been created.

OPPORTUNITIES

- Numerous EU funds and initiatives will increase the efficiency of the national measures adopted, providing financing and advice.
- Possibility of peer-to-peer learning or mentoring, by which trained workers will help others in the same company.

[22] Employment and Social Developments in Europe. Annual Review 2018. European Commission.

Line 5: Digital skills training for public sector workers

The public sector, which accounts for 50% of GDP, plays an essential role in driving the digitalisation of Spanish society and will be equally prominent in the project to achieve social and economic recovery after the COVID-19 crisis. **Digital skills training for public sector employment is differentiated from that provided in the private sector** for the following reasons:

- The digital skills of public employees, whether ICT specialists or otherwise, must be enhanced so that public agencies can successfully conduct an internal transformation (of procedures, relationships with the public and their own organisational culture) in order to properly perform their role of regulators, promoters and facilitators of the digital transformation of Spain;
- Within the field of public administration, staff training constitutes a subsystem with specific characteristics, as stipulated in Act 30/2015, of 9 September, on the professional training system for public sector employment, and in the Public Administration Training for Employment Agreement.

This line of action has a single measure:

MEASURE	KEY FACTORS FOR SUCCESS
13. Digital skills training for public sector workers.	**The Ministry of Territorial Policy and Public Administration will implement a plan to enhance the digital skills of public sector workers and develop a training programme in this respect for all levels of public administration.** **Diagnosis of the digital skills training status of public sector workers.** **The National Institute of Public Administration (INAP) will develop and implement a digital skills training plan for the personnel in national administrative agencies.** **A model will be developed for selective recruitment procedures, taking into account digital skills, both of a general nature and those specific to the job description.**

PUBLIC SECTOR WORKERS
Strengths, weaknesses, opportunities and threats

WEAKNESSES

- Uneven rates of advance by technology (faster) and users' adaptation to technological change (slower) creates a lag between digitalised procedures in public administration and the efficient use of telematic resources by the personnel responsible. This lag must be overcome for the adaptation to change to be efficient.
- Organisational deficiencies impair the response to functional needs, not only as regards training in digital skills but also in their efficient everyday use.

THREATS

- Strong risk that inadequate digital skills training among public sector workers will hamper their ability to adapt to new scenarios in which these skills are essential.
- In the foreseeable future, the efficient use of data science at different levels of complexity (from spreadsheets to big data and artificial intelligence) will require the mastery of new skills.
- Over 50% of the public sector workers currently employed will retire during the next ten years, and so greater effort will be needed to provide digital skills training for these older workers.
- Failure to address this situation will provoke a loss of cognitive capital and compromise the performance of administrative units.

STRENGTHS

- The current development of e-administration in Spain is very advanced in the procedures and use of electronic resources.
- Government agencies have ample experience in the digitalisation of citizen-oriented services and in training public sector workers in the electronic processing of administrative procedures.
- Since Act 11/2007 came into force, the promotion of automated administrative actions has been prioritised and the management of electronic documents and files is now a reality in Spanish public administration. In this respect, too, Act 18/2011, of 5 July, contributed to promoting the digital transformation of the administration of justice.

OPPORTUNITIES

- The COVID-19 pandemic and its implications in this field (spurring the introduction of remote working, telematic relationships and new software) lends greater urgency to the digital skills training provided for public sector workers.
- Digital skills training is a fundamental ingredient of the Recovery, Transformation and Resilience Plan; accordingly, this framework provides additional financing to maintain the training programmes.
- The development of a new framework for the public sector (the Public Sector Act and its regulatory details for public managers and for the development of the administrative career path) offers an opportunity to incorporate digital skills training into selection procedures, recruitment and the retention of human resources.

Line 6: Develop digital skills in SMEs

This line of action addresses the digitalisation of SMEs, and will contribute to digital transformation by identifying the digital skills needed (by entrepreneurs, managers and employees), unifying the policies aimed at public sector employment with those targeting private enterprises, and incorporating young people as agents of digital transformation. The importance of digitalisation as an engine of innovation and of the ecological transition and as a vital element to improve competitiveness and productivity is highlighted in the 2030 Strategic Policy Framework for SMEs, in which the following lines of action are proposed:

1. Incorporate digital tools in the relations between SMEs and government agencies.
2. Facilitate the digital transformation of SMEs, as a key element in their life cycle.
3. Improve the availability of channels to finance the digitalisation of SMEs.
4. Develop assistance programmes for SMEs in Industry 4.0, facilitating diagnosis of companies' digital maturity and on this basis designing a plan for improvement.
5. Support the incorporation of key enabling technologies, such as nanotechnology, micro and nanoelectronics, photonics, advanced materials, advanced manufacturing systems and industrial biotechnology, in manufacturing processes, materials and/or finished products.
6. Establish mechanisms to promote the incorporation of SMEs into vocational training plans.

The digital transformation of companies is a transversal process that affects all kinds of business activities, including production, sales, marketing, human resources and economic management.

A recent study on digital skills in Spanish companies[23] highlighted the existence of a significant digital gap between large companies and SMEs. Thus, 86% of SMEs do not have a digitalisation plan, and only 2% are concerned about this fact (according to the DESI index). This lack of concern weighs down the competitiveness of the Spanish economy, as according to the OECD a 10% increase in the digitalisation of companies could increase GDP by 3.2%.

The digitalisation of SMEs improves not only competitiveness of the company in question, but also has a driving effect on other sectors of the economy, in particular by aligning the supply and demand of ICT specialists. This finding disproves the stereotype that digital professionals only work for large

[23] tudy conducted by the Digital Economy institute of the ESIC Business & Marketing School. https://cdn5.icemd.com/app/uploads/2018/12/3r-Estudio_Competencias_Digitales_ICEMD-5.pdf

and inherently technological companies.

In this area, initiatives such as "Digital Advisors" and "Digital Transformation Offices" were conducted until 2020 by the public agency RED.es, while SME Acceler-8, a resource platform for SMEs and freelancers, was also established by RED.es, in collaboration with public and private entities and in the framework of the Emergency Plan to combat the effects of COVID-19. Other initiatives in this respect have been undertaken by the Ministry of Education and Vocational Training.

In all of these actions, advice and counselling are available to participating SMEs to assist them in incorporating ICTs into processes such as business management, relationships with third parties, e-commerce and the digitalisation of services or solutions. Moreover, the above offices provide presential advisory services, plus information and awareness raising activities on the need for SMEs to effect a digital transformation, and the opportunities that this may produce.

For the above reasons, this line of action emphasises the need to continue promoting and supporting digitalisation. Specifically, the following measures are proposed:

MEASURE	MEASURE
14. Digital transformation programmes for SMEs.	**Coordinated action by the Ministry of Economic Affairs and Digital Transformation, the Ministry of Industry, Commerce and Tourism and, in collaboration with the EOI, the Ministry of Labour and Social Economy, and also, where appropriate, the Ministry of Culture and Sports, to implement training programmes and scholarships, in conjunction with the SME Acceler-8 programme, to achieve the following goals, among others:** › **Train entrepreneurs and managers** in aspects of e-commerce, resource planning systems, customer relationship management, process automation, marketing, digital positioning, etc. › **Promote on-the-job training** for companies to improve management procedures and promote their digital transformation. › **Apply specific programmes for SMEs** in areas such as climate change and energy transition. › **Train young experts in the digitalisation of SMEs.** › **Provide grants and scholarships to fund the work of experts in the digital transformation of SMEs.**

MEASURE	KEY FACTORS FOR SUCCESS
14. Digital transformation programmes for SMEs.	**Provide training for industry, entrepreneurs and SMEs in digitalisation, in the following areas:** Industry: resilience, innovation and digitalisation of industrial SMEs, including reskilling and upskilling in strategic industrial sectors (culture and sports, the audiovisual industry, tourism, transport and energy transition, among others). These actions are aimed, in particular, at strengthening resilience, raising awareness of issues related to the adoption of advanced technologies, accelerating innovative and industrial entrepreneurship, promoting open innovation and strengthening business growth. Promoting innovative digital entrepreneurship: a programme developed by the Ministry of Industry, Commerce and Tourism, through the EOI and in coordination with the High Commissioner for Spain Entrepreneurial Nation. The EOI Coworking Spaces network will promote digital entrepreneurship throughout Spain. Actions by the Ministry of Labour and Social Economy to facilitate digitalisation by entrepreneurs. **Digitalisation training actions focused on business internationalisation:** Business training, through ICEX CECO teaching activities. Strategic consulting and training (e-market services). Training programmes in the use of digital tools for strategic decision making, such as *DigitalXBorder* and *Marca&Innovación,* a competitive differentiation programme for CEOs.

SMEs
Strengths, weaknesses, opportunities and threats

WEAKNESSES

- Insufficient digitalisation of Spanish SMEs. According to DESI 2020, only 18% of Spanish SMEs sold via online channels in 2019, and little progress had been made since DESI 2018.
- Only 13.5% of SMEs employ ICT specialists, compared to 72% of the companies with >250 employees, according to INE 2018 data.
- Only 8% (DESI 2020) of Spanish SMEs sell online internationally.
- Only 11% of the turnover of Spanish SMEs is based on e-commerce (DESI 2020).

THREATS

- Strong risk that the shortage of ICT specialists will prevent or hinder the digital transformation of SMEs.
- If the productive sector does not have ICT specialists, disruptive innovation processes that require technological capacity cannot be addressed.
- The rapid, continuous transformation of technology requires businesses to adapt constantly.

STRENGTHS

- 19% of SMEs sell online (19%), slightly above the European average (18%).
- SMEs have prior experience via programmes such as SME Acceler-8. Moreover, they have always participated in initiatives to boost the Spanish economy.
- SMEs account for almost 60% of all businesses in Spain[24]. If they can raise turnover and become more competitive, this will have a positive impact on job creation.
- Micro-enterprises represent 41% of total employment in the non-financial business economy[25] (11.5 percentage points above the EU average).

OPPORTUNITIES

- The COVID-19 pandemic has highlighted the immediate need for SMEs to have an online presence.
- Students can become agents for digitalisation, for example, when working as interns or in dual vocational training courses. The current generation have far stronger digital skills than the rest of the population.
- The presence of workers with good digital skills can favour entrepreneurship and the creation of technological SMEs. Moreover, technological intrapreneurship within companies will require professionals with advanced digital skills. In consequence, there will be more and better jobs.
- Digital security is a key factor in digital transformation, both for SMEs and for the workers involved.
- Digitalisation will bring about new markets, products and digital solutions, associated with the green transition. This process will be significantly boosted by the National Integrated Plan for Energy and Climate.

[24] http://www.iPYME.org/Publicaciones/CifrasPYME-enero2020.pdf

[25] https://industria.gob.es/es-es/Servicios/MarcoEstrategicoPYME/Marco%20Estrat%C3%A9gico%20PYME.pdf

Line 7: Increase the presence of ICT specialists (in vocational training and university graduates and researchers)

This line of action seeks to ensure that current and future needs will be met for specialists in digital technologies, at above-basic and expert levels, in reponse to the demands of the productive sector and the need for innovation in digital products and services.

In this field, State authorities have exclusive competences in regulating the conditions for the issuance and recognition of academic and professional qualifications, for determining teaching plans and for basic curriculum design, in order to ensure a common pattern of training and the official nature and nationwide validity of the certificates awarded.

To achieve the goals proposed in this line of action, measures have been proposed for curricular coordination between universities and vocational training institutions to incorporate specific digital skills (in fields such as cybersecurity, artificial intelligence, data analysis, web design, user experience design, blockchains and fintech) that are currently in great demand, either by adapting existing study plans or by creating new ones, as appropriate.

This line of action will be jointly undertaken by the Ministry of Universities and the Ministry of Education and Professional Training, taking into consideration the strategies adopted by relevant foundations and companies, in order to achieve a comprehensive, consensual approach.

MEASURE	KEY FACTORS FOR SUCCESS
15. Adapt existing vocational and university training options and design new specialities to facilitate the acquisition of advanced digital skills.	› **Modular, scalable ICT training routes,** specialisation courses and other types of training, based on the National Catalogue of Professional Qualifications, creating a comprehensive training itinerary. › **Official accreditations,** endorsing the quality and relevance of the certification awarded. › **Periodic, systematic analysis to determine the digital skills in greatest demand.** › **Ongoing work by the Observatory of the National Institute of Qualifications (INCUAL) to detect new certifications and to update those existent.**
16. Programme to attract and retain ICT experts.	**The Ministry of Universities and the Ministry of Inclusion, Social Security and Migration will introduce:** › **Measures to eliminate obstacles to the return of Spanish digital professionals from abroad** or the arrival of foreign experts, especially from outside the EU. › **Ph.D. programmes in digital specialities.**

DIGITAL SPECIALISTS

Strengths, weaknesses, opportunities and threats

WEAKNESSES

- Shortage of ICT specialists: in Spain, 25% of companies wishing to hire digital experts have problems finding them.
- Only 13.5% of SMEs employ ICT specialists, compared to 72% of companies with >250 employees, according to INE 2018 data.
- New occupational profiles and digital skills are not always incorporated into university curricula or advanced vocational training cycles.
- Strong and growing bias towards ICT specialists with higher education compared to those with only intermediate qualifications: this is the case of 82.4% of professionals in Spain compared to 63.1% in the EU.
- ICT specialists are aging: an increasing number are aged over 35 years, while the number of young persons in this field is falling, both in the EU and in Spain, but more so in Spain.

THREATS

- Strong risk that the shortage of specialists in digital technologies will prevent or hinder the digital transformation of companies.
- The expert knowledge of ICT specialists at a given time point (on concluding their training) may become less valuable or inappropriate at a later time point, if ongoing professional experience does not include continual reskilling.
- In the absence of appropriate ICT specialists, the productive sector may not have the necessary technological capacity to address disruptive innovation or to take advantage of opportunities arising from the new economic and environmental model.

DIGITAL SPECIALISTS

Strengths, weaknesses, opportunities and threats

STRENGTHS

- Employment in the ICT sector grew by 7.3% in 2018.
- As shown in the Map of AI Capabilities published by the Ministry of Science and Innovation, a growing number of public and private entities are researching, developing, using or providing services with enabling technologies.
- The demand for technology profiles associated with business intelligence - data intelligence, big data, artificial intelligence or blockchain - increased by 33% in 2019.
- There is strong demand in the labour market for vocational training graduates with ICT qualifications, especially those whose studies are most closely related to professional needs.
- The number of ICT boot camps – i.e. short-term, intensive courses in big data and data analysis, requiring neither experience nor previous training in this field – is rising exponentially.
- New vocational training courses are being designed in the field of digitalisation, complementing intermediate and higher-level training with options for specialisation.
- An important public-private collaboration framework for digital training is being established, especially in advanced vocational training and university studies.

OPPORTUNITIES

- There exists a significant margin of employability following the acquisition of advanced digital skills by students in the humanities and social sciences, in areas such as data analysis and e-marketing.
- Students may become agents for digitalisation in the business world, when they become interns or enter dual vocational training, as the digital skills of this generation are much greater than those of the general population.
- The implementation of the National Integrated Plan for Energy and Climate offers multiple opportunities for the development of digital skills among entrepreneurs and SMEs, taking advantage of their capillarity within the economic system, in areas such as the creation of local energy communities, the application of building information modelling, smart metering, indicators of building 'smartness', distributed generation, storage, monitoring of energy exchanges with blockchain, the deployment of electric vehicles, smart grids and the sensorisation of low emission zones.

05

GOVERNANCE AND INVESTMENT BUDGET

05
GOVERNANCE AND INVESTMENT BUDGET

Society's growing need for digital skills requires the introduction of a new paradigm, updating the models of teaching-learning applied in schools (primary and secondary), vocational training centres and universities. Moreover, new models must be created to ensure the development and adoption of digital skills, firstly for ICT specialists and subsequently via periodic reskilling and upskilling.

This process must involve all elements of society, but particularly those most at risk of digital exclusion, such as the elderly, the long-term unemployed, young persons with little formal education, training or employment opportunities, and women and girls. All these groups must be addressed and included, to ensure there are equal opportunities in all professional sectors, particularly those which require digital skills.

Digital skills have a marked transversal nature, which influences the policies applied and impacts on each of the agencies, units and Ministries involved. This consideration underlies the inclusive, multidisciplinary approach of the National Plan for Digital Skills, which must address a wide range of stakeholders and sectors in order to express a comprehensive, coherent outlook.

In this Plan, the proposed model of governance is termed a "Digital Skills Hub", to be created as a public-private institutional associative body, which will guide the implementation of the Plan to achieve the following goals:

1. **Create a joint work space** in which, for example, combined indicators will be defined to measure the progress and impact of the actions led by different departments, and to foster the exchange of best practices in launching, managing and evaluating projects.
2. **Identify opportunities for collaboration with the private sector,** to promote and lever innovation in the field of digital skills.
3. **Generate a network knowledge** to interconnect the actions taken by members of the Hub, thus facilitating data-based decision making.
4. **Provide a brainstorming environment** in which to explore initiatives that can be simulated or launched as pilots before their implementation on a larger scale and that promote the early detection of technological trends and changes in the market.
5. **Generate a channel of communication** that guarantees the uniqueness of the message, conveys the execution milestones reached and provides recommendations on digital skills.

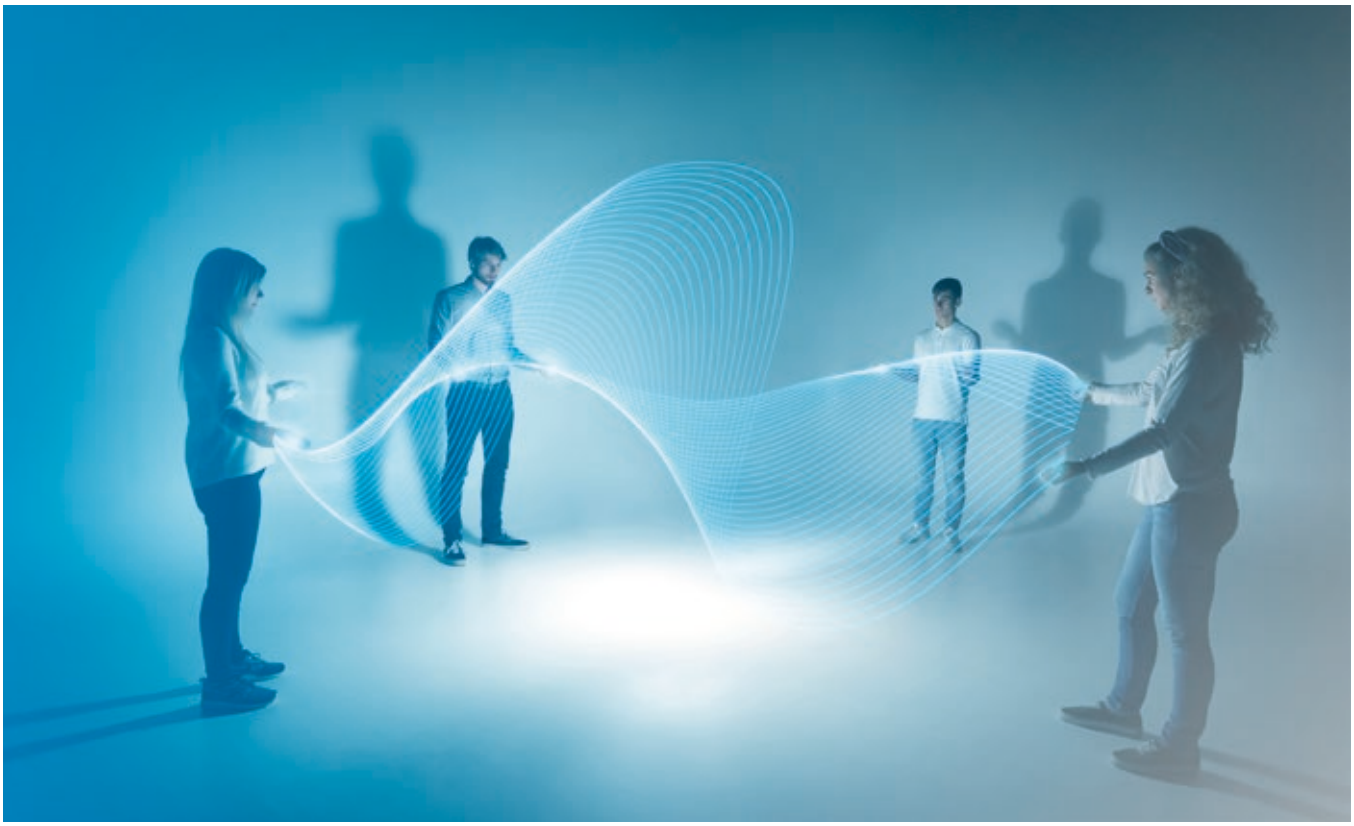
The Digital Skills Hub has three main purposes:

I. **To spearhead the digital skills revolution for the 21st century,** ensuring compliance with a code of conduct and the exchange of best practices.
II. **To foster innovative practices in the field of digital skills,** using emerging technologies and promoting the use of open source applications.
III. **To advance towards a common, global vision,** based on a shared diagnosis, to incorporate active economic, technological, social and educational policies in the field of digital skills, under the same strategic approach as that of the General State Administration.

To achieve these goals, the Hub must perform the following tasks:

1. **Promote legislation to ensure compliance with the strategic aims of the National Plan for Digital Skills,** with coherent, coordinated actions in each of the initiatives undertaken, conducted individually or by different Ministerial departments.
2. Ensure the proper **execution, monitoring and evaluation** of the actions foreseen in the National Plan for Digital Skills.
3. Provide a **space for dialogue and debate,** enabling collective decision making.
4. Promote the sustainable, inclusive and equitable growth of companies creating digital content and of providers of training/consulting services for digital skills.
1. **Strengthen the sector,** making it more competitive via synergies with companies providing complementary services, together with non-business organisations and public-private collaboration.
2. **Establish a system of global evaluation indicators** focused on the real impact produced by the acquisition of digital skills and by subsequent improvement and specialisation, among the entire population, but with particular attention to women and girls (who are currently under-represented in STEM-related activities) and to the impact on environmental sustainability.

The Ministries concerned will supervise the implementation of the projects and measures described in the Plan, each working within the framework of its sectoral arrangements with the Autonomous Communities, via agreements and other instruments of public-private collaboration:



AXIS	LINE OF ACTION	MEASURE
I. Transversal digital skills	**1 Digital skills training, with special emphasis on population groups at risk of digital exclusion**	1. National network of digital training centres, via integrated, reference-level vocational training institutions. 2. Massive open online courses (MOOC). 3. Specific actions for digital inclusion.
	2 Bridging the digital gender gap	4. Programme to promote scientific-technological vocations among young people. 5. Programme to promote digital skills training for women and their participation in technological training itineraries.
II. Digital transformation in education	**3 Digitalisation of education and the development of digital skills**	6. Plan for digitalisation and digital skills training in the education system. 7. Incorporate digital skills and programming knowledge into the compulsory education curriculum. 8. Create open educational resources for teaching with digital media. 9. Digital skills vocational training plan (FPDigital). 10. Plan to modernise the Spanish university system (UniDigital).
III. Digital skills for employment	**4 Training in digital skills throughout the working life**	11. Vocational training programmes to provide flexible, modular digital reskilling and upskilling. 12. Accredit digital skills at different levels, but especially basic digital skills, in the National Catalogue of Professional Qualifications.
	5 Digital skills training for public sector workers	13. Digital skills training programme for public-sector workers.
	6 Digital skills training for SMEs	14. Digital transformation programmes for SMEs.
IV. Digital specialists	**7 Expand the supply of ITC specialists**	15. Adapt existing vocational and university training programmes, and add new specialities focused on advanced digital skills. 16. Programme to attract and retain experts in digital skills.

The investment budget foreseen in Component 19 "Digital skills training" of the Reconstruction, Transformation and Resilience Plan (RTRP) amounts to 3.593 billion euros for the period 2021-2023. The breakdown for the different axes is as shown below:

AXIS	2021-2023 budget[6] (€ m)	%
I. Transversal digital skills	890	24,77%
II. Digital transformation in education	1637	45,56%
III. Digital skills for employment	906	25,22%
IV. Digital specialists	160	4,45%
Total	**3.593**	**100,00%**

[26] Component 19 RTRP

In addition to Component 19 of the RTRP, a complementary contribution of 157 million euros is estimated for Components 20 "Strategic plan to promote vocational training", and 21 "Modernisation and digitalisation of the education system". Therefore, the total budget for the Plan, including the investments foreseen for Components 19, 20 and 21 of the RTRP is 3.75 billion euros[27].

AXIS	2021-2023 budget[28] (€ m)	RTRP Component / Investment (€ m)
I. Transversal digital skills	890	C19 / 890
II. Digital transformation in education	1.703	C19 / 1637 C20/ 5 C21 / 61
III. Digital skills for employment	997	C19 / 906 C20 / 91
IV. Digital specialists	160	C19 / 160
TOTAL (estimated)	**3.750**	**C19 / 3593 C20 / 96 C21 / 61**

[27] To determine the total budget of the General State Administration for digital skills training, it is necessary to include the other actions in this respect included in the ordinary State Budget and the European funds obtained (ERDF, ESF, etc.).

[28] Components 19, 20 and 21 RTRP

ANNEX 1

INTERNATIONAL AND EUROPEAN CONTEXT

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INTERNATIONAL AND EUROPEAN CONTEXT

SUSTAINABLE DEVELOPMENT GOALS

The stated aims of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals (SDGs), adopted by all the UN member countries in 2015, are to end poverty, to fight against inequality and injustice, to guarantee decent work, to protect the environment and tackle climate change, and in general to seek prosperity and well-being for all.

The seventeen SDGs are integrated and indivisible, global in scope and universally applicable. All of the areas addressed are interrelated components of economic and social development and of efforts to protect environmental sustainability.

In June 2018, the Council of Ministers approved the **Action Plan for the Implementation of the 2030 Agenda,** within which the National Plan for Digital Skills is a key element, focusing on the following SDGs:

- **SDG 4,** to provide **inclusive, equitable, high-quality education and lifelong learning** for all. The teaching of digital skills not only equips children and young people to adapt to the continual change that characterises digital societies, but also provides the knowledge, capacities, values and attitudes needed to approach learning as an instrument of lifelong value. In this context, too, fostering education for girls and women in science, technology, engineering and mathematics (STEM) is of particular importance.

- **SDG 5,** to achieve **gender equality and empower all women and girls.** There is currently a significant digital divide in women's access to STEM careers. According to the White Paper on women in technology[29], **the proportion of women in the ICT sector has remained practically unchanged in the last 20 years,** at about 30%. This minority presence of women is also apparent in the digital skills training sector (according to the Ministry of Education, in 2018 only 7% of university students were taking technological degrees, and within this minority, only 28% were female), an imbalance that suggests many women will face serious challenges in adapting to the demands of a rapidly changing job market.

- **SDG 8,** to promote s**ustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.** The Strategic Plan foresees actions to improve the quality of employment, and is committed to the use of digital resources to improve the effectiveness of actions in this respect. The Plan also supports the development and integration of new digital technologies throughout the economy, acknowledging the decisive role to be played by digitalisation in achieving productivity growth and in raising competitiveness in an inclusive and sustainable way. No less important is the provision to **working people** (both those currently in employment and those yet to enter the job market) of the **basic skills necessary to use digital tools** and to benefit from the advantages offered by digitalisation.

[29] White Paper on women in technology. Sara Mateos Sillero and Clara Gómez Hernández, March 2019, Secretariat of State for Digital Advancement, Ministry of Economy and Business.

- **SDG 9,** to **build resilient infrastructure, promote an inclusive, sustainable industrial fabric and foster innovation.** In Spain, the industrial sector is currently being challenged by a variety of macro-trends, including rapid technological progress, disruptive innovations and the transformation towards a decarbonised, circular economic system in which renewable energies are becoming increasingly important. This transition towards an **inclusive, environmentally sustainable industry is indivisible from its digital transformation,** to focus on Industry 4.0, fuelled by R&D&I in science and technology. Accordingly, the **promotion of advanced digital skills** is essential to scientific research and the development of innovative solutions that, when technologically and commercially mature, can be put into practice in the industrial sector.

Policies to develop the **circular (green) economy,** a reform that is of crucial importance to SDG 9, are being coordinated by the Ministry of Economic Affairs and Digital Transformation and the Ministry for the Ecological Transition and the Demographic Challenge. **Training in digital skills is vital to equip the workforce to participate in the circular economy.** According to the ILO, the green economy will generate 20 million jobs worldwide in areas such as the repair, remanufacture and management of electronic waste[30]. Policies to mitigate and adapt to the effects of climate change (SDG 13) will also play a major role in the economy, potentially generating large numbers of sustainable, high-quality jobs. According to the ILO, the renewable energy sector will contribute 18 million net jobs in the next decade, worldwide, while in Spain alone, energy transition in the mobility sector will add over 23,000 net jobs by 2030 and inject three billion euros into the GDP, according to a Ferrovial-Iberdrola report on transport and the environment.

Finally, both SDG 1, to end poverty, and SDG 10, to reduce inequalities, are crucially related to the acquisition of digital skills. According to the Spanish Institute of Statistics and the Office of the High Commissioner Against Child Poverty, in the lowest income bracket (net monthly income less than 900 euros), 9.2% of households with one or more children do not have access to the internet; this figure contrasts starkly with the 0.4% of higher-income households in this situation.

These considerations highlight the crucial role to be played by the National Plan for Digital Skills in tackling poverty and inequality, to ensure that the need for digital skills not only does not provoke exclusion but may even become a vector to bridge current divides within society.

[30] Occupations most in demand across industries in a global energy sustainability scenario, 2030. Skills for a Greener Future: A global view based on 32 country studies. International Labour Office, Geneva: ILO 2019.

EUROPEAN DIGITAL STRATEGY "Shaping Europe's digital future"

On 19 February 2020, the European Commission presented its European Digital Strategy "Shaping Europe's digital future", which for the next five years will focus on promoting the implementation of digital technologies to create a fair and competitive economy, an open, democratic and sustainable society and, ultimately, a better quality of life for European citizens by means of technology that works for the people.

The European Digital Strategy will benefit **European citizens, businesses and the environment,** via three lines of action, each producing a specific impact on the corresponding group of beneficiaries.

3. **Technology that works for the people.** In this respect, the first step is to **invest in digital skills** for all European citizens. In addition, action will be taken to:
   - Protect against cyber threats (hacking, hijacking programs, identity theft, etc.).
   - Guarantee that artificial intelligence (AI) is developed in a way that is respectful of people's rights; promote trust in the use of AI-based digital services without fear of the fraudulent use of personal data or of bias in automated decision making.
   - Accelerate the deployment of ultra-fast broadband for homes, schools and hospitals across the EU, to overcome connectivity, the first barrier to digital transformation.
   - Expand Europe's supercomputing capacity to develop innovative solutions in medicine, transport and the environment.

4. To promote a **fair and competitive digital economy,** it will be necessary to:
   - Expand lines of finance for SMEs, enhance access to these lines and create a community of emerging and fast-growing innovative companies. Companies should receive assistance not only during startup, but in all subsequent phases prior to maturity. The creation of such a community will foster collaborative learning.
   - Enact legislation on digital services to reinforce the responsibility of internet platforms and clarify the rules applicable to online services.
   - Ensure that in the digital economy the EU rules are fit for purpose and that all businesses compete on an equal footing

5. To promote an **open, democratic and sustainable society** and safeguard the natural environment, we must:
   - Use technology to help Europe become climate neutral by 2050, with a particular focus on reducing greenhouse gas emissions in the digital sector.
   - Empower citizens to acquire better awareness, control and protection of their data.
   - Create a European space for health data, promoting research and diagnosis by telematic means and proactively facilitating early responses to health emergency situations.

DIGITAL EUROPE 2021 - 2027

Digital Europe is a European Commission programme, to be implemented from 1 January 2021, focused on strengthening Europe's capabilities in **artificial intelligence, high-performance computing, cybersecurity and advanced digital skills,** thus providing the security and interoperability required for their proper use in the economy and society. The simultaneous development of these activities will generate the synergies necessary to create a prosperous, inclusive and environmentally friendly digital economy and society.

Advanced digital skills are defined in Article 2, letter f) of the Regulation of the European Parliament and of the Council establishing the Digital Europe programme for the period 2021-2027 as the "skills and competences necessary to design, develop, manage, deploy and maintain the technologies supported by this Regulation"[31].

Advanced digital skills, the fourth of the specific objectives of the Digital Europe programme, include those related to high-performance computing, big data analysis, cybersecurity, robotics and artificial intelligence. Skills in these areas will be enhanced, and the pool of talent in Europe expanded, by:

- Training for students, workers and specialists in ICTs.
- On-the-job training and intensive programmes for students, graduates and young entrepreneurs.

It is important to realise that **digital skills cannot be disassociated from the other pillars** mentioned above. Ignoring or neglecting any one would imperil the overall outcome, since they are all interdependent: to be reliable, artificial intelligence needs cybersecurity, and cybersecurity requires high-performance computing to process the large volumes of data that must be protected. Cross-cutting all of these areas, advanced digital skills are crucial not only to maintain operability with previous technologies, but to use them efficiently and responsibly.

RECOVERY IN THE POST-COVID-19 ERA

On 27 May 2020, the European Commission presented its Next Generation EU proposal for a comprehensive recovery plan, which was projected to be sustainable, homogeneous, inclusive and equitable for all Member States. This plan readjusts the priorities of the 2020 Work Programme, to focus on stimulating European recovery and resilience after the pandemic.

The recovery plan proposes to make good use of all the opportunities offered in 2020 and in the following years (2021-2027) to repair the damage to the single market, protect lives and guarantee a sustainable recovery, promoting a level playing field. To achieve these goals, an effective ecological and digital transition, by all EU Member States, will be essential.

The recovery plan funds will be invested in three areas, incorporating various pre-existing EU programmes:

- The **European Green Deal,** to promote renewable energy projects, a clean hydrogen economy and the circular economy, to help create local employment and to reinforce the Fair Transition Fund (aimed at promoting professional reconversion), among other goals.

[31] Article 9 of the Regulation addresses financing for the programme, for the period 2021-2027, for each of the targets established. For specific objective 4, advanced digital skills, the budget allocation is €699,543,000.

- The **Digital Single Market,** through more and better investment in connectivity, especially through the deployment of 5G networks, the construction of a real data economy as the motor of job creation and a stronger industrial and technological presence in strategic sectors such as cybersecurity, artificial intelligence and supercomputing.
- Initiatives to promote a **fair, inclusive recovery,** such as the *New Skills Agenda for Europe* and the *Digital Education Action Plan,* both of which will foster the acquisition of digital skills.

The **New Skills Agenda for Europe**[32], adopted by the Commission on 10 June 2016, is focused on strengthening human capital, employability and competitiveness, and aims to provide training, technical resources and support so that European citizens may acquire the digital skills needed for active participation in society and the economy. These goals will be addressed via the following initiatives

1. Upskilling pathways: new opportunities for adults[33].
2. European qualifications framework for lifelong learning[34].
3. Digital skills and jobs coalition.
4. Blueprint for sectoral cooperation on skills[35].
5. EU skills profile tool for third country nationals[36].
6. EU policy in the field of vocational education and training[37].
7. Key competences for lifelong learning[38], including digital skills for all population groups and in all stages of education and training.
8. Europass framework[39] (a common framework for the provision of better services for skills and qualifications).
9. Recommendation on graduate tracking[40].
10. Analysis of the report "Study on the movement of skilled labour", outlining trends, drivers and policy responses in relation to the flow of skilled workers in Europe between 2006 and 2016[41].

[32] https://ec.europa.eu/social/main.jsp?catId=1223&langId=en
[33] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32016H1224(01)
[34] https://ec.europa.eu/ploteus/search/site?f[0]=im_field_entity_type%3A97#
[35] https://ec.europa.eu/social/main.jsp?catId=738&langId=en&pubId=7969
[36] https://ec.europa.eu/social/main.jsp?catId=1412&langId=en
[37] https://ec.europa.eu/education/policies/eu-policy-in-the-field-of-vocational-education-and-training-vet_en
[38] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.C_.2018.189.01.0001.01.ENG
[39] https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX%3A32018D0646#
[40] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32017H1209(01)
[41] https://ec.europa.eu/social/main.jsp?catId=738&langId=en&pubId=8156&furtherPubs=yes
[42] https://ec.europa.eu/digital-single-market/en/news/value-proposition-digital-skills-and-jobs-coalition

DIGITAL SKILLS AND JOBS COALITION

The Digital Skills and Jobs Coalition is one of the ten key initiatives of the New Skills Agenda for Europe. It was launched in 2016 and since then it has coordinated agents from the public and private sectors, NGOs and teaching professionals in all EU Member States to develop a catalogue of the digital skills currently in demand, so that European citizens in general and workers in particular may obtain the digital skills necessary to fully participate in society. The main aim, thus, of the Coalition is to help satisfy the demand for digital skills, essential in today's labour market and in the world of tomorrow. The Coalition members all endorse its Charter (or Value Proposition) and undertake to alleviate skills gaps in all areas, from the most basic skills needed for everyday life and work, to the specialist talents of an ICT professional.

The provision of opportunities to acquire digital skills is essential to preserve competitiveness in all sectors of the economy and to maintain the inclusive nature of European society in the digital age.

Digital skills are valuable for all citizens: from the general population, enabling them to seek information and communicate online, to professionals, for example to build a digital identity, to position themselves in the market, to reach their customers, to create and publish digital content, and even to programme specific applications.

In Europe, there is currently a shortage of human capital with digital skills. According to the 2020 DESI report[43], around 10% of the European workforce have no digital skills at all, mainly because they do not use the internet, and at least 35% lack the basic digital skills required in most jobs. This deficiency means there is a significant loss of job opportunities in all sectors of the market.

As observed in the Introduction, the Coalition identifies four categories of digital skills: basic, advanced, specialised in ICT and for education. Each of these corresponds to a particular population group: in the first, citizens in general and unskilled or unskilled workers; in the second, skilled workers; in the third, ICT professionals; and finally, anyone wishing to acquire digital skills for personal reasons or for their work.

The National Plan for Digital Skills, in line with the Digital Skills and Jobs Coalition, defines seven lines of action to provide digital skills to the same population groups.

[43] Informe DESI 2019.

DIGITAL EDUCATION ACTION PLAN

In early 2018, the European Commission outlined its Digital Education Action Plan[44], in the context of the **2025 European Educational Area,** aimed at creating a package of measures to help Member States take advantage of the opportunities offered by digital technology in educational matters.

This Action Plan sets out **three priorities:** (1) Make better use of digital technology for teaching and learning; (2) Develop key digital skills and competences for digital transformation; (3) Improve education systems by means of data analysis and forecasting.

To address these targets, **eleven actions** are identified:

1. Reduce differences in connectivity between Member States, deploying high-capacity broadband in primary and secondary schools. In Spain, the **Connected Schools** programme is part of this action.
2. Support educational centres in the use of digital technologies for teaching-learning, with **SELFIE,** a self-assessment tool on the use of digital technology, and create a mechanism to share and publicise nationwide innovative practices in the use of digital technologies. From the outset, the Spanish authorities have encouraged the use of this tool, and our country currently has the largest rate of participation in Europe in this respect. In line with this initiative, a framework has been drawn up for a Digital Plan, as part of the Educational Area Project.
3. Support the development of a **common, reliable and multilingual framework for the issuance of digitally certified degrees and qualifications,** so that these documents may be readily interpreted in any Member State and be stored directly in professional profiles such as Europass. This framework is directly related to the European Qualifications Framework for lifelong learning and to the European Classification of Skills, Competences, Qualifications and Occupations, and encourages the use of blockchain for the issuance of digitally certified qualifications.
4. Create an **online European platform** to support universities and higher-level vocational training institutions in the use of digital technologies to improve the quality of their teaching-learning processes, and to foster internationalisation and cooperation.
5. Promote the development of **digital competences and scientific skills in higher education,** through training and continuous vocational development, to strengthen open science and citizen science in Europe (which is one of the lines of action of this National Plan).
6. Include programming throughout primary and secondary education and vocational training, through participation in **EU Code Week,** which promotes computational thinking, programming and the critical and creative use of digital technologies. During the 2019 edition of EU Code Week, over 1000 events were held in Spain.

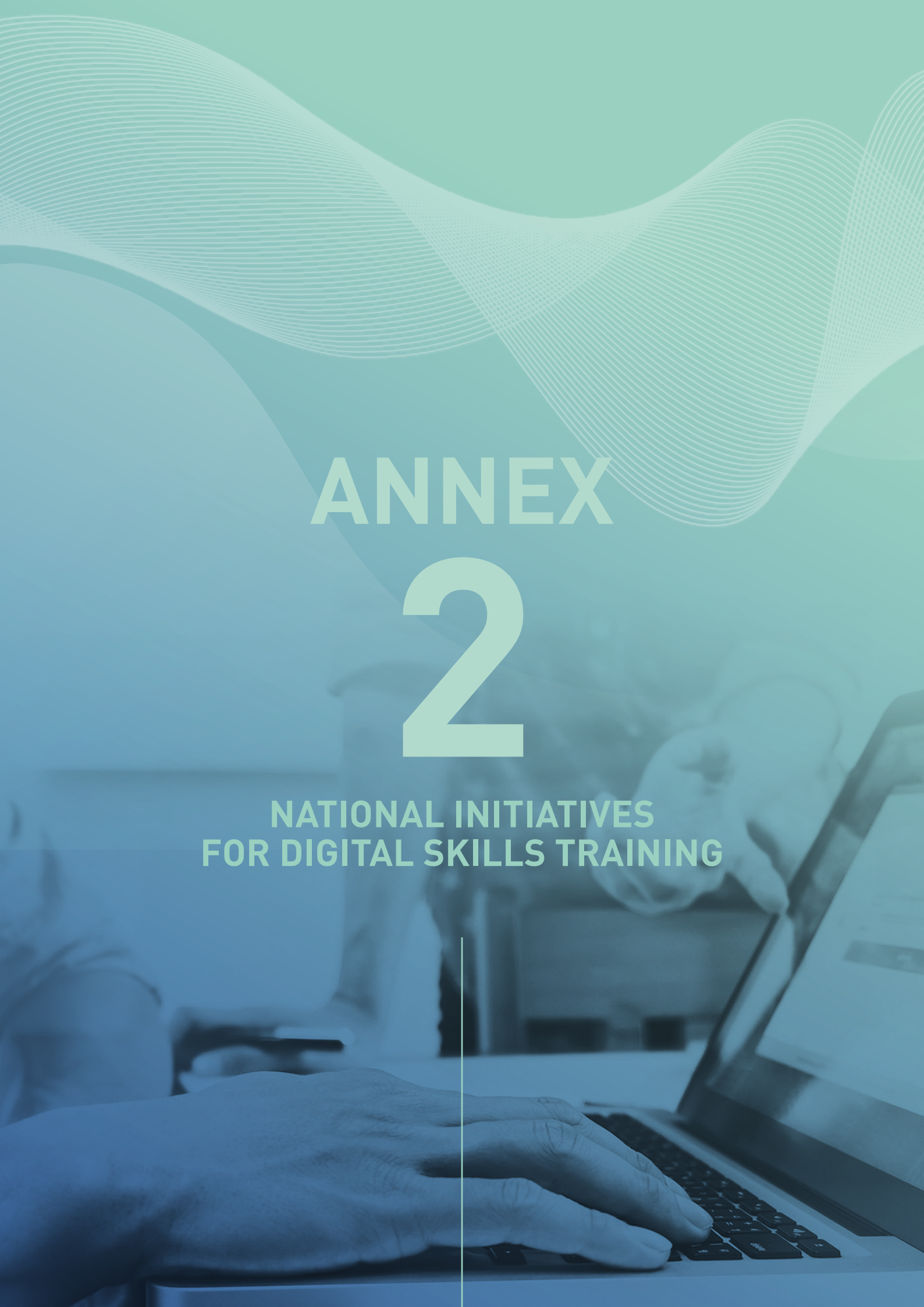
[45] https://intef.es/aseguratic/

7. **Raise awareness of the risks and challenges** of digital transformation, via two initiatives: (1) awareness-raising campaigns for students, teachers and families about the importance of online safety; (2) training for teachers in cybersecurity and how to address this question, for primary and secondary schools. In Spain, the Ministry of Education, through the National Institute of Educational Technologies and Teacher Training (INTEF), in collaboration with the Spanish Agency for Data Protection and with public and private agents, has created a Safe ICT portal **(SeguroTIC)**[45]**,** which provides information and resources to the schools community.
8. **Develop digital and entrepreneurial skills, especially in primary and secondary school students in Europe,** to facilitate students' access to the job market and participation in society and to bridge the gender gap in technological and business sectors. All of these measures are adopted within the Digital Skills Framework for citizens.
9. Compile evidence on the progress made in integrating technologies into the classroom and in developing the digital skills of teachers and students, via targeted studies and the subsequent publication of research outcomes.
10. **Launch pilot projects in the field of artificial intelligence**, to generate and analyse predictive models of the future skills needed by citizens, doing so by obtaining, combining, comparing and analysing the data produced by AI techniques. In this respect, the *Educate in Digital* programme includes a specific line of action in which AI will be used to generate personalised educational itineraries. **The School of Computational Thinking and Artificial Intelligence**[46]**,** which has been jointly established by all the educational authorities, is a partner in this action.
11. Launch a **strategic outlook on key trends arising from digital transformation** and their impact on education systems. This action will be conducted in cooperation with EU experts and will make use of existing and future channels of cooperation on education and training.

[46] https://intef.es/tecnologia-educativa/pensamiento-computacional/

ANNEX 2

NATIONAL INITIATIVES FOR DIGITAL SKILLS TRAINING



ANNEX 2

NATIONAL INITIATIVES FOR DIGITAL SKILLS TRAINING

The initiatives currently in progress are classified as follows (by target population): (1) citizens; (2) businesses; (3) the working population; (4) ICT specialists; (5) teachers and students.

BASIC DIGITAL SKILLS FOR ALL CITIZENS

1. Programmes to encourage **all citizens** to acquire basic digital skills in order to play an active role in society. Of all the target populations for this Plan, this is the most complex; despite its heterogeneity, the fundamental characteristic, after excluding all the citizens addressed in the other initiatives (children, students and those either working or seeking employment), is that most of the persons lacking basic digital skills are aged over 65 years. A significant initiative in this area is the 2019-2023 National Strategy to Prevent and Fight against Poverty and Social Exclusion, which among other aims seeks to promote equitable, inclusive education.

DIGITAL TRANSFORMATION OF SMEs

2. Programmes to facilitate the digital transformation of companies in general, and that of SMEs in particular. The three programmes "Digital Advisors", "Digital Transformation Offices" and "SME Accelera-8" are all intended to facilitate the digital transformation of SMEs. These companies form the backbone of the Spanish economy, accounting for over 99% of the productive fabric. Of these initiatives, the first two concluded in 2020, while the third was launched in April 2020 to help SMEs survive the crisis generated by the COVID-19 pandemic, and includes actions with a maximum duration of three years. The three initiatives have the following characteristics:

    a. The **"Digital Advisors"** programme was applied by RED.es, part of the (then) Ministry of Energy, Tourism and the Digital Agenda, through the (then) Secretariat of State for the Information Society and the Digital Agenda. This programme provided advisory services for SMEs to implement digitalisation plans by which ICTs will be incorporated into their systems (in areas such as business management, relations with third parties, e-commerce and the digitalisation of services or solutions). The programme had a budget of €5 million, provided by the European Regional Development Fund for the period 2014-2020, charged to Spain's Multi-regional Operational Programme.

    b. Under the programme **"Digital Transformation Offices",** also launched by RED.es, these Offices were set up to facilitate the digitalisation of SMEs and to foster digital entrepreneurship, doing so via awareness-raising and other actions to support digital transformation, and support services, proposing ICT solutions to enhance company management and training procedures. A Digital Transformation Office was created within each of the 17 Autonomous Communities. The programme was assigned a budget of €5 million, provided by the European Regional Development Fund for the period 2014-2020, under the Smart Growth Operational Programme.

c. The programme **"SME Accelera-8"** was created under Royal Decree-Law 8/2020, of 17 March, on extraordinary, urgent measures to address the economic and social impact of the COVID-19 pandemic, and was implemented by RED.es, with a budget of €250 million for technological projects in this respect. Of this amount, €36 million was allocated to digital skills programmes, €14 million to the digital transformation of SMEs, €140 million to technological development in artificial intelligence and other enabling technologies, €55 million to promoting the data economy and digital content and €15 million to supporting entrepreneurship. All these lines of finance were supplied by the European Regional Development Fund and the European Social Fund.

In addition, a network of physical offices was established, together with an online platform for digital transformation, offering SMEs support and advice on digitalisation.

CED DIGITAL SKILLS FOR THE WORKING POPULATION

3. Programmes to increase employability and enhance the quality of work in the digital age, aimed at the working population (employed or otherwise):

   a. **"Digital talent"** is one of the Lines of Action within the SME Accelera-8 programme. It is composed of various training and occupational orientation activities to improve digital skills, for **persons registered as unemployed and for young persons neither in employment nor enrolled in formal training or education systems.** The budget for these actions is €36 million: €11 million for unemployed persons and €25 million for young persons (as described above) eligible to enroll in the National Youth Guarantee System.

   b. **"Digital Professionals"** also administered by RED.es, provides training for the digital industry, facilitating job placement where advanced digital skills are required. The initiative is comprised of the following programmes:

      b.1. **"Youth employment",** under the National Youth Guarantee System, provides unemployed young persons with digital skills training, facilitating access to jobs arising from the digital transformation of companies. The programme has a budget of €20 million and forms part of the "Plan for digital inclusion and employability" within Spain's Digital Agenda. It is co-financed by the European Social Fund, within the 2014-2020 programming period, and is assigned to the Spanish Operational Programme for Youth Employment. The hiring commitment made is that at least 30% of the young persons who complete the training should be given an employment contract lasting at least six months, in positions related to ICT and the digital economy (and that no more than 5% should be self-employed).

      b.2. **"Postgraduate training",** programme provides training grants in the field of digital economy. It is intended to increase not only the supply but also the demand for ICT training, in line with the "Plan for digital inclusion and employability". These grants, which have been promoted in three public calls for applications (in 2014, 2015 and 2017), are administered via educational institutions and universities.

      b.3. **"MOOC"** or Massive Open Online Courses, have been co-developed by RED.es and various companies and training institutions to supply "knowledge pills" on the digital economy and emerging technologies.

b.4. The "**National Reference Centre for e-Commerce and Digital Marketing"** was created in 2014 under an interministerial collaboration agreement between the Ministry of Education and the Ministry of Labour, Industry and Economy. The Centre provides technical programmes for digital skills trainers, programmes on entrepreneurship and innovative programmes specifically for unemployed persons. The Centre was developed by the School of Industrial Organisation (EOI) in coordination with RED.es and in 2020 had a budget of €512,000.

b.5. **"Continuous training"** is a programme to promote lifelong learning and to improve employability in the digital economy. It has a total budget of almost €11 million, co-financed by the European Social Fund, as part of the 2014-2020 Operational Programme for Employment, Training and Education (OPETE).

b.6. **"Creating the Future"** is composed of various actions to promote the acquisition of digital skills in all stages of life (the lifelong learning approach). It has a budget of almost €4 million and is co-financed by the European Social Fund, within OPETE, for the 2014-2020 programming period.

b.7. **"Youth Employment"** is a digital skills training programme provided by the EOI Foundation, with a budget of €28 million.

b.8. **"Postgraduate Training",** master's degrees in digitalisation, developed and provided by the EOI.

b.9. **"MOOC",** online courses in digitalisation, developed and provided by the EOI.

b.10. **"OPETE continuous training",** digitalisation programmes for persons employed in SMEs. Budget: €11.4 million.

b.11. **"OPETE continuous training",** digitalisation programmes for the long-term unemployed. Budget: €22.3 million.

c. The **"2019-2021 Emergency Plan for Youth Employment"** was launched by the then Ministry of Labour, Migration and Social Security, today the Ministry of Labour and Social Economy. Among its goals, the Plan seeks to ensure that at least 225,000 young people are trained in digital skills, 75% in basic skills and 25% in higher skills.

d. The initiative **"Digital skills training programmes for workers in employment"** was launched by the then Ministry of Labour, Migration and Social Security, today the Ministry of Labour and Social Economy. These programmes consist of digital transformation training courses offered in 2021, and include grants to participate in these courses, throughout the country. The programmes are primarily aimed at persons in employment, assigning priority access to women, persons with disabilities, workers with little formal education and persons aged over 45 years.

e. **"Vocational training modernisation plan".** This Plan has a budget of €122.5 million and aims to provide training for 500,000 semi-skilled workers, especially those working in SMEs, over a total period of four years. It was initiated in 2020, in collaboration with social partners. Based on public-private collaboration, the Plan will enable participants to receive professional training and achieve qualifications facilitating their incorporation into the labour market, and at the same time help meet the needs of the productive sector.

f. **"Go digital!".** In 2020, a public-private collaboration plan was promoted between the National Foundation for Employment Training (FUNDAE) and technology companies, with the support of the National Public Employment Service (SEPE), to provide training courses and resources, free of charge, to workers and the general public, through the "Go digital!" space created on the FUNDAE and SEPE web pages. This initiative will continue with the promotion of new forms of public-private and public-public collaboration.

g. **"Reincorpor-8"** is a three-year programme (2019-2021) to prevent and reduce long-term unemployment by establishing efficient mechanisms for reincorporation into the job market. Many circumstances may lead to job loss, including business restructuring, changes in the job market or transformations resulting from the incorporation of ICT into production processes. In view of the latter consideration, this plan proposes, among other measures, reskilling in ICTs for persons in this situation, together with measures to prevent technological change and digitalisation from generating long-term unemployment.

h. **Programmes for business internationalisation, offered by ICEX Spain Exports and Investments** (ICEX-CECO). These programmes include training options (Master's degree in International e-commerce, or in Digital marketing; MOOC in Digital economy); **an e-market services programme** (providing skills training and strategic advice); training programmes in the **use of digital tools for strategic decision making,** such as DigitalXBorder (in collaboration with the School of Industrial Organization and ADIGITAL), or *Marca & Innovación* (Branding and Innovation); and **competitive differentiation for CEOs,** in collaboration with the Leading Brands Forum of Spain, the ESIC Business School and Banco Santander.

ADVANCED DIGITAL SKILLS FOR ICT PROFESSIONALS

4. Programmes to train ICT specialists, equipping technology professionals in all sectors of the economy with advanced digital skills:

   a. **"Artificial intelligence and enabling technologies"** is one of the Lines of Action within SME Accelera-8, creating a set of training actions to encourage companies to develop enabling digital technologies.

   b. New **vocational training qualifications for technicians** (basic and advanced) in the following areas: Smart manufacturing / Digitalisation of maintenance / Cybersecurity in operational technology environments / Cybersecurity in information technology environments / Implementation of 5G networks / Development of videogames and virtual reality / Maintenance of hybrid and electric vehicles / Additive manufacturing / Artificial intelligence and big data / Building information modelling / Composite materials / Systems maintenance and security in electric vehicles / Internet of things.

DIGITAL SKILLS IN EDUCATION

5. Programmes for the **education sector,** to transform the lifelong learning models of digital skills, including teacher training.

   a. Important initiatives have been undertaken by the **National Institute of Educational and Teacher Training Technologies (INTEF)[47],** with various actions and projects to develop digital skills in education, focusing on centres, teachers, students and their families:

      - Both **presential and online** modes of educational training and collaboration are offered within the frameworks available to teachers, students and education centres.
      - The creation and sharing of **educational resources** is encouraged via the Pro-Common Platform and the Educational, Digital, Interactive and Open (EDIA) project, as well as initiatives aimed at the entire educational community, such as "At-home learning".
      - Finally, initiatives such as the School of Computational Thinking and Artificial Intelligence, the Classroom of the Future and the Observatory of Educational Technologies contribute to the **pedagogical integration of technologies** and the development of advanced digital skills.

   b. The **Connected Schools** programme provides non-university educational centres with access to ultra-fast broadband. During its period of execution (2015-2020) this programme will reach over 6.5 million students and 16,500 publicly funded centres. It has a budget of €330 million, provided by the European Regional Development Fund (ERDF) under the Multi-regional Operational Programme for Smart Growth.

   c. A recent initiative is the **Educate in Digital** programme, part of the Plan for Digitalisation and Digital Skills in the Educational System. This programme will provide educational centres with equipment enabling high-quality connectivity, together with applications, tools and resources to facilitate digital skills education, both presential and online. In short, this programme will provide the education system with an intelligent platform

[47] https://intef.es/

for teachers, students and education authorities, enabling them to create personalised itineraries and to monitor the learning process, via individualised and aggregated analyses.

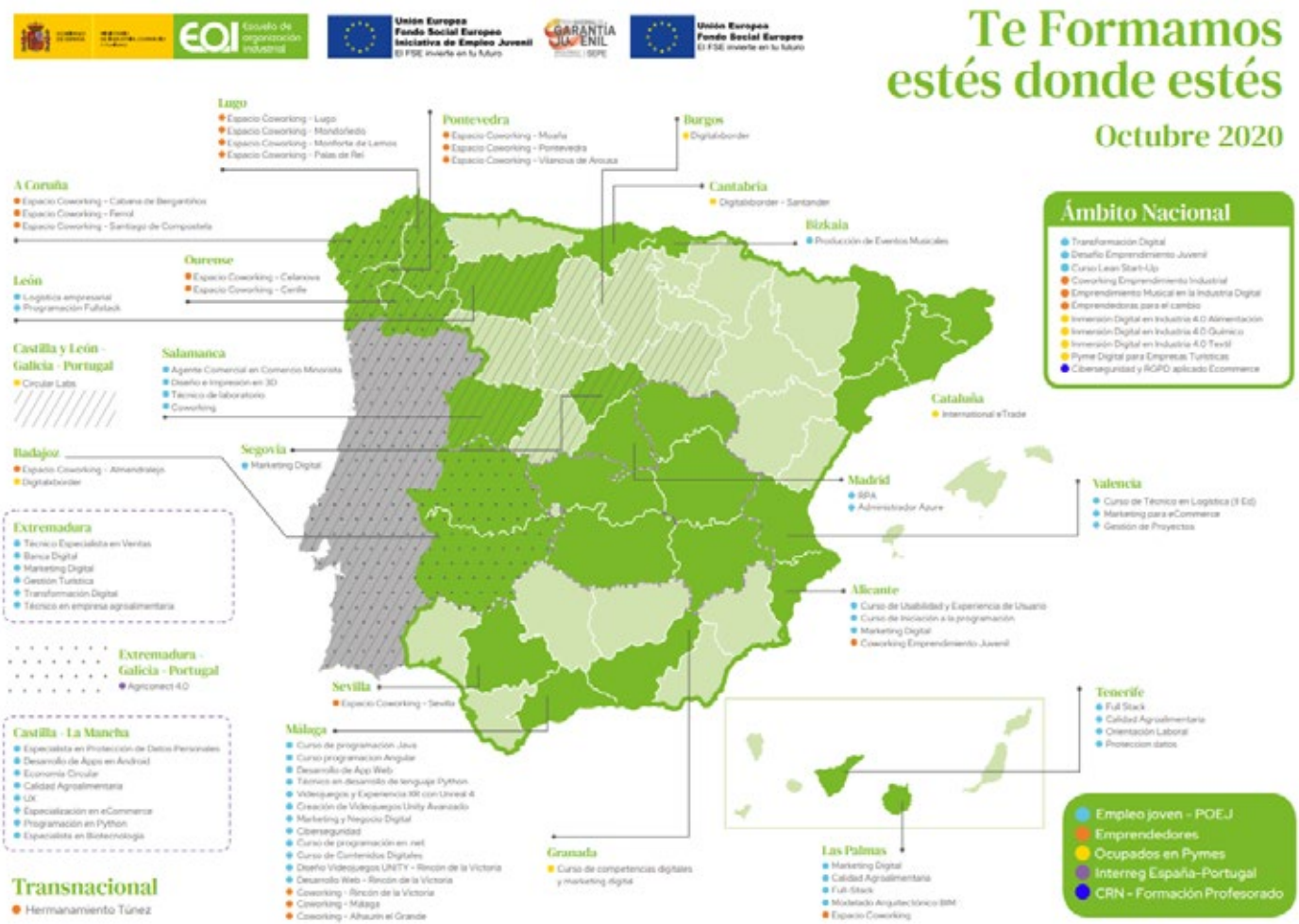
d. **Safe Internet for Kids** is an initiative by the National Cybersecurity Institute (INCIBE) to promote the safe, responsible internet use by children and adolescents. In the field of digital skills, this programme will:

- Raise awareness and understanding of significant issues among children, teenagers, families, educators and professionals in the field of youth welfare, via campaigns, initiatives and programmes, nationwide.
- Provide a helpline service to advise and assist minors, families, educators and professionals in this field on how to deal with the risks of the internet, such as harmful content, dangerous contacts and inappropriate behaviour.

In line with actions to ensure students' safety in the use of technologies for learning, INTEF has developed **AseguraTIC,** a website for educators, families, students, schools and administrations, aimed at protecting minors in their interaction with the internet and at providing the adults in their environment with tools for this purpose, based on a variety of materials in digital format, including educational content, guidelines, presentations, websites, exercises, games and training courses.

EOI FOUNDATION NETWORK OF COWORKING SPACES

This workspace for entrepreneurs and startups is designed to increase the chances of success of innovative projects at an early stage of their development. The network is part of the entrepreneurial ecosystem promoted by EOI, with access to networking, training and investment opportunities, and is integrated within the European Coworking Programme[48].



[48] https://www.eoi.es/node/26613

ANNEX 3

3

MONITORING AND EVALUATION INDICATORS

ANNEX 3

MONITORING AND EVALUATION INDICATORS

No.	Indicator	Unit	Data source	Annual frequency	Start year	End year
Strategic goal 1: Ensure digital inclusion						
1	Number of persons enrolled in ICT-related education and training courses. Number of persons aged over 65 years enrolled in digital skills programmes	%	Ministry of Equality Ministry of Education and Vocational Training ONTSI, RED.es	2	2021	2025
Strategic goal 2: Ensure the acquisition of digital competence within the education system to prepare professionals and citizens for a digital future						
2	Number of teachers trained in digital skills and in the pedagogical application of digital technologies.	%	Ministry of Education and Vocational Training	2	2021	2025
3	Number of Interactive Digital Classrooms installed.					
4	Number of portable computing devices distributed to students.					
5	Number of education centres that design and implement a Digital Plan.					
6	Number of Open Educational Resources created and maintained for digital teaching.					
7	Number of students enrolled in digital skills courses in vocational training.					
Strategic goal 3: Provide digital training for unemployed persons to facilitate their incorporation into the job market, with special attention to the population groups most affected by digitalisation and robotisation						
8	Nº de hombres y mujeres en desempleo inscritos en cursos de formación	%	Ministerio de Educación y Formación Profesional	2	2021	2025
9	Nº hombres y mujeres matriculados en formación digital en sectores de la industria, comercio, turismo, agricultura, pesca y alimentación	%		2	2021	2025

No.	Indicator	Unit	Data source	Annual frequency	Start year	End year
Strategic goal 4: Ensure that current and future workers will have the digital skills required and be able to acquire new ones as necessary in their working lives, to participate in the digital transformation of the productive fabric.						
10	Number of employed persons enrolled in digital skills training courses	%	Ministry of Education and Vocational Training RED.es Ministry of Labour and Social Economy and FUNDAE	2	2021	2025
Strategic goal 5: Ensure that Spain has sufficient specialists in digital systems and technologies.						
11	Number of professional persons enrolled in digital skills training courses	%	Ministry of Equality Ministry of Universities Ministry of Education and Vocational Training Red.es	2	2021	2025
Strategic goal 6: Ensure that Spanish companies in general, and SMEs in particular, have the necessary digital skills to address digitalisation.						
12	Number of companies receiving assistance from digital skills training initiatives	%	Ministry of Labour and Social Economy (SEPE)	2	2021	2025
13	Number of self-employed persons, or working in the social economy, participating in digital skills training courses					

ANNEX 4

SUMMARY OF MEASURES

AXIS	LINE OF ACTION	MEASURE
I. Transversal digital skills	**1 Digital skills training, with special emphasis on population groups at risk of digital exclusion**	1. National network of digital training centres, via integrated, reference-level vocational training institutions. 2. Massive open online courses (MOOC). 3. Specific actions for digital inclusion.
	2 Bridging the digital gender gap	4. Programme to promote scientific-technological vocations among young people. 5. Programme to promote digital skills training for women and their participation in technological training itineraries.
II. Digital transformation in education	**3 Digitalisation of education and the development of digital skills**	6. Plan for digitalisation and digital skills training in the education system. 7. Incorporate digital skills and programming knowledge into the compulsory education curriculum. 8. Create open educational resources for teaching with digital media. 9. Digital skills vocational training plan (FPDigital). 10. Plan to modernise the Spanish university system (UniDigital).
III. Digital skills for employment	**4 Training in digital skills throughout the working life**	11. Vocational training programmes to provide flexible, modular digital reskilling and upskilling. 12. Accredit digital skills at different levels, but especially basic digital skills, in the National Catalogue of Professional Qualifications.
	5 Digital skills training for public sector workers	13. Digital skills training programme for public-sector workers.
	6 Digital skills training for SMEs	14. Digital transformation programmes for SMEs.
IV. Digital specialists	**7 Expand the supply of ITC specialists**	15. Adapt existing vocational and university training programmes, and add new specialities focused on advanced digital skills. 16. Programme to attract and retain experts in digital skills.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