



DIGITAL ITALY 2021 MARKETS, DYNAMICS, POLICY

EXECUTIVE SUMMARY

MACRO-INDICATORS

Digitalization macro-indicators draw an overview of the widespreading adoption of different technologies. The pandemic has made the use of digital technology inevitable in several sectors. This is why the the digital market has withstood the blows of the crisis better than the economy as a whole. The contribution of digital technologies was crucial in ensuring business and public services continuity, while the number of remote workers surged. Data on businesses' digital transition confirm that Italy is progressively aligning to the European average adoption levels.

However concern remains on the lower investment levels in in training compared to the US and other European countries.



Some 73% of companies in the infrastructure sector adopted digital platfoms

Some 19% of large companies (more than 250 employees) with smart working recorded higher than average productivity



EXECUTIVE SUMMARY

Macroindicators

In 2020, digital technologies have taken on a central role both in economic activities and in daily life: they guaranteed the continuity of many work activities, enabled remote work and remote teaching, made it possible for everyone to access services through digital channels and enjoy content and entertainment.

Statistics confirm the increase in digitization in enterprises, including small and medium-sized enterprises. The number of remote workers grew from 570,000 in 2019 to over 6 million during the first



lockdown in March 2020 (+ 1000%), a level that will stand even after a gradual return to normality (Source: Observatory of Politecnico di Milano).

Internet and e-commerce users grew to over 50 million (+ 2.2%) (Source: Digital 2021, We are Social) and over a million of them connected to the internet for the first time during 2020. Between January and May 2020, new online consumers reached two million, up from 700 thousand in the same period of 2019 (Source: Netcomm). Digital payments grew by 29% in 2020 (Source: Innovative Payment Observatory, Politecnico di Milano). The use of cash declined with the growth of internet banking (+ 25%), credit cards (+ 32%) and debit cards (+ 18%) (Source: Retail Banking Excellence Benchmark of BCG).

Also on the digital Public Administration front data confirm a major increase in use of digital services:

- SPID certificates exceeded 20 million as of April 2021, almost 14 million more than 12 months before (Source: AgID);
- in March 2021 there were 19 million citizens with electronic identity card (CIE).

Payments through the the PagoPA platform also increased in May 2021 (+ 93% compared to May 2020) same period of the previous year (Source: AgID).

THE CONTEXT: ECONOMY, EMERGENCY, INVESTMENTS AND **TECHNOLOGIES**

From a health crisis, the Covid-19 pandemic has soon led to an economic crisis.

World GDP at the end of 2020 registered a decline of -3.3%. Some countries, including Italy, had a much worse contraction in domestic production. Estimates for 2021 predict a rebound at different levels across countries, within a common scenario of great uncertainty, both regarding the containment of diffusion of the virus and the extent of the effects of the various policies to support and stimulate the economy.

However, the first months of 2021 show positive signs for industrial production in our country.

Great expectations are related to the National Recovery and Resilience Plan (PNRR).



% reduction in criminal trials duration

PRTRTRT

Employed People: -1.9%

Digital transformation in the National Recovery and Resilience Plan (PNRR)

The European Recovery and Resilience Facility assigned EUR 191.5 billion to Italy for the National Recovery and Resilience Plan (PNRR). The Complementary Fund (financed through the multiannual budget deviation approved by the Council) provides for additional 30.6 billion euros. The overall combined funding of 222.1 billion euros will fund a vast package of investments and reform projects aimed to increase growth and employment rates. The relaunch action is connected to three strategic axess: digitisation and innovation, ecological transition and social inclusion. The Plan is structured in 6 Missions, 16 Clusters and 48 Lines of action (Figure 1).

In particular, among the 6 missions in which the Plan is divided, the mission "Digitization, innovation, competitiveness, culture and tourism" will count on 49.86 billion euro of funds (including complementary funds), equal to over 20% of total resources.

The Mission has three main intervention groupings: 1) the companies' and the production system's digitalization and innovation for 26,55 billion euros, with a particular focus on SMEs. This includes the strengthening of the Transition 4.0 programme with multi-year measures to promote investments in capital goods and the updating of machinery. Other interventions are focused on completing infrastructure modernization: broadband, ultra-fast fibre optic networks, 5G and satellite monitoring.

2) the Public Administration's digitalization investing

nearly12 billion euros on several fronts including a national cloud and the interoperability of PA databases. The aim is to migrate 75% of public administrations to cloud platforms and to provide 70% of Italian citizens with a single digital identity before 2026. 3) Tourism and Culture 4.0 with € 8 billion to increase Italy's attractiveness through modernization and a "Tourism and Culture 4.0 plan" euro (to which are added the funds of the program.

The second Mission "Green Revolution and the ecologic transition" is the first one in terms of dedicated funds with some 31% of the Plan's resources (69,8 billion euros) plus the budgetary planning funds, for a total of 79 billion euros. Within the Mission efforts to achieve the European Green Deal objectives, there is one specific component involving digital solutions:

Figure 1:

The National Recovery and Resilience Plan



the Energetic Transition and local mobility sustainability, aiming to increase the share of energy produced by renewable sources (in line with the European objectives), to stimulate industrial supply chains, including the hydrogen one, and to strengthen and digitalize network infrastructures.

Other Missions with a potentially high impact on digitalization are:

- Education and Research with an allocation of 33,8 billion euros;
- Health with an allocation of 20,23 billion euros to strengthen territorial networks and modernize the National Health System especially in the domains of Electronic Health Records (FSE, *Fascicolo Sanitario Elettronico*) and telemedicine.

The Plan provides for a reform strategy that should enable Italy to fill its infrastructural and technology gaps, laying down the conditions for a more rubust recovery of the Italian economy. Within the reform package, an important role is played by the ones regarding Public Administrations and the Justice system, both focusing on the issues of reorganisation and competences, as well as on a digitalization program that gives to technologies the role of strategic lever for the relaunch of the country.

THE DIGITAL MARKET

The digital market dropped across all regions worldwide in 2020.

In North America and Asia Pacific the decline was lower. Italy saw a slight -0.6% decrease in 2020 to 71.5 billion euros.

This performance resulted from a two-tier dynamics: the high growth of Digital Enablers (driven by Cloud and Cybersecurity) and the flat dynamics of the more traditional component of the market. This trend is likely to continue in the next three years, even if the digital market growth will be strongly intertwined with the implementation of the PNRR. For this reason, in the chapter, four different scenarios were drawn.

Digital Market Forecast 2021-2024 (Billion Euro)



Scenario based on 100% use of PNRR annual funding allocations

Demand for ICT experts in the ICT sector: share of some 35% of overall demand



The digital market in Italy

LThe Italian digital market was worth 71.5 billion euros in 2020 with a slight -0.6% decline over 2019. Nonetheless the digital market performed better than the rest of the economy in 2020 and its share of the GDP kept on growing up to 4.3% (it was 4% in 2017). Digital spending per employee also grew to 1,818 euro in 2020 (1,692 in 2016).

The two biggest declines were in Network Services (-6.4%) and Software (-2.3%). Software was hit by the investment freeze in the SME business segment as well as by the shift from licenses to SaaS services.

On the contrary, the trend was positive for devices and systems (+1.3%) and ICT services (+3.3%).

Devices and systems benefitted from the booming demand of laptops and mobile devices due to the COVID-19-driven remote working expansion. In ICT services a double digit growth in cloud services and flat dynamics in outsourcing services offset the negative performance in all of the other segments. Digital content kept growing in 2020, although at a slower pace compared to the previous years due to the combined effect of high growth in on-demand video online subscriptions and publishing and a major decline in digital advertising. (Fig. 2).

Figure 2: The digital market in Italy 2018-2020



Figure 3:

Forecast of the Italian digital market (2021-2024) and impact scenarios

High impact 8.5% 🔶 8.2% Medium impact Low impact Base scenario 6.9% 6.8% 7.0% 6.1% 6.0% 6.0% 5.5% 5.1% 4.8% 4.6% 4.0% 4.1% 3.5% 3.7% 2020/2021 2021/2022 2022/2023 2023/2024 % growth Source: NetConsulting cube, on PNRR data, April 2021

The impact of PNRR investments on the digital market

The growth forecasts of the digital market in next three years are heavily affected by the implementation in the PNRR and its provision of almost 50 billion euros for investments in digital technologies and solutions by 2026.

For this reason, four scenarios have been developed.

- First scenario: forecast of the evolution of the digital market without any impact of PNRR (organic growth or baseline scenario).
- · Second scenario: 100% use of the annual funds

allocation provided for by the PNRR for digital investments.

- Third scenario: 70% use of the annual funds allocation provided for by the PNRR for digital investments.
- Fourth scenario: 50% use of the annual funds allocation provided for by the PNRR for digital investments.

If funds for digital investments were used entirely starting from 2021 the market would see an incremental increase of 3.6 billion reaching 77.6 billion euros against 74 billion of baseline growth projections. This would lead to a 8,1% growth of the digital market in 2021 against a baseline forecast of 3.5% estimated without the contribution of PNRR funds. In subsequent years incremental growth is between 4.5% and 0.6% points above the base scenario growth rate, depending on whether the funds will be used in full or for 70% or 50% share. In the most optimistic hypothesis of full use of the funds for digital investments, the market will reach a value close to 95 billion euros in 2024 (Fig. 3).

The sectors that will benefit from the greatest impact from digital transition PNRR funding are Public Administration, Healthcare, Industry, Telecommunications, Travel & Transportation and Energy and Utilities.

The Public Administration is set to define its process of transformation and digitization across many areas of action, including: the creation of the National Cloud Architecture where data and applications from over 200 central administrations and 80 health units will migrate; the strengthening of Cybersecurity; the achievement of real and effective interoperability of data and systems and other initiatives aimed to ensure access to digital public services to all the citizens. Overall some \in 6.14 billion of funds have been earmarked for digitization in the public administration. Additional \in 3.61 billion have been allocated for the reform of the justice system. This makes a total of \in 9.75 billion euros, or \in 11.15 if the complementary fund from the national the multi-year budget is added (Fig. 4).

On Education and Research the Plan allocates € 30.9 billion euros, while additional funding will be added as defined in the Connected School Plan.

Around € 20.22 billion will be mobilised for healthcare, mainly targeted to the reorganization of the local healthcare system as well as to major investments in the fields of telemedicine, electronic health records, medical equipment modernization, digitalization of ER hospital clinical-care processes.

For the Industrial sector the PNRR will represent a driving force for recovery. Out of the overall \in 26.55 billion allocation some \in 18.8 billion will be addressed to strengthening Transition 4.0 and some \in 2 billion for the development of innovative production chains and internationalization. The component "Digitization, innovation and competitiveness of the production system" will focus on the SME system (\in 800 million) and on the production of microprocessors (\in 750 million). In the telecommunications sector some \in 6.31 billion will be spent for ultrafast networks with the aim of providing 1 Gigabit connection to families, businesses and schools by 2026, thus anticipating the European Digital Compass strategy by four years.

The investment for networks is coupled with the simplification of the authorization processes so to speed up the adoption across the territory, confirming the strategic value of infrastructures for fiber optic cabling and 5G coverage.

Within mission 2 "Energy transition and sustainable mobility", \notin 6.74 billion are dedicated to the Energy and Utilities sector, to increase the share of energy produced from renewable sources and another \notin 5 billion to the expansion and digitization of network infrastructures to strengthen smart grids and to interventions to improve networks resilience to climatic conditions. The use of hydrogen as an alternative source of energy represents a key component for the progressive decarbonisation in the 'Hard-to-abate' industries.

In the field of sustainable mobility some € 750 million euros will be allocated to the development of electric charging infrastructures to accelerate the transition from traditional fuel-based filling stations to refueling points for electric vehicles.

For Travel and Transportation, the PNRR dedicates a total of \in 25.40 billion to investments in the railway network (\in 24.77 billion) and on intermodality and integrated logistics (\in 0.63 billion). In particular, investments in the areas of digital monitoring of roads, viaducts, bridges and networks to enhance remote control capabilities and in the digitization of road infrastructure will have a special impact on digital security spending.

In the field of intermodality and logistics, the major impact on digital investments is expected from the digitization of the logistics chain and airports.



Figure 4: Mission 1 - Line of Action 1.1. The PNRR and the digitization of the Public Administration

7 investment areas are instrumental to achieve full digitization in the public administration:

INVESTMENT	OBJECTIVE	RESOURCES
Digital infrastructures	Ensure a cloud first approach and develop the National Strategic Pole	0.9 mld
Enabling and supporting migration to cloud	Undertake a support and incentive program for national and local public administrations	1 mld
Data and interoperability	Develop the National Data Platform, avoiding duplication of information for the public administration and minimizing citizens' efforts	0.65 mld
Identity, address, notification services and payments	Enhance existing instruments (PagoPA and IO) and implement new ones, like the unified platform for digital notifications	2.01 mld
Cybersecurity	Enable the national cybersecurity Perimeter to foster cyber defence and protect citizens	0.62 mld
Large central administration digitization	Define specific actions targeted to the digitization of the major bureaucratic nodes (i.e. justice, healthcare, etc.)	0.61 mld
Basic digital skills	To intervene in support of citizens' digital skills, to give to all the same opportunities and to complete the path to a truly digital country	0.20 mld

TECHNOLOGIES

The 2020 lockdown pushed many people to go digital and several companies to innovate and use new technologies as well as to enhance digital activities and ecommerce. This resulted in a positive market trend for ICT systems and devices and for digital content and advertising. Spending on ICT services has also been on the rise.

On the other hand, the market contracted for ICT software and solutions and network services. Digital Enablers continue to be the foundation of technology investment growth: Cloud services, Big Data solutions, wearable technologies, Cybersecurity. Blockchain and Artificial Intelligenc, among others, play a leading role in companies' digital transformation.



Digital Data Transformation Roadmap

100%

Banking and insurance and telecommunication & media are in the middle of a digital data transformation



63% of companies carry out GDPR audit annually, 15% don't



companies who do not consider it as a priority

Technologies

Similarly to previous years, the overall -0,6% digital market decline in 2020 results from a two-tier dynamics: the -1,9% decrease of the "traditional" segments outweighted by the strong 7,1% growth of Digital Enablers.

Mobile business solutions, including ecommerce and mobile banking apps, along with Cloud technologies, addressed companies flexibility requirements during the pandemic crisis and will remain crucial in the companies' digital transformation plans.

Thanks to its scalability and flexibility benefits, Cloud computing is finally recognised as a key enabling technology within the evolution of corporate ICT architectures and the increasingly pervasive digitalization of business processes.

Although Cloud solutions saw a major increase in collaboration and video-conference services to enable fast response during the Covid-19 emergency time, the adoption of Cloud services has finally started to encompass core strategic applications. As a result, Cloud solutions hit 3.898 million euros

in 2020 (+18,8%).

IoT solutions were the only digital enabler market with a negative performance in 2020 due to the postponement of several projects following the economic crisis. Nonetheless, the "Transition 4.0 plan" and the National Recovery and Resilience Plan (PNRR) fiscal incentives are expected to trigger a quick recovery (Fig. 5).

Figure 5:

Digital Enabler and Transformer Market Forecast, 2020-2024



Cybersecurity and Big Data have a smaller size compared to Cloud, IoT and mobile business, but are also forecasted to grow at a high pace (13% compund annual average growth) in the 2020–2024 period.

Cybercrime grew dramatically in 2020 as more and more attacks tried to exploit the vulnerabilities associated with the growing adoption of remote working. To overcome the threat of "borderless" organizations companies grew their investment in Cybersecurity solutions such as: VPN, Endpoint Security, Identity Governance, and Privileged Account Management. Cloud Security solutions and IoT device security also saw strong growth, driven by growingly pervasive digitalization.

Big Data solutions hit 1,150 million euro in 2020 (+8,7%). Defining a Data Strategy is one of the top priorities for the Italian companies who are engaged in a Digital Transformation process. Investment decisions were also encouraged by the stronger resilience and response to the crisis shown by the com-

panies that adopted a data-driven development strategy before the pandemic.

Wearable technologies reached 700 million euros in 2020 (+8,9%) and are expected to grow further over time thanks to the widespreading adoption across several industry sectors, driven by 4.0 paradigms as well as by the new rules of conduct urged by the pandemic..

Artificial Intelligence and Blockchain solutions are still at an initial development stage within the whole Digital Enabler landscape and will see sustained double-digit growth rate for the next few years. The surge of many new applications for processes' automation and optimization (not only in manufacturing) combined with a growing usage of machine learning technologies and Robotic Process Automation will drive Al's expansion. Blockchain Technology applications are mostly employed in the banking sector, although new pilot projects are on the rise in other industry sectors. INDUSTRY SECTORS, SMEs, REGIONS

In 2020 the digital market showed diversified dynamics across the various sectors.

Positive growth in spending on digital technologies and services was in banking, insurance, telecommunications & media, energy & utility, healthcare and the public administration. On the contrary digital spending was down in distribution and services, travel & transportation and manufacturing. The positive dynamics of large companies digital spending was not strong enough to offfset the decline in SMEs. From a regional distribution standpoint, the digital market has seen greater concentration in the North West and Central Italy.



Healthcare and **PNRR:** more investments for telemedicine, the enhancement of the electronic patient record, the modernization of the medical equipment base.

More than 200 actions defined in the Three Year IT Plan for the Public Administration

Digital goods and services spending 2020

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Public Administration

+5.2% +1.4% -5%**ěěěě**

Large enterprises

Small enterprises

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Industry Sectors

The 2020 dynamics of the digital market were diversified across industry sectors . Slower or negative trends converged in those sectors that were hit harder by the economic crisis or had a more widespread presence of "digital laggards" (especially SMEs). These sectors include Travel & Transportation, Retail/Wholesale (except large-scale organised distribution for food and consumer goods) and the least digitally advanced SMEs within Manufacturing. In these industries many digital projects (as well as other investments) were frozen because of the drop in consumer demand during the lockdown. On the contrary digital investments kept a sustained

or growing dynamics in Public Administration, Education, Healthcare, Banking, Insurance and Utilities. In these sectors the urge of keeping continuity in business and utilities processes and the growing demand for remote services and goods delivery drove higher adoption of technologies and solutions aimed to support and protect critical processes and enhance and protect digital interaction with growing masses of online customers.

Manufacturing recorded heterogenous dynamics resulting in a -4,8% decline in 2020. Investment freeze due to the falling production activity were only partially offset by the ongoing digital transformation projects and the growing adoption of Cloud computing and AI applications. Figure 6 shows the expected trends according to the baseline scenario until 2024.

The increasingly marked digitization of processes and services, also with the introduction of artificial intelligence functionalities, along with modernization of infrastructures and applications towards cloud platforms continue to be the main drivers of investment in all market sectors.

Figure 6:

The digital market by industry sector, 2020-2024



Figure 7:

The Italian business digital market by enterprise size 2018-2020

The Digital Market in SMEs and by Region

2020 has accentuated the gap that still exists in the adoption of digital technologies between SMEs and large firms, and across different geographical areas.

The expenditure of medium-sized enterprises (50-249 employees) and smaller organizations (1-49 employees) suffered a more sustained decline which resulted in a -2.4% drop for medium-sized enterprises and -5% for small ones (Fig. 7).



SMEs still show many gaps on both the organizational front and the technology endowment. According to several studies, SMEs still do not recognize a strategic role to digital technologies and their contribution in the innovation of their organizational and business model. Small and medium-sized companies stand out for lower adoption of Big Data solutions (7.3% against 27.3% of large companies), robotics solutions (7.2% against 29% of large companies) and 3D printing (3.9% vs 17.7% of larger organizations) as well of IoT devices (21.2% against 44.2% of large businesses). The gap between SMEs and large companies is also deep in the use of online sales channels. Firms with 10-49 employees are a lot less active in launching e-commerce initiatives compared to realities with at least 250 employees (15.2% against 40.2%).

From a geographical point of view, the Italian digital market is mainly represented by the expenditure incurred by businesses and citizens of the North West (35.2% of the entire market) and Central Italy (25.8%). In both areas, digital spending is highly concentrated. In the North West, NetConsulting cube estimates confirm the driving role of Lombardy, with an overall 25% share of the entire digital market. In the Center, Lazio leads in digital products and services spending (16.4% of the market total), as the most important bodies of the Central Public Administration are headquartered there together with a remarkable presence of companies and universities. The expenses incurred in the North East and in the South and Islands are characterized by a similar share of the Italian digital market, equal to 19.8% and 19.2% respectively.

THE ICT SECTOR TRANSFOR-MATION

The ICT sector has shown good resilience facing the economic and financial impact of the health emergency. The structure of companies and employees in this sector mirrors the trends and distribution of the Italian digital market.

While the number of firms in the industry and commerce sectors has dropped significantly, the number of companies in the information and communication services sector has increased in 2020. The demand for ICT professionals has grown for the most innovative ICT skills especially in software and services, while the demand for profiles linked to more traditional activities continues to drop.

A major increase was recorded also in the number of registrations of new ICT startups and innovative SMEs. In large majority these companies activities are in the fields of software and IT consulting.

Number of companies 2020 (Y-on-Y % change)



ICT sector revenue

+9.8%	ICT wholesale
+ <mark>2.6</mark> %	ICT services
<mark>+</mark> 1.8%	Hardware
-0.1%	Software
-11.9%	Telecommunications

Innovative ICT startup registrations (as of end 2020): 11,899 enterprises, +9%



ICT startup and innovative SMEs geographic distribution

29.5%	Lombardy
13.5%	Lazio
8%	Campania
7.3%	Veneto
7.1%	Emilia Romagna

2,282 Startup Milan1,237 Startup Rome259 Startup Naples

PERSPECTIVES ON THE POST-PANDEMIC FUTURE

2020 has given us a much more digital country. The pandemic has also polarized companies performance, rewarding the reaction capacity of digitally advanced organizations and penalizing non-technologically up-todate companies.

At the same time, the Public Administration awareness on the need to digitize has increased. New perspectives have opened up beyond the emergency phase and the PNRR will have to translate into a true and a real leap in the digitization process of the country, focusing on some priorities such as ultra-broadband for all, "Intelligent" industrial supply chains, the digitization of entire sectors (health and PA), innovative startups and digital skills. The large investment effort required by the PNRR is a unique opportunity not only for the relaunch of the country, but also for the relaunch of the ICT sector, thanks to the crucial role that will be played by such technologies as Artificial Intelligence, Blockchain, Big Data and Cybersecurity.

In the 2021-2024 period the average annual growth of the digital market may accelerate from a base 3,8% to 7,1%



Now it is the time to get real about

execution

More ICT researchers and more **upskilling** and reskilling

to get more ICT skills in the short time

A vision of enduring investment for more innovation for italy and from Italy.



As investment priorities have been identified and the PNRR resources allocated, it is now urgent to proceed with the execution of the interventions, qickly and with competence. From the perspective of Anitec-Assinform, the most relevant aspects on which to pay the utmost attention include ultra-broadband to all, digitization of the Public Administration and Health, the reform of the Code of Contracts, intelligent industrial supply chains through AI and Blockchain, R&D and development of innovative startups and, finally, the strengthening of digital skills.

Continuity in the governance of the public administration digitization

Acceleration of the diffusion of ultra-broadband and digitalization of the Public Administration are the pillars of Digital Italy 2026 Plan. The objectives are very ambitious, in a sector where Italy starts from far behind compared to Europe, with lower ultra-broadband penetration and lower use of digital public services by citizens and businesses.

Although investments and roles have been defined, modalities of implementation are still somewhat unclear, especially with regard to the regulation to implement the planned activities and the continuity with what has already been put in place in recent years. For example, with regard to digital infrastructure and the migration to Cloud it will be impossible to ignore what has already been implemented and the active Consip framework contracts in the SPC (connectivity public service) and Cloud services domains. The too slow progress in the migration of public systems to the Cloud certainly makes the consolidation of the around 11,000 data centers a priority. The creation of support structures and other actions are undoubtedly designed with the aim to accelerate the migration to the Cloud.

However, important elements connecting the new actions with the processes already in place need further consideration and understanding. For example it is still to be defined how technology requirements will be updated and managed trying to maintain continuity with existing cloud investments. It is still to be defined how supplier certification procedures will be updated and how the roles of the "support team" and of the NewCo will coordinate and complement each other and with the other actors of the digitalization of the Public Administration. Better understanding is also needed on whether and how the public accounting rules will be revised to encourage the adoption of "as a service" solutions.

More data valorization and skills for proactive healthcare

The Sixth Mission ("Health") of the PNRR allocates resources for the digitization objectives of networks of proximity, telemedicine facilities for territorial assistance and, more generally, innovation, research, digitization in the NHS (modernization of hospitals and Electronic Health Records).

It will be crucial to proceed not only with the reform of proximity healthcare services, but also with the redevelopment of the territorial units (structures, equipment, telemedicine) in really integrated territorial systems dedicated to chronic conditions, able to create healthcare journeys "designed around the patient", thanks to the integration of the data collected across the various care units and settings. Investments in Electronic Health Records aim to overcome the weakness derived from being the last link in a chain of a still uncomplete digitization. The accessibility and valorization of health data still faces two major obstacles: the shortage of data science professionals and the low accessibility of data themselves. To ease data accessibility, a new institutional structure will be defined by the end of 2022 (bill by end October 2021) to foster prevention in the health and environmental and climatic fields. In general, however, a strategy is needed to create a "heathcare data space" with defined methods and secondary usage options. Regulation is also needed to contextualize anonymous or anonymizable health data as an object of study of a population, define the methods of creation and management of these data, and establish the necessary regulation of processes. A more effective organization needs to be set up too, to encourage interaction between the actors involved, the sharing of standards, the generation of synergies for skills development. Last but not least technology will enhance and disseminate innovative methodologies.

New models of digital project management in ICT procurement

Along with investments it is necessary to create or guarantee the context so that, with digitalization, the Public Administration really makes a difference, and interaction with public bodies becomes the trigger of ever faster and pervasive digitization processes in the population and in the entire economy.

To achieve this, the government has set the priority to reform of the Code of public contracts, so that investment plans of the individual Missions can benefit from more efficient and timely purchasing processes and methods.

Through the proxy bill approved in June 2021 by the Council of Ministers and intended to reform the current Code in full, the qualification of the contracting authorities will have a crucial role in ICT procurement activities and will lead to both a reduction in their number and higher quality and specialization of the staff.

Particularly significant for the enhancement ICT procurement will be the measures on the use of databases for the qualification of operators, the continuous updating and strengthening of the database of contracts and the qualification and digitization of Central purchasing bodies (with the implementation of a e-platform as a basic requirement to participate to the national assessment of procurement capacity) in addition to the alignment with the requirements of the EU directives of maximum adherence to the principles of transparency and competitiveness, so to effectively ensure equal access to tenders (also for SMEs). The overarching objective is not only to simplify, digitize and accelerate the whole procurement cycle, but also to create and guarantee the context, skills and governance systems necessary for a fast widespreading adoption of new digital project management models.

Specific strategy and investments for Artificial Intelligence and Blockchain

In the PNRR there is limited space, both in terms of focus and of resources, on Artificial Intelligence and Blockchain, despite their remarkable potential as a digitalization tool in industrial supply chains as well as in the world of public services and in society at large. The lack of references to these technologies also stands out as the alignment and coordination with the European guidelines are missed. The application areas associated with possible uses of these technologies include recruitment processes, purchases by public administrations, improvements in the quality of regulation, contrast to tax evasion and illegal dumping of waste, tourist behavior analysis. These represent only a small share of the several possible application areas in other equally important chapters of the Plan, from supply chains (pharma, agrifood, fashion) to education and research, from mobility, to healthcare.

While the spectrum of applications of Artificial Intelligence to the industrial and non-industrial world is widely known, for Blockchain it is worth highlighting these uses (considering the enabling characteristics of the technology itself): auditability and certification, dtata interoperability and control; decentralized automation of controlled processes ("Smart Contracts").

Dedicated strategies and investments would allow industrial supply chains (but also public administration and healthcare processes) to make the most of the possibilities offered by artificial intelligence and blockchain technologies. They would also quickly enable innovators and investors in these technologies to achieve competitive economies of scale and of scope so to be able to govern or at least influence the markets and avoid a too high technological dependence on other countries.

ICT sector enhancement through more focus on R&D and ensuring critical mass for innovative ICT startups The definition of the areas of intervention and the



funding levels confirm the determination to create a solid synergy between research and the production system, trying to rebalance the R&D activity towards a greater contribution from applied research and a higher level of technology transfer, through the establishment of public-private partnerships and joint research and development initiatives.

The increased use of collaborative R&D initiatives responds to the aim to increase the historically low propensity of private SMEs to invest in internal R&D or in startups and innovative SMEs participating in aggregation initiatives along industry or production chains.

We find all our desired lines of intervention regarding research, development and innovation (RS&I) for ICT: more resources (even if not yet at the appropriate level), enhancement of innovative public procurement, strengthening of the human capital and expansion of partnerships.

There is also good news on the front of innovative startups with the allocation of a euro 300 million funding for startups, to supplement the National Fund for Innovation - CDP Venture Capital aiming to support 250 innovative SMEs with investments for 700 million euros (average equity investment of 1.2 million). While we agree with the method, we need a better understanding of "how much" and "how" this investment can be effectively directed towards RD&I in ICT, addressing the traditional weaknesses of fragmentation and lack of venture capital.

More ICT researchers and higher upskilling and reskilling effort for more ICT skills in the short term The National Plan for Recovery and Resilience clearly shows across all relevant areas the willingness to move from a reactive to a conscious and proactive approach to skills, to strengthen the so-called "economy of knowledge "and bridge the mismatch between school and work.

Particularly important, from our point of view, are several measures for the digital transition (to improve digital culture and digital skills in all professions) and for the strengthening of the ICT industry (with the increase in the number of ICT professionals). The implementation of this training plan has to be fast both in preparing future generations (promotion of STEM areas, from ITS-Istituti Tecnici Superiori to university) and in retraining the current workforce (active and not). The fundamental question will be therefore a scenario one: to accelerate on digital transition not only networks and technologies will be necessary but also more "makers" and "users" with the adequate digital skills.

Particular attention must be paid to the initiatives of lifelong lerning, those that more realistically will be able to spread digital culture and skills on a large-scale basis in the short term (1-2 years).

Expectations are quite high on the impact of reskilling and upskilling initiatives in the public administration, healthcare and industrial supply chains (training 4.0 tax credit, managerial training in SMEs, tax wedge cut for employees in CIG-Cassa Integrazione Guadagni redundancy fund, training for the unemployed and lifelong learning).

With a view to strengthening and developing the Italian ICT supply chain with more innovation, it would have been desirable to see a greater financial commitment on recruiting staff in ICT R&D and for a greater increase both in the number of doctorates and in the average fees for researcher. A vision of enduring investment for more innovation for italy and from Italy

The large investment effort committed by the PNRR constitutes a unique opportunity not only for the relaunch of the country, but also for the relaunch of the ICT sector, thanks to the crucial role that such technologies as Artificial Intelligence, Blockchain, Big Data and Cybersecurity will have.

For this to happen, the post Covid-19 strategy must be supported by a vision of enduring investment that enhances the role of these technologies in the transformation of processes and services, timely preparing the basic and advanced digital skills necessary to reap the benefits of digital, and stimulating the creation of virtuous ecosystems that help mitigate territorial differences and improve sustainability and inclusion.

It is therefore very urgent to use the investments allocated by the PNRR for digitization in the best way possible, trying to optimize prospected tools and mechanisms to achieve greater innovation from our ICT supply chain, especially by strengthening the introduction of new researchers, triggering pervasive adoption of digital solutions through public services, accelerating the creation of human capital, helping innovative ICT startups to scale the critical mass needed to attract greater venture capital.

These areas do not exhaust all the priorities of the PNRR, but we believe they should inspire the government choices in the phase of resource allocation and project implementation, being aware that an adequate competitive positioning of the country system, both in exploiting and in producing innovation, represents an insurance for the future, for the growth and the safety of businesses, people and institutions.







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