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REPORT ON REGULATIONS AND DIRECTIVES ON COMBINING DIGITIZATION AND SKILLS IN ITALY

1ST PROJECT RESULT – REPORT 3A (31/03/2023)

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INTRODUCTION

In the historical period we are experiencing, digitalization and related skills constitute a fundamental strategic axis for the social and economic growth of the country. Digital skills are key to achieving digital citizenship, ensuring digital inclusion, and accessing and participating in the knowledge society with full awareness in this area.

It is no coincidence that Article 8 of the Digital Administration Code is dedicated precisely to the “Computer literacy of citizens” and provides that the State and public administrations promote *“initiatives aimed at promoting the dissemination of digital culture among citizens with particular regard to minors and categories at risk of exclusion, also in order to encourage the development of legal informatics skills and the use of digital services of public administrations with specific and concrete actions, using a combination of different means, including the broadcasting service.”*

Digital skills are therefore a priority for the economic and social development of the country and in Italy there is still much to do. Suffice it to recall the data of the *Digital Economy and Society Index (DESI) 2020* report, in which Italy is in last position for the Human Capital area as more than half of the population does not have at least a basic level of digital skills.

Therefore, in this paper we will analyze how important transversal skills and digitization policies are nowadays, referring to the current European and Italian context. Subsequently, the digitalization of skills in both the private and public sectors will be discussed, indicating the related priorities, lines of intervention and ongoing initiatives. To conclude, the risks will be identified together with the opportunities, incentives and good practices implemented by digitalization.



I. THE IMPORTANCE OF SOFT SKILLS AND DIGITIZATION POLICIES

The intense and continuous digitalization of companies and industry, of the Public Administration and of today's society, a process that has also accelerated with the Covid-19 pandemic, requires that workers and citizens, in general, acquire technological knowledge and are competent in the management of new information and communication technologies, as well as of the various IT or artificial intelligence systems that It is necessary to know how to use it to carry out almost any type of management or work or social activity, both in the private and in the public sector. However, several studies highlight the shortage of skilled workers with the technical and digital skills needed to fill many of the emerging positions in today's labor market.

It is therefore easy to understand the importance of acquiring new digital skills, which translate into a strategic element both for the worker who owns them, and for the company that benefits from them. In this sense, the Recommendation of the European Parliament and of the Council of the European Union of 18 December 2006 (subsequently taken up in 2018) on key competences for lifelong learning lists "digital competence" among the eight key competences for personal fulfilment and development, as well as for promoting active citizenship, aimed at social inclusion and job creation.

For this reason, companies, in concert with governments and public institutions, must implement policies of continuous training of personnel, and of every person in general, throughout their lives, to be able to face the unstoppable technological innovation and make the most of its possibilities for development and wealth creation. Thus, the Council of Europe Recommendation of 22 May 2018 on key competences for lifelong learning highlights the need to raise and improve the level of digital competences at all stages of education and training for all segments of the population.



From Europe to Italy

Digital competence first appeared in the new framework of key competences for lifelong learning in the 2006 Council Recommendation of the European Union and subsequently taken up in 2018, as a transversal skill for life, reflecting an understanding of digital knowledge that goes beyond strictly technical and procedural notions that characterize previous European approaches. As opposed to the mere conceptualization of ICT (*Information and Communication Technologies*) skills, the updated concept now incorporates aspects such as critical evaluation of online information or the creative practices of digital content production. The DigComp Framework is a fundamental tool that has been developed by the European Union to address the challenge of digital transformation by investing our lives and workplaces. DigComp was first published in 2013, and then revised and updated. Its latest version, DigComp 2.1, dates back to 2017 and offers a description of the skills that are needed today to use digital technologies in a safe, critical, collaborative and creative way to carry out activities and achieve goals related to work, learning, leisure, inclusion and participation in our digital society. This framework is the main reference in Europe today, for the development and strategic planning of digital competence initiatives.

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The DigComp Framework includes five dimensions:

1. Five areas of expertise identified as part of digital competence: information and data literacy; Communication and collaboration; Digital content creation; Safety; Troubleshooting.
2. Twenty-one descriptors of relevant skills and qualifications for each area.
3. Eight levels for each competency, namely Basic > Level 1 and Level 2; Intermediate > Level 3 and Level 4; Advanced > Level 5 and Level 6; Highly specialized > Level 7 and Level 8.
4. Knowledge, skills, and attitudes applicable to each competence.
5. Examples of use, on the applicability of competence to different purposes.



Copper work is flexible enough to be used in different industries, where digital competence is increasingly important:

- In the education and training sector where, digital competence is relevant at all levels of the education system (including school and higher education) for several reasons, ranging from active citizenship to the use of Information and Communication Technologies (ICT), for learning purposes, to job search;
- In the area of lifelong learning and social inclusion, digital competence is also important in everyday life and the lack of digital competence can increase the risk of social exclusion of already disadvantaged people (e.g. disabled, migrants, elderly people, etc.);
- In the employment and workplace sector, digital competence is now needed in the workplace, at different levels (more general or more specialised), as an increasing number of job profiles require mastery of digital skills.

In these fields, DigComp has been used with a variety of purposes that are of interest to understand its role in adult education, specifically as a tool to analyze the digital competence requirements of various jobs and to define the related professional digital profiles; as a tool to assess and certify digital competence levels; as a tool to design, develop and deliver training programs on digital skills.

A relevant field of interest for adult education trainers in digital competence focuses on adults at risk of social exclusion, in particular people on the margins and older people who need to develop digital competences to maintain their social relationships and train their cognitive abilities in a digital world.

In 2019, the European Commission's Directorate-General for Employment, Social Affairs and Inclusion published "*Inspirational practices for tomorrow's inclusive digital world*", which describes examples of good practice in the area of 'digital skills for all'. In general, these examples indicate increasing levels of citizen participation in the democratic life of our societies (e.g. co-producing digital and inclusive public services for all) or training specific segments of the population, including older people, migrants, young people with disabilities and NEETs (neither in the world of work nor in education or training), to make them digitally literate.



In 2017, the European Commission - DG CONNECT published the results of the study “*ICT for Work: Digital skills in the workplace*”, aimed at investigating the transformation of jobs in the EU's digital economy, the extent to which digital technologies have penetrated the workplace and the digital skills required today by employers and the labour market. The study highlights how the digitalization of the economy is contributing to the polarization of the labor market in fact, on the one hand, it has led to a greater demand for highly qualified subjects, able to use new technologies to carry out their professional tasks, on the other, it has led to a decrease in the demand for low-skilled workers. Again, automation based on smart technologies replacing humans has led to job losses in some cases, while at the same time the digitalization process is fostering the emergence of new jobs that require cognitive and interactive skills complementary to computer work. In addition, digitalization is also leading to the transformation of existing jobs, reshaping job tasks and, consequently, the skills needed to perform certain jobs.

Recent data on digital skills and the labour market indicate the growing mismatch between digital skills needed on the labour demand side and digital skills currently available on the supply side. More specifically, according to 2017 statistics, 85% of jobs in the EU need basic digital skills, while 43% of the EU population do not have a sufficient level of digital skills.

According to 2016 Eurostat data, people with low levels of education or low incomes continue to be at risk of digital exclusion, while the number of people with a low level of digital skills increases with age. For example, while 96% of young people aged 16 to 24 living in the European Union use the Internet at least once a week, only 57% of people aged 55 to 74 do. Some progress has been made in recent years, but the situation still needs to be improved to support and encourage citizens' participation in the social, political, and economic life of contemporary societies.

As highlighted in several EU documents and literature on digital inequalities, digital competence is a driver for the social advancement of those at risk of marginalisation. The European Union has undertaken several initiatives in the related area of “e-inclusion”, a term that refers to actions aimed at creating “an information society for all”. From the Riga Ministerial Declaration of 2006 to the *Digital Agenda for Europe 2010-2020*, digital inclusion or *e-inclusion* was seen as a necessary



condition to ensure equity and social justice as the lack of access to digital information resources and opportunities in the information society represents a heavy factor of discrimination.

In this changing situation, DigComp was used to analyse the competence requirements of professions and the definition of professional digital profiles distinguishing between the following sectors:

- Existing professions such as administrative clerk in the public administration, primary school and early childhood teacher, etc.;
- General business functions such as industrial operations and services, marketing and sales, etc.;
- General working conditions such as entrepreneur, virtual employee, consultant for the Third Sector, employment services personnel;
- New IT-intensive jobs in different economic sectors (Industry 4.0 jobs in production, new digital jobs in museums) and distinct IT specialist job profiles.

The categories mentioned above need to develop different levels of digital competence in different areas. For example, based on case studies documented in *“DigComp at Work. The EU's digital competence framework in action on the labour market: a selection of case studies”*, employment services staff need intermediate and advanced levels of digital competence in all areas, while for primary and early childhood teachers the relevance is limited to certain areas such as content development or device protection. Of course, for digital professions such as digital collection curator or online community manager, a high level of digital competence is transversal to several examples given in the document.

With some adaptations, DigComp has also been used as a self-assessment and/or certification tool and/or to design the training offer. For example, in 2012 the government of the Basque Country promoted the “Ikanos” project to build a learning support platform for the digital competence needs of citizens, workers and/or the unemployed. DigComp was used to develop a set of tools, including a self-assessment test for both career guidance and training and to increase the employability of the unemployed, fifteen digital professional profiles, the Ikanos *“Personal Learning Environment”*



(MEWP) for the continuous development of digital competence and the new BAIT digital skills certification system. From an education and training perspective, the idea of an MEWP is particularly interesting as an MEWP is a system that helps learners take control and manage their own learning. This includes providing support to students to set their own learning goals and manage their learning, manage both the content and the process, communicate with others in the learning process, and then achieve learning goals. Important concepts in MEWPs include integrating episodes of both formal and informal learning into a single experience, the use of social networks that can cross institutional boundaries, and the use of network protocols (Peer-to-Peer, web services, syndication) to connect a range of resources and systems within a personally managed space. As the digital world is constantly changing, learning digital technologies cannot be realized once and for all as continuous learning and learning is required to learn within self-managed and personalized learning spaces.

Italy also joins the European coalition for digital skills. In fact, the Italian coalition that adheres to the European Union Commission's program for digital skills and professions is born, with the aim of bridging the different forms, social and cultural, of digital divide among the Italian population, promoting digital inclusion and promoting the development of new professional skills.

On 21 July 2020, the Minister for Technological Innovation and Digitization signed the decree adopting the National Strategy for Digital Skills, an essential basis for the implementation of organic, multisectoral and effective interventions on a fundamental area for the economic and social development of the country. Until now, the lack of a strategy has limited the implementation of digital transformation processes, therefore digital skills are a strategic priority and developed within the "Digital Republic" initiative and the National Strategy is the result of a collaborative approach that has put Ministries, Regions, Provinces, Municipalities on the same table, Universities, research institutes, companies, professionals, Rai, associations and various articulations of the public sector, in addition to the organizations belonging to the National Coalition.



There are four axes of intervention of the Strategy:

1. In education and training for the development of digital skills within education cycles for young people, under the coordination of the Ministry of Education and the Ministry of University and Research;
2. In the field active work is to ensure adequate digital skills in both the private and public sectors, including e-leadership skills, with the coordination of the Ministry of Economic Development and the Minister for Public Administration;
3. In the ICT specialist skills with the aim of enhancing the country's ability to develop skills for new markets and new employment opportunities, largely linked to emerging technologies and the possession of the skills essential for the jobs of the future, with the coordination of the Ministry of University and Research and the Ministry of Economic Development;
4. In citizens to develop the digital skills necessary to exercise citizenship rights and conscious participation in democratic life, under the coordination of the Minister for Technological Innovation and Digitization (MID).

The goal is to eliminate the gap with other European countries, in general terms of digitization and with respect to the individual axes of intervention, and to break down the *digital divide* between various areas of our national territory.



II. THE IMPORTANCE OF SKILLS DIGITIZATION IN ITALY

Data on the development of the digital economy and society available at national and international level indicate that Italy is characterized by a significant shortage of digital skills among the population. According to Eurostat data from 2019, only 42% of Italians between 16 and 74 years old have digital skills at least at a basic level (it is 58% in the EU), with a significant impact on the use of digital services. Italy ranks last among European countries for Internet use, with 17% of people aged between 16 and 74 who have never surfed the net (almost double the EU average of 9%). The data also indicate that only 1% of Italian graduates have a qualification in ICT (worst position in the EU) and that the percentage of ICT specialists, although it has increased over time and has reached 3.6% of total employment, is still far from the EU average (4.2%). Compared to ICT graduates, the gap between supply and demand is growing, with a shortage of 5,100 units for graduates equal to 35% of the needs (2019 “*Digital Skills Observatory*” data).

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The lack of digital skills is for Italy one of the main obstacles to the development of the country and assumes the characteristics of a priority because:

- Has a negative impact both on the provision of digital services by the public and private sectors, and on citizens' access and use;
- Exposes a significant part of the population to the risk of social exclusion and from the labour market;
- Hinders access to forms of public participation and consultation;
- Increases the risk of citizens' exposure to large-scale disinformation.

An inadequate level of digital skills not only affects citizens' private lives, but also has an impact on their employability and access to the digital environment for the continuous updating of knowledge and skills. A figure to pay attention to also concerns workers at risk due to automation processes as only 20% of them benefit from continuous training.



The Strategy for Technological Innovation and Digitization of the country “Italy 2025” provides a clear horizon for the challenge “Inclusive and sustainable development” or work for ethical, inclusive, transparent and sustainable innovation, which increases the well-being of society. This means working so that people's digital capacities are strengthened, the State guarantees ethical, responsible, and non-discriminatory technological development and citizens are trained to access the jobs of the future through a process of continuous training.

The national strategic initiative for digital skills called "Digital Republic" is the soul of this challenge.

Digital skills are a fundamental strategic axis for social and economic growth, obtainable only if three conditions of sustainable evolution are achieved with detailed system interventions:

1. The population acquires more and more digital awareness and therefore manages to make the most of the benefits of digital by directing an "ethical" evolution of the use of technologies and their social use;
2. Public administrations and companies are induced to improve the services provided, in which the user is seen at the center, as a conscious person, implementing a profound transformation, including of production processes, which requires both widespread digital skills (starting from the e-leadership of managers, with a mutual contamination of "business" skills and digital transformation skills) and specialized ones;
3. The education system is organized to cover the needs of developing digital skills in an organic way and in a logic of continuity and correlation in the training path between the different phases of personal and working life.

This means that growth, connected to the development of digital skills, can only take place within a virtuous circle in which at the same time all stakeholders and, first and foremost, acting as an overall driving force, all institutions and public administrations raise the level of quality of needs towards other actors and assume the commitment to change and the “leap” required by digital transformation. The activation of a virtuous circle on the development of digital skills creates the conditions for the realization of the 2030 Agenda, not only as regards the realization of quality



education within the reach of the entire population, but also for the implementation of policies aimed at reducing inequalities and ensuring sustainable cities and decent jobs.

The National Strategy for Digital Skills together with the Digital Republic want to be the system response to achieve these goals.

Private sector

The digital transition of the company is one of the great challenges of European industrial policy together with that of the environmental transition. It is a challenge that has at its heart the issue of human capital and the accompaniment of companies in the integration of technologies within their processes to create innovative and truly sustainable productivity. It is necessary to consider in the development of production systems the growth and integration of emerging technologies, such as, for example, *Blockchain, IoT, AI, Quantum Computing, Embedded Systems, Data Mining, Cybersecurity*, High Performance Computing Systems and development of certified software systems while Significant emphasis should also be given to the relationship between the development of digital technologies and the green economy, very important issues in light of the creation of new, more sustainable and inclusive production systems.

Here are some elements of evaluation:

- 30% of the new workforce needed in Italy will be employed, in the coming years, in jobs related to the use of digital technologies or the circular economy. Already today, companies that focus on innovation and seek to expand their reference market, also leveraging *exports*, require digital skills in data analysis, programming and management of innovative solutions;
- In a constantly evolving technological scenario, traditional professions are therefore subjected, and increasingly will be in the future, to a constant action of *upskilling* and *reskilling*. At the same time, the new players of the ongoing digital revolution are entering



the market, driven by demand, such as the *artificial intelligence specialist*, the *big data analyst*, the *cloud computing expert*, the *business intelligence analyst* or the *social media marketing manager*;

- The important contribution of women to the technological development of the country system and the importance given by Italy to the "Women in Digital" declaration signed at EU level on 9 April 2019 during Digital Day 2019 should be highlighted;
- In this changing context, the *Digital Economy & Society Index (DESI)* places Italy, in 2020, at the lowest levels about the "Human Capital" dimension, which includes the use of the internet and basic and advanced digital skills. A situation certainly not encouraging both as regards the efficiency of the PA and for the competitiveness of the economic system. Poor digitalisation has profound effects on growth and productivity;
- If we consider that ICT employees currently represent 4% of workers, the country's great challenge will be to support new players, specialists, and their strategic skills, in their emergence on the market and, at the same time, to strengthen digital skills for the remaining 96% of non-ICT workers, strengthening the broad-spectrum entrepreneurial fabric. This figure is even more significant if we consider that only a part of those employed in the ICT sector carry out technical development activities and even fewer are employed in sectors that develop or use frontier technologies;
- It is therefore evident the need to support the entrepreneurial fabric with actions aimed at supporting on the one hand the technological transformation of the related business models and on the other the training of the personnel involved, at all levels, together with an information action that guides the interested actors step by step in order to allow them to identify the digitalization path closest to real needs, making the best use of the best and most effective tools currently in the field.



About the initiatives underway, the Public Administration, as part of an overall system strategy aimed at supporting the entrepreneurial fabric of the country in seizing the opportunities provided by technological innovation, has put in place a set of tools aimed at:

- Enhancing digital skills;
- Directing companies to technological transformation;
- Disseminate innovation at all levels;
- Linking the world of research with the business world;
- Support the demand for innovative technological solutions.

Similarly, in the private sector, more and more attention has been paid to issues related to training and process or product innovation.

In addition, in terms of accompanying companies in the digital transformation of their business processes, an active role is played, through a close public-private synergy, by the Ministry of Economic Development (MiSE). In parallel with the Competence Centers, which carry out functions of support for technology transfer, experimentation of new enabling technologies and advanced training on technologies, together with the trade associations and the Chamber system, a development path has been created that sees in the field the cohesive action of PIDs, Digital Enterprise Points, DIHs, *Digital Innovation Hubs*, up to the EDIH, the *European Digital Innovation Hub*. A complex of structural nodes that, through keywords such as experimentation, technology transfer, training, information, and digitization, constitutes the backbone with which the 4.0 policies put in place by the Administration are offered and tested.

The information and accompaniment process described above cannot be separated from the presence of a strong training component, both internal and external. In this context, the initiative of the ITS finds space, real high technology schools closely linked to the production system that prepare the specialized middle managers who in companies help to govern and exploit the potential of Enterprise 4.0 solutions. In the wake of digital transformation, the training offer in recent years, as proof of a constantly growing demand, has expanded, both as regards the Public Administration and



as regards the private sector, with tools and actions aimed at increasing the degree of specialization in the ICT sector, to strengthen digital skills for work to strengthen the innovation capacity and digital culture of the Public Administration, and also to certify the degree of competence achieved.

In a context of necessary and continuous technological development, particular importance is covered by all those actions that in some way facilitate the entrepreneurial fabric in carrying out certain actions. This is the case of incentive tools (tax credit, *vouchers* and other facilitation measures) for the introduction of technologies enabling digital transformation, for the development of workers' digital skills, for the realization of *digital transformation* through projects aimed at implementing the enabling technologies referred to in the Industry 4.0 plan and digital technologies in the supply chain, and finally for the activation of ultra-broadband services.

Every development and transformation action needs a place that acts as an aggregator and attractor and therefore as a reference for stakeholders in the sector on the territory ora meeting point between the world of research and the world of business. This is the case of the House of Emerging Technologies, areal technology transfer center that will be built in the municipalities subject to 5G experimentation to support research and experimentation projects, the creation of startups and technology transfer to SMEs, on issues involving the use of *Blockchain*, *IoT* and Artificial Intelligence.

Demand support is promoted as part of the "National Smart Specialisation Strategy 2014-2020", drawn up by MiSE and MUR, approved by the European Commission, which identifies public demand for innovation (innovation and pre-commercial procurement) as an important stimulus tool. In line with the Strategy, the MiSE has launched a new program of "Calls for intelligent public demand", using the Agency for Digital Italy (AgID) as implementing subject, which took new force in April 2020 with the memorandum of understanding signed between MISE, MUR and MID.

It therefore seems necessary to start a strategic planning capable of guaranteeing, through targeted actions, the improvement of the technological skills of the entire workforce and a greater connection between the world of training and the world of business, responding concretely to the challenges of



digital transformation. Innovation, implemented at the level of person, process and product, must become that "*must have*" through which to strengthen Italy in the global competitive framework.

Therefore, it is necessary to strengthen the digital skills, both basic and specialized, of all staff and at all functional levels with particular attention to the digital gender divide, direct stakeholders to have greater awareness of new technologies, modernize company production processes, also through effective training, while improving the use and access to telecommunications networks.

The issue of digital skills for the future of Italian companies therefore requires joint action, involving the various stakeholders. It is, in fact, a system action in which there must be the full involvement of the various stakeholders or ministries, territorial public bodies, large private actors, trade associations, chambers of commerce.

This system action will involve public and private actors engaged around measurable objectives within a strategy led by a task force established at the MiSE and in direct relation with the indications of Europe and with the #NextGenerationEU strategy. The multiple interventions introduced will be monitored to understand strengths and weaknesses and, where necessary, carry out corrective or strengthening actions. In parallel, new actions and programmes will be launched with the aim of:

- Aim to introduce more innovation and business in schools;
- Launch the Startup *competition* both in schools and universities;
- Create training modules dedicated to small businesses to facilitate their access to digital technologies;
- Strengthen training 4.0;
- Bringing digital businesses closer to traditional businesses through joint projects;
- Establish an Italian Centre for Artificial Intelligence.

Finally, collaborations will be strengthened both between central administrations, in order to develop, each as far as it is concerned, more coordinated actions and measures both on an operational level and in terms of monitoring and evaluation of effectiveness and with the Committees and Observatories currently involved in various ways in studies and research in the



sector, in order to improve the aforementioned analysis tools and immediately intercept the new needs that should arise from an extremely dynamic evolutionary framework such as that linked to *digital transformation*.

The impact to be produced, in line with the expected results of the National Strategy for Digital Skills, can be summarized as follows:

- Increase in private employees with basic digital skills;
- Increase in private employees with specialized digital skills;
- Modernization of production processes;
- Greater technology transfer to companies;
- Greater presence of the business world in the world of teaching and vice versa;
- Increased interaction between digital businesses and traditional businesses;
- Multiplication of national initiatives on emerging technologies such as *Blockchain*, *IoT* and *Artificial Intelligence*;
- Facilitating access to and use of ultra-broadband telecommunications networks and digital technologies.

The specific reference indicators are linked to the intervention priorities and the lines of intervention to be pursued and, as previously highlighted, in particular to the improvement of the technological skills of the workforce, to the technological improvement of production processes, to the strengthening of the link between teaching and business and finally to the improvement in access to in-band networks. ultra-wide and in the use of emerging technologies.



Public sector

The affirmation of a digital culture and innovation shared at all levels of administration is a key factor in accelerating the process of transformation of the Italian Public Administration in an innovative sense and improving the services offered to users. To date, the lack of digital skills is manifested at all levels of the Public Administration, both decision-making and operational, because:

- Most public administrations have not yet appointed the Manager for the transition to digital operating mode, provided for by art. 17 of the CAD, Digital Administration Code, (Legislative Decree 82/2005). In addition, many of the resources called to cover this role do not have adequate technological, legal and managerial IT skills required by the standard. This delay, highlighted in the Final Report of the Parliamentary Commission of Inquiry on the digitization of the PA approved in 2017, proves to be even more significant if we consider that, although the latest formulation of art. 17 of the CAD dates back to 2016, the request to identify a single competence center on digital has been foreseen since 1993 for central administrations;
- The excessive focus, especially in the selection paths, on legal-administrative skills has contributed over time to the affirmation of a managerial class often lacking the skills necessary to recognize innovation opportunities and to coordinate the processes of change enabled by digital technologies that directly involve the functions and operating procedures covered (a research launched in 2018 from the National School of Administration reports the prevalence among public managers of operational IT skills rather than skills related to a more strategic and managerial ICT management);
- The human capital of the Italian PA is poorly equipped, elderly (45% of Italian civil servants are over 54 years old compared to 22% of the OECD average) and above all low-skilled (only 38% of public staff have obtained a university degree and 3% a post-graduate degree). This lack of qualification has not been remedied in recent years with appropriate investments in training, especially in the digital field (in 2017, digitalization training registered just over 126,000 participants, equal to about 5% of the total).



With reference to the ongoing initiatives, the public system is carrying out a series of activities on the digital skills of public employees aimed at defining and systematizing sets of key competences according to the different professional profiles and the different role assumed in the process of implementing the digital transformation (IT specialists, managers and civil servants), activate interventions to identify skills and training needs and finally aimed at promoting the strengthening of digital skills through turnover.

An active role in defining reference models for the systematization of digital skills in the PA was played by AgID, Agency for Digital Italy, through the updating of the “Guidelines for the quality of digital skills in ICT professionalism” and the publication of the “Guidelines for the harmonization of professional qualifications”. The theme of mapping the skills and training needs of the Digital Transition Manager (RTD) represents, then, one of the key points of the memorandum of understanding that AgID signed in 2019 with the Conference of Rectors of Italian Universities (CRUI), as a starting point for the definition of targeted and quality skills development paths.

While AgID's commitment is mainly aimed at IT specialists (equal to about 32,000 employees, of which about 18,000 in central public administrations and 14,000 in local public administrations) and lays the foundations for a work of systematization of key skills for public managers to support digital transformation, through the “eLeadership Guidelines”, the Department of Public Administration with the Syllabus “Digital skills for the PA”, mainly addresses the so-called “administrative” employees, equal to about a third of the total number of Italian public employees. The Syllabus “Digital skills for the PA”, structured in five areas of competence and three levels of mastery, represents the reference base for an *online self-assessment* tool of the knowledge and skills possessed that allows you to detect your training needs, access a targeted and free course offer and measure your progress. The e-learning training offer has been available since autumn 2020, together with the *self-assessment* tool, and is aimed at all interested administrations.

In addition, on the training front, a wide training offer has recently been developed, mainly focused on specialized skills and RTD, responsible for the Digital Transition, in line with the provisions of the Three-Year Plan for IT in the PA 2019-2020. The system initiatives, mainly promoted by the



Department for Digital Transformation, AgID and SNA, National School of Administration, also in collaboration with other central administrations, are then accompanied by a multiplicity of initiatives both at regional and local level and sectoral, aimed at addressing specific needs related to certain professional categories or to the mission of the proposing body. Finally, the universities offer a varied offer of masters, modules, or specialized paths, in key sectors, such as cultural heritage and health, as well as focused on the figure of the RTD. However, all these initiatives, which have an important qualitative impact, are insufficient to meet the overall demand for digital skills to support decision-making processes by specialists and public managers or specific sectoral needs. This is especially true if we consider that about 22,000 RTDs (one per administration) should be identified, and that more than 38,000 managers are currently in service. To these are added the officials who increasingly find themselves governing innovation processes as well as investing in training to achieve career progress.

Smart working has proved to be a key tool during the epidemiological emergency. The configuration of agile work as “*ordinary mode of carrying out the work performance in public administrations referred to in Article 1, paragraph 2, of Legislative Decree 30 March 2001, n. 165*”, operated by art. 87, paragraph 1, Legislative Decree no. 18 of 17 March 2020, converted by Law no. 27 of 24 April 2020, and the consequent generalized recourse to this institute, have made it possible to find the positive possibility of combining two needs. Don the one hand, the containment of the spread of the contagion; on the other hand, the continuity of administrative action. However, there is no doubt that the favourable outcome of this regulatory framework was also made possible by the availability of workers' personal equipment and their ability to use the necessary technological, IT and digital devices. This overall experience shows that agile work, digital skills, and the digitalization of administrative action are ultimately factors able to coexist and operate synergistically, in a profitable process of osmosis. Even the most recent provisions, contained in Decree-Law no. 34 of 19 May 2020, in the process of conversion, also motivated by the epidemiological emergency, confer a further, new structure to agile work, also for specific training profiles, in particular of public management, called to manage, in this mode, the organization of offices and personnel, and always with a view to the continuity of services provided to citizens and businesses. Also, in the Directive of the Minister of Public Administration n.3 / 2020 training is recognized as a fundamental tool for accompanying staff



in the process of spreading the ability to work in agile mode and as a basis for the development of the skills necessary to accelerate innovation. It is not, therefore, only a matter of increasing the use of agile work *tout court*, but of allowing its use in terms of increased awareness of its potential, especially by public management. Smart working aims to combine the promotion of organizational well-being with the improvement of administrative action in terms of effectiveness and efficiency, as well as the implementation of the digitization of procedures and services provided to citizens and businesses.

The strengthening of digital skills in the public sector through turnover has been explicitly promoted since Law no. 56/2019 which provides that the preparation of needs plans by administrations must consider the priority recruitment of professionals with high skills also in the field of digitization.

The Minister for Public Administration and the Minister for Technological Innovation and Digitization have signed a protocol that promotes a more structural approach to digital skills, which includes the possession of these skills among the fundamental requirements of candidates for entry into the public sector and its strengthening in the staff who are already employed there.

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With reference to the public employment sector, the impact to be produced, consistent with the expected results of the Strategy, can be summarized in:

- Increase in civil servants with at least basic digital skills;
- Increase in civil servants with specialized ICT skills;
- Increase in the number of digital public services for citizens and especially businesses.

The specific reference indicators are linked to the intervention priorities and actions to be pursued and, in particular, to future public employees selected through paths that enhance the role of digital skills applied to the public sphere, to non-IT civil servants who benefit from targeted training interventions to support digital transformation, starting from the structured identification of needs training at an organizational, professional and individual level and finally to IT specialists who benefit from dedicated selection paths and highly qualified training interventions in order to strengthen specialized skills and the recognized role in the PA sector.



III. OPPORTUNITIES AND RISKS OF DIGITIZATION

If on the one hand the Digital Transition is accelerating the acquisition of new skills, on the other it seems that the adult population is still lacking in qualifications and professional skills with which to grow professionally. Therefore, if Digital and Technological Transformation is a priority, it is also true that many adults' risk not finding work and falling behind due to the lack of adequate skills and skills, especially digital.

The PIAAC survey (*Program for the International Assessment of Adult*) conceived by the Organization for Economic Cooperation and Development, has highlighted a growing but decidedly worrying picture for adult education in Italy.

Below is the picture that emerges:

- Thirteen million Italians have a low level of education;
- Including those in employment who possess insufficient skills, the under-qualified population is between 53% and 59% of adults (25-64 years);
- 54% of the population has qualifications below secondary education;
- 34% have a diploma;
- 14.7% have a post-diploma qualification.

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Fortunately, the level of adult skills is clearly also improving thanks to the increase in the rate of schooling of citizens; however, the picture remains not positive and digital, numerical and alphabetical skills are missing.

As previously written, to be active citizens and professionals it is essential to acquire and certify one's Digital Skills.

According to the European Commission, nine out of ten professions will soon require technological skills. Digital skills are currently evaluated in Public Competitions and for recruitment in private companies, a sign that the time has come to update their skills and learn how to work digitally.



To require it is precisely the world of work, which is increasingly struggling to find ICT professionals and people who have basic Digital Skills, namely from data analysis to cloud work, from the creation of digital content to IT security and *problem solving*.

To solve the problem, Italy and Europe have launched several initiatives with the aim of intervening on *low-skilled* adults, such as the National Strategic Plan for the Development of Skills of the Adult Population, drawn up by the Interinstitutional Table on Lifelong Learning with the aim of implementing measures to make people more competitive professionally, while the European Union has issued, the aforementioned Council Recommendation on key competences for Lifelong Learning, which contains the basic competences for lifelong learning.

In Italy there are currently no structured training courses, but there are already several projects of national scope. Here are the main ones:

- Since 2019 the ANG inRadio network of the National Youth Agency has been active. It is a digital radio aimed at listening to young people, social inclusion and strengthening digital skills through activation on social and cultural issues.
- Since 2017 the national fair FIRIDA has been held, a large event dedicated to adult education, promoted by MIUR and the Italian Network of Adult Education (RIDAP). Since 2019, the fair has been linked to Leonardo visionario, a training project on innovative teaching and digital technologies in education that has provided over 60,000 hours of training in one year.
- In 2014, the MIUR launched the National Activity Plan for Innovation in Adult Education (PAIDEIA), which supports the activities of the territorial networks of lifelong learning and promotes the experimentation of the online PIAAC (ANPAL leader), providing the Provincial Centres for Adult Education (CPIA) with a *self-assessment* tool prepared by the OECD to measure adult skills.

Many of the active projects are collected within the national initiative "Digital Republic", in the relative National Coalition for digital skills, to which numerous subjects (including schools, universities, administrations, companies, associations and institutions) have joined since May 2019.



There are numerous training initiatives in non-formal contexts, itinerant on the territory, delivered in specific locations, delivered online, or related to specific projects or events.

There are also many digital facilitation and training initiatives spread throughout the territory promoted by regions (such as "Pane e internet" in Emilia-Romagna and "DigiPASS" in Umbria), municipal administrations, in-house IT, libraries, and associations.

To strengthen the role of young people as digital facilitators to facilitate access to digital skills, an experimental axis of "Digital Civil Service" promoted by the Minister for Technological Innovation and Digitization and the Minister for Youth Policies is being structured.

The evaluation of the data shows the need for action on three priority fronts:

1. Internet access for the working-age population with little or no digital skills and low educational attainment;
2. Digital literacy of the working-age population already using the Internet;
3. The inclusion/digital access of the elderly, women who are not employed or conditions, immigrants, people with disabilities and disadvantaged groups in general, with a low level of education.

The priorities highlighted translate into the following lines of intervention:

- Training courses for adults within the Educational Institutions, in synergy with the schools that open to the territory and strengthen digital literacy initiatives, in particular within the activities for permanent education of the CPIAs (Provincial Centers for Adult Education).
- Training courses within the non-formal educational circuit, based on the enhancement of *lifelong* learning, with online learning platforms that accompany the growth of the level of competence.
- "Road" path - Training of digital and information skills on the territory, based on the role of neighborhoods, local communities, and public spaces, such as libraries, to create networks of



assisted access points and digital facilitation facilities, in a pervasive way, where it is possible to support access to the network and public digital services.

- Communication paths, based on the belief that literacy and awareness-raising processes require continuous communication activities, also with systematic support of the mass media, of a strictly functional nature to the objective and not merely promotional.
- Digital inclusion path, with a series of measures dedicated to disadvantaged social groups such as the elderly, people with low education or low income, people with disabilities, also through widely distributed and simple use tools such as radio and television and specific digital facilitation interventions.

From the evaluation of the initiatives in progress and from the experiences carried out, it emerges the need to "leverage" on the experiences (both of the public and private sectors and of civil society) that have reached a level of maturity such as to be able to constitute a reference and to address in a systemic way the problem of lack of integration (at territorial level as well as between actors of different types and between administrations) and the episodic nature of interventions and initiatives.

Therefore, the Operational Plan must provide for organic, systemic, and national interventions that enhance experiences and initiatives that have proved effective at local and national level, also taking into account the comparison with other key actors in the Community panorama of the initiatives and plans for the development of digital skills promoted by the Commission itself. Interventions that address the issue of the development of digital skills in a differentiated way depending on the starting level, in order to identify gradual objectives and targeted actions, so as to involve those who play a role of "mediators" and "facilitators" towards citizenship in different areas and who can best carry out the accompaniment towards digital (librarians, operators of employment centres, senior centres, social assistance centres, etc.) . Measures that integrate the availability of skills and places in the territory (e.g. schools, libraries, associations, digital facilitation points, etc.) as well as the opportunities offered by radio, television and the network, according to a hybrid approach, in a general logic of systematization of available resources. In this context, the initiative launched by the



Ministry for Technological Innovation and Digitization (MID) is also developed for the creation of a digital gym aimed at supporting the acquisition and strengthening of citizens' digital skills and finally, from an organizational point of view, it is important that it is shared the multi-stakeholder approach and the system vision of the National Coalition, maximizing integration and collaboration between the different actors.

For CPIAs, in addition to teacher training interventions, priority is given to interventions aimed at encouraging the non-occasional use of technological instruments and laboratory spaces not only in projects to expand the training offer, but also in first-level legal courses, as well as in Italian language learning paths. With reference to the latter type of training offer, the availability of teaching modules to be carried out through the support of technological instruments would prove to be particularly incisive, also in consideration of the vastness of the relative audience of recipients.



IV. DIGITIZATION INCENTIVES AND BEST PRACTICES

Digital Skills is the mantra of these years and is perhaps the most important game that Europe and member states have ever played. In addition to innovation and the growth of the continent's economies, equity, and the opportunity for everyone to carve out a slice of the labour market are also at stake. Not only PCs, tablets, and smartphones but also Data, Artificial Intelligence and Robotics. Digitalisation is undoubtedly a decisive phase for Europe and is requiring everyone's commitment, starting with citizens, businesses, and the public sector.

Therefore, observing basic Digital Skills is an important starting point but we need to introduce into the lives of all of us advanced skills and technologies that allow us to win the challenge of the Digital Transition and to be competitive with the rest of the world and it is more important to be able to include everyone and leave no one behind.

For these reasons, the European Digital Decade issued by the Commission in 2021 highlighted the need to introduce Advanced Technologies and provide everyone with the skills needed to adopt them.

Also in its 2021 Strategic Forecast Report, Europe underlines the importance of developing new skills and strengthening the capacity to use cutting-edge technologies to achieve global leadership by 2050.

According to the European Commission, the advanced technologies that will be decisive in the coming years and that will bring great changes in various fields, from the world of work to that of school, are:

- Cloud and Edge Computing, two key technologies in Europe's digital future. There are two parallel but different ways of storing data and ensuring interoperability. The first sees the existence of data centers that centralize information while the second provides a series of devices connected to each other and referring to the central one.



- Artificial Intelligence, now present in many of the daily actions carried out by man, from browsing social media to enjoying a streaming movie, up to the selection of a music playlist. An AI algorithm reconstructs human skills such as reasoning, learning (hence machine learning technology) and planning. For this reason, Europe believes in a profound regulation of this resource, so that it is adopted in an ethical way and for the benefit of people.
- Big Data is a particularly interesting area for the European Commission, as it aspires to a single market for data in Europe that makes it accessible to the economy and society. A common space for data and Digital Sovereignty not only contribute to achieving global leadership, but also bring real benefits to everyone's lives. A *data-driven* approach would make significant progress in health, transport, public service, and energy transition.
- 5G is one of the most promising emerging technologies because it virtually provides ultra-broadband with very low latency, ideal for connecting people and objects and for collecting and analyzing data in real time. This technology has applicability in different sectors, starting from the professional, health, safety, and Smart Cities.
- Quantum and Photonics are two of the most discussed and innovative technologies in Europe. On the one hand we find a quantum acceleration computer, capable of performing multiple calculations in parallel thanks to the quantum bit unit and a computing power that solves complex problems that would take years, in a few minutes. On the other hand, a system capable of generalizing and manipulating light particles, i.e. photons. This makes it possible to exponentially accelerate technological innovation on the continent, with practical applications in the world of surgery, lighting, personal computers, and automobiles.
- Robotics is a technology in which Member States strongly believe, especially for its usefulness in complex areas such as manufacturing, search and rescue, surgery, and healthcare. For these reasons, in support of the 2006 European Machinery Directive, Europe is working on a definitive strategy for robotics within the Digital Decade. The initiative will achieve true governance on the adoption of this technology and initiate strategic partnerships between the public and private sectors.



- Internet of Things, macaronically translated "Internet of Things", is the extension of the benefits of the Internet to objects. This allows a connection between man and the tools he uses, with the possibility of interacting with technological devices in a quick and personalized way.

Therefore, Europe's digital future is upon us, and it is now essential to acquire the Digital Skills needed to actively participate in society. Let's talk about *Digital Skills* for the adoption of *AI*, *IoT*, *Cloud*, *Data* and more. Technologies destined to revolutionize the lives of citizens, schools, businesses, and public administration.



CONCLUSIONS

The report of the *Digital Economy and Society Index (DESI) 2020* reads: *"Italy is launching initiatives aimed at strengthening digital skills and addressing the issue of digital inclusion. Intensifying and concentrating efforts would help reduce the digital divide among the population and ensure that the majority have at least basic digital skills. Another important step in this area would be a comprehensive approach to upskilling and reskilling the workforce, including strengthening advanced digital skills."*

The lack of digital skills in the various areas, for which Italy is among the European countries most in difficulty, is one of the main limitations for the social and economic development of the country and for its recovery from the current period of crisis, assuming the characteristics of priority. This is why it is necessary that the issue of digital skills becomes a strategic priority for Italy.

The development of the country, closely linked to digital transformation processes, will not be sustainable without an investment in human capital with specialized technological and application skills in the ICT sector. The lack of digital skills becomes for Italy one of the main factors that negatively affects development, assuming the characteristics of a priority.

Despite some progress, the results of the survey on policy priorities among companies conducted by the Digital Skills Observatory, unfortunately confirm the gap between available resources and demand for personnel. It also highlights the need to develop domain application skills (PA, transport, health, social services, cultural heritage, security, professions, etc.) that can with "digital thinking", with "digital design", with "digital organization" proceed to a renewal of all sectors of the country. The creation of new and qualified jobs cannot be separated from the ability to know how to train these key figures.

In conclusion, considering all the initiatives developed within the Digital Republic, including those of the National Coalition, the objective to be achieved by 2025 is to involve in digital facilitation activities and training activities, a quantity of the "target" population such as to position Italy in the first three



positions compared to other European Union countries. similar in socio-economic and demographic characteristics, such as Germany, France, Spain, and Poland.



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