

DIGITISATION

Sectoral Strategic
Guidelines



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THE 10 FIELDS OF ACTIONS OF CDP 2022-2024 STRATEGIC PLAN



ENERGY
TRANSITION



CIRCULAR
ECONOMY



SAFEGUARDING
THE TERRITORY



SOCIAL
INFRASTRUCTURE



CAPITAL MARKET



DIGITISATION



TECHNOLOGICAL
INNOVATION



SUPPORT TO
STRATEGIC SUPPLY
CHAINS



INTERNATIONAL
COOPERATION



TRANSPORT /
LOGISTICS NODES

KEY MESSAGES

- In 2021, in line with the National Recovery and Resilience Plans, the European Commission adopted the **Digital Compass**, which defines clear targets for 2030 in four main policy areas to support the digital transition: skills, infrastructure, digital transformation of businesses and the digitisation of public services.
- Italy has taken numerous initiatives to support the country's digitisation, in an attempt to reduce certain **weaknesses** that could slow down the market's development, hindering the achievement of national and European objectives. Indeed, Italy ranks **20th among the EU Member States** in the 2021 edition of the Digital Economy and Society Index (DESI) in terms of digitisation.
- The objectives set by the Digital Compass for 2030 are ambitious and require Italy to take important steps to close some **gaps with other Member States**. These efforts will have to focus, in particular, on **the enablers of digitisation**, i.e. **ultra-broadband and 5G coverage**, and **digital skills**.
- In this context, four **priority areas** are identified to bridge the existing gaps and facilitate the country's digital transition:
 - ▶ **development of connectivity infrastructure**. Supporting the homogeneous deployment of connectivity in the country, ensuring service levels through future-proof technologies; supporting the development of state-of-the-art connectivity technologies for the development and competitiveness of strategic industrial sectors, such as Stand-Alone 5G and private 5G connectivity networks;
 - ▶ **digital transformation of businesses**. Supporting investments in intangible digital tools (e.g. management licences and software), necessary for the digital transformation of processes; facilitating the acquisition of basic and specialised skills through the financing of specific training courses;
 - ▶ **digitisation of Public Administration**. Supporting the digitisation of Public Administration, including through support to cloud migration; facilitate the adoption of IoT systems; and promote the interoperability of systems. Finally, promoting the dissemination of basic (and specialised) digital skills among civil servants;
 - ▶ **strengthening digital security**. Consolidating the market of cybersecurity operators, also by strengthening national major operators; strengthening systems to support cybercrime prevention and investigation activities by supporting both government and businesses in adopting adequate prevention systems.
- In this context, CDP can intervene, according to **additionality and complementarity criteria**, helping to fill the **investment gaps** typical of the sectors and territories subject to intervention, in which market operators are unable to mobilise adequate resources, as well as **providing support to Public Administrations** in digital transformation projects and processes.
- To ensure transparency and accountability of decision-making processes, CDP aims to measure the quality and impact of the supported actions. To this end, CDP uses a **set of KPIs** for monitoring and evaluating each field of action.



1. Context

1.1 European targets for digitisation

1.2 Italy's positioning: strengths and gaps to be bridged

1. CONTEXT

1.1 EUROPEAN TARGETS FOR DIGITISATION






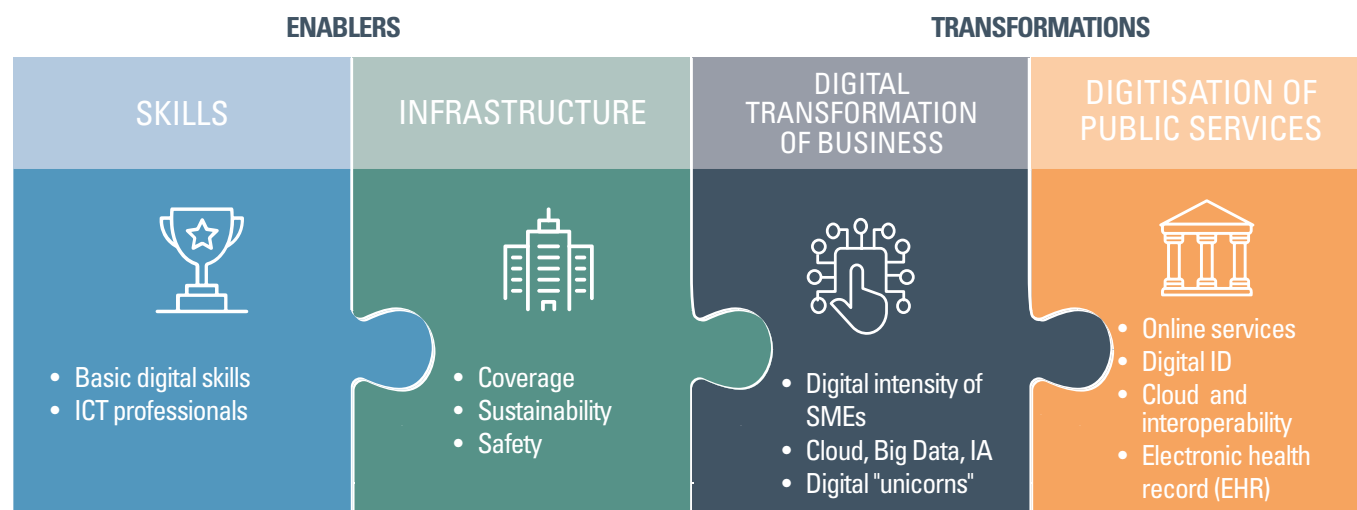
-  The **digital transition**, along with the “green” one, is one of the pillars of **the so-called “twin transition”** and is a fundamental prerequisite for achieving a climate-neutral economy (i.e. the so-called “net zero”) by **2050**¹.
-  Over time, digitisation objectives have become a priority for the EU Member States, including Italy, to the point of gathering numerous indications directly from the European Council in the context of the Country Specific Recommendations².
-  As early as **2014**, the European Union launched a regulatory and strategic path to facilitate the development of infrastructure and enabling technologies for environmental sustainability, citizen inclusion and business development³. These initiatives concern the areas considered most strategic for the so-called “**Digital Decade**”, including open data, cybersecurity, the digital single market and artificial intelligence.
-  In **2020**, with the Von der Leyen’s presidency and the acceleration brought about by the pandemic emergency, the European Commission adopted a real **Strategy for Shaping Europe’s Digital Future**⁴, aimed at ensuring that new technological solutions facilitate the digital transformation, contributing to the consolidation of Europe’s role as a global leader in this field.
-  Finally, in **2021**, in order to respond to the need for a medium-term plan, and in line with the National Recovery and Resilience Plans, the European Commission further strengthened its action through the strategy “Europe’s digital decade: digital compass” (in short, “**Digital Compass**”), which will be approved by Parliament and the Council by the first half of 2022⁵.
-  The Digital Compass defines **four areas of action**, identifying targets for each Member State and specific KPIs to measure the effectiveness of the planned actions (Figure 1).
-  The policies **aim to support the demand and supply of digitisation**, promoting measures to stimulate both the development of enabling factors, i.e. skills and infrastructure; **and key transformations and reforms** such as the digitisation of the Public Administration and businesses.

FIG. 1 – DIGITAL COMPASS: THE FOUR POLICY AREAS OF THE EUROPEAN STRATEGY⁶



Source: CDP elaboration on European Commission, 2021

¹ European Commission, Shaping Europe’s digital future, <https://digital-strategy.ec.europa.eu/en>

² See, for example, the Council recommendations for Italy in the 2021 Spring Package, <https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1591720698631&uri=CELEX:52020DC0512>. New recommendations are expected in spring 2022, after the suspension linked to the roll-out of the Recovery and Resilience Plans.


³ European Commission, Digital Strategy, <https://digital-strategy.ec.europa.eu/en/policies>

⁴ European Commission, Shaping Europe’s digital future, <https://digital-strategy.ec.europa.eu/en>


⁵ For information and data relating to the Digital Compass, including the KPIs and the objectives mentioned in this document, see: https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/europes-digital-decade-digital-targets-2030_en; for the Communication from the European Commission to the Parliament and the Council, see: COM(2021) 118 final, 2030 Digital Compass: the European way for the Digital Decade.

⁶ Figure 1 does not include all the indicators envisaged in the Digital Compass, as they either go beyond the scope of this document or are analysed in the “Strategic Sectoral Guidelines for Technological Innovation” document.

ENABLERS


 **Digital skills** (“A digitally skilled population and highly skilled digital professionals”) are the first tool and prerequisite for achieving the other three macro-objectives of the European strategy. To make digital services widely adopted, it is essential that citizens and businesses have the skills to be able to effectively understand the benefits and then use them, fostering a virtuous cycle between supply and demand. In this perspective, the Digital Compass defines two European targets for 2030:


- from the point of view of stimulating demand, the percentage of the adult population (16-74 years) with **basic digital skills** should reach at least 80%⁷, with an increase of 24% compared to 2021;
- from the point of view of the skills needed to strengthen the digital supply, the number of **ICT professionals** is expected to increase from the current 8.4 million (about 4% of the workforce) to as many as 20 million (about 11% of the workforce) by 2030, with a substantial equalisation between men and women, thus contributing to the reduction of the digital mismatch between demand and supply of highly digital workers.

 Along with skills, **digital infrastructures**⁸ (“Secure and performant sustainable digital infrastructures”) is the second tool; i.e. the technological prerequisite for the full socio-economic inclusion and participation of citizens and businesses. The European strategy identifies three pillars underpinning the design of connectivity infrastructures for 2030:

- **coverage.** The EU hopes for total household coverage by Gigabit networks by 2030, currently standing at 59%. Coverage to **be further strengthened by 5G coverage**, in 2021 standing at only 14% of inhabited areas;
- **sustainability.** Challenges related to digital transformation require data management and processing infrastructure ensuring high capacity and wide coverage. However, **current technologies have a high impact in terms of energy consumption**, in contrast to the net-zero objectives⁹. In this regard, it is necessary to strengthen existing cloud infrastructure, both in terms of capacity and in terms of sustainability;
- **security.** The vast **amount of data produced in Europe** is currently **stored and processed outside Europe**. This inevitably entails cybersecurity risks, with increased network vulnerability, and thus an increase in breaches. To date, **European cloud service providers hold only a small market share**, equal to 16% of the total in 2021, down from 27% in 2017, despite a constantly growing market in the last five years¹⁰. In order to increase the capacity, resilience and cloud security in Europe, it is therefore necessary to invest in the development and implementation of data processing technologies based on **decentralised cloud infrastructure**. In this regard, the Digital Compass aims on the one hand to create **10,000 peripheral nodes**, capable of ensuring more secure and sustainable data processing; on the other, to make available (by 2025) the first **European quantum computer**, a key technology to ensure, among other things, the security of information and shared data. There are many potential applications, in areas of strategic importance such as the digitisation of the Public Administration, whose services are generally characterised by a high concentration of sensitive information. The “**Gaia-X**” initiative¹¹, along with the more recent “**Structure X**”¹², both promoted at European level, set themselves the goal of creating an **ecosystem for the construction of a cloud architecture based on decentralisation**.

TRANSFORMATION

 The **digitisation of public services** is a prerequisite for democratisation and the implementation of inclusive citizenship. For example, electronic voting, electronic health records, telemedicine; payments by the Public Administration (e.g. welfare contributions) and payments to the Public Administration (e.g. local taxes).

 In addition, more easily accessible **public services for businesses** also mean a potential reduction in bureaucracy, in efficiency and simplification of processes, e.g. authorisation or verification, with an important reduction in the administrative burden for businesses.

⁷ The European objectives mentioned in this report refer to targets estimated at the average level among European countries.


⁸ The Digital Compass also provides a specific target for European semiconductor production. This aspect is not analysed in the “Strategic guidelines for digitisation” document as it is already widely covered in the “Strategic guidelines for technological innovation” document.


⁹ The Fondazione Politecnico di Milano has calculated that a traditional datacentre can consume 3,000 kW, roughly the same as 1,000 apartments.


¹⁰ Synergy Research Group, 2021.

¹¹ <https://www.gaia-x.eu/>

¹² <https://www.gaia-x.eu/news/structura-x-lighthouse-project-european-cloud-infrastructure-launched-concrete-implementation>

 The EU faces many challenges in the area of digitisation of the Public Administration, which can be achieved on the one hand through greater **integration of cloud technologies and the achievement of full interoperability**, in the spirit of Gaia-X, as well as through the rationalisation of data exchange processes. On the other, objectives can be achieved through the **adoption of a digital identity**, a secure and directly manageable tool for citizens to access a range of online services.

 According to the Digital Compass, all citizens and businesses should have online access to the main public services¹³ by 2030, leveraging platforms to integrate, even at the local level, data and information to provide more advanced services for the development of urban and rural communities (e.g. **smart transport systems**, more advanced **waste collection** systems, **smart parking**).

 A specific objective is also assigned to **public services for the telemedicine**¹⁴: all European citizens must have access to the Electronic Health Record by 2030, as an enabling tool for services linked to prevention and to the reduction of chronic conditions; with specific objectives both for general practitioners (85% of them must have access to the Electronic Health Record by 2025) and for Regions and Autonomous Provinces, which must adopt the Electronic Health Record by the first half of 2026. In this regard, and to underline the relevance of this objective, the European Commission has recently launched the European Health Data Space¹⁵, in order to foster the creation of a single market for health products and services at the European level; to harmonise health policies between Member States, but also to develop the growth potential of the «data economy» applied to the health sector.

 With regard to **digital identity**, the objective to be achieved by 2030 is to cover **80% of the European population**.

 **Businesses also face many challenges to digitisation**, particularly SMEs. By 2030, European companies will have to:

- increase the **level of digital intensity**, i.e. the level of use of digital tools within the company, with 90% of SMEs having to reach at least a basic level¹⁶;
- increase **the use of cloud technologies, artificial intelligence and Big Data** to 75% of European businesses¹⁷.

¹³ Primary public services are those related to career, study, family, periodic commercial operations, and removals.



¹⁴ Telemedicine refers to all those digitised services involving the provision of healthcare services at a distance, such as teleconsultation, tele-referral, telehealth, telemonitoring. For a complete list, see: "Indicazioni per l'erogazione di prestazioni e servizi di teleriabilitazione da parte delle professioni sanitarie", adopted by agreement at the State-Regions Conference on 18 November 2021 (Record of Acts No. 231/SRC): <https://www.statoregioni.it/media/3221/p-3-csr-rep-n-215-17dic2020.pdf>

¹⁵ https://ec.europa.eu/health/ehealth-digital-health-and-care/european-health-data-space_en

¹⁶ For the complete list of digital technologies used to build the digital intensity index, see: https://digital-agenda-data.eu/datasets/digital_agenda_scoreboard_key_indicators/indicators#ebusiness

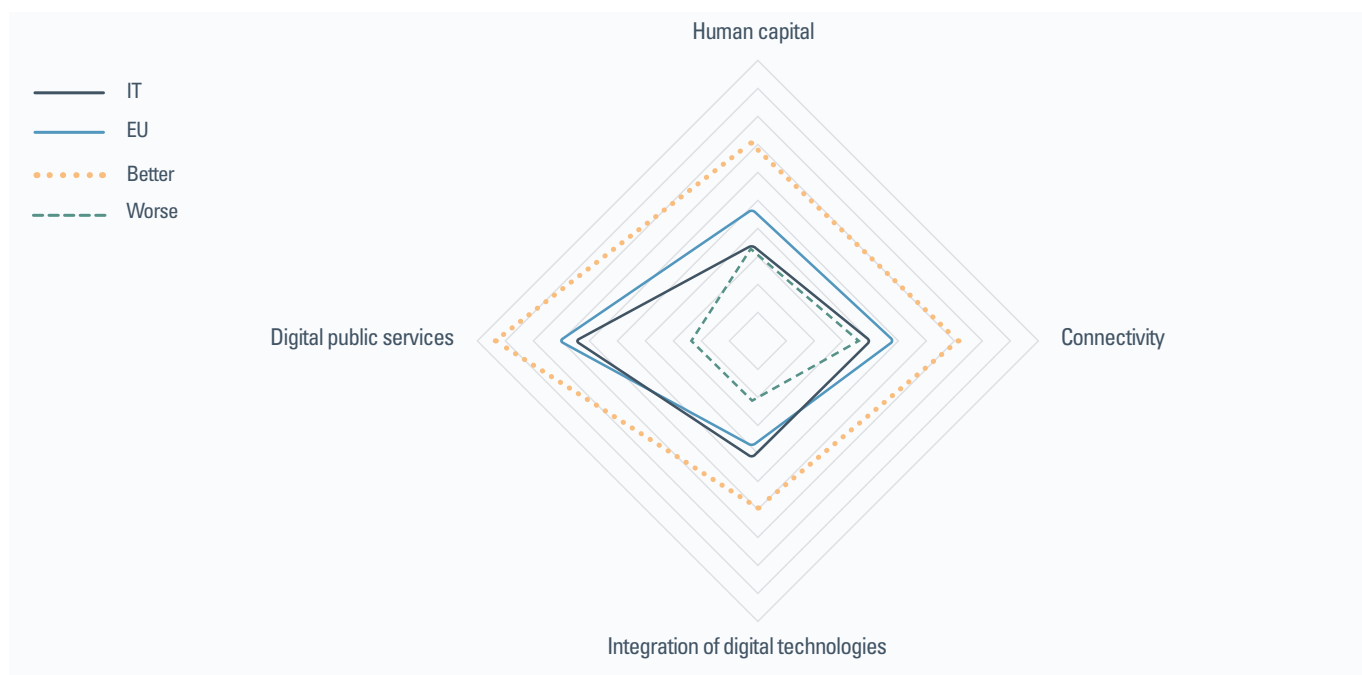
¹⁷ For the sake of completeness, the Digital Compass also includes a further European-wide target concerning businesses, namely, to double the number of "unicorn" start-ups in Europe to 122 in 2020. "Unicorn" start-ups are those organisations that have achieved a valuation of 1 billion dollars or higher, although they are not yet listed on the stock exchange. For more details on these aspects, please refer to the "Sectoral Strategic Guidelines for Technological Innovation" document.

1.2 ITALY'S POSITIONING: STRENGTHS AND GAPS

 Strengths	 Gaps
<p>Ultra-broadband white areas in implementation phase with good coverage of interventions</p> <hr/> <p>Relatively high 5G readiness rate (i.e. 60% of the assigned spectrum)</p> <hr/> <p>Digital intensity of Italian SMEs above the European average</p> <hr/> <p>Public Administration Cloud: National Strategic Hub under development</p>	<p>Ultra-broadband grey areas lagging behind and at risk of lack of resources</p> <hr/> <p>5G network coverage levels below the European average</p> <hr/> <p>Digital skills, both general and specialist, still below the European average</p> <hr/> <p>E-government (i.e. online public services) still low, with a shortage on the supply side, but above all on the demand side of citizens, including telemedicine services</p> <hr/> <p>Maturity of cybersecurity still heterogeneous among public and private companies</p>

 The 2021 edition of the Digital Economy and Society Index (DESI)¹⁸ allows for analysing the Italian context with respect to the four cornerstones of digitisation policies. In 2021, Italy **ranked twentieth among the EU countries** in terms of digitisation, obtaining a score of 45.5 compared to 50.7 of the European average¹⁹. Of the four components, it is the level of basic digital skills that weighs most heavily. In fact, Italy has a higher index than Romania and Bulgaria only, being among the lowest at European level (Chart 1).

CHART. 1 – DIGITAL ECONOMY AND SOCIETY INDEX: THE POSITIONING OF ITALY WITH RESPECT TO THE EU



Source: CDP on European Commission data, 2021

¹⁸The Digital Economy and Society Index data reported in in this document refer to the 2021 release, or to previous editions, where explicitly indicated. All data is available at this link: <https://digital-agenda-data.eu/datasets/desi/visualizations>. For more information on the features of DESI, see: <https://digital-strategy.ec.europa.eu/en/policies/desi>

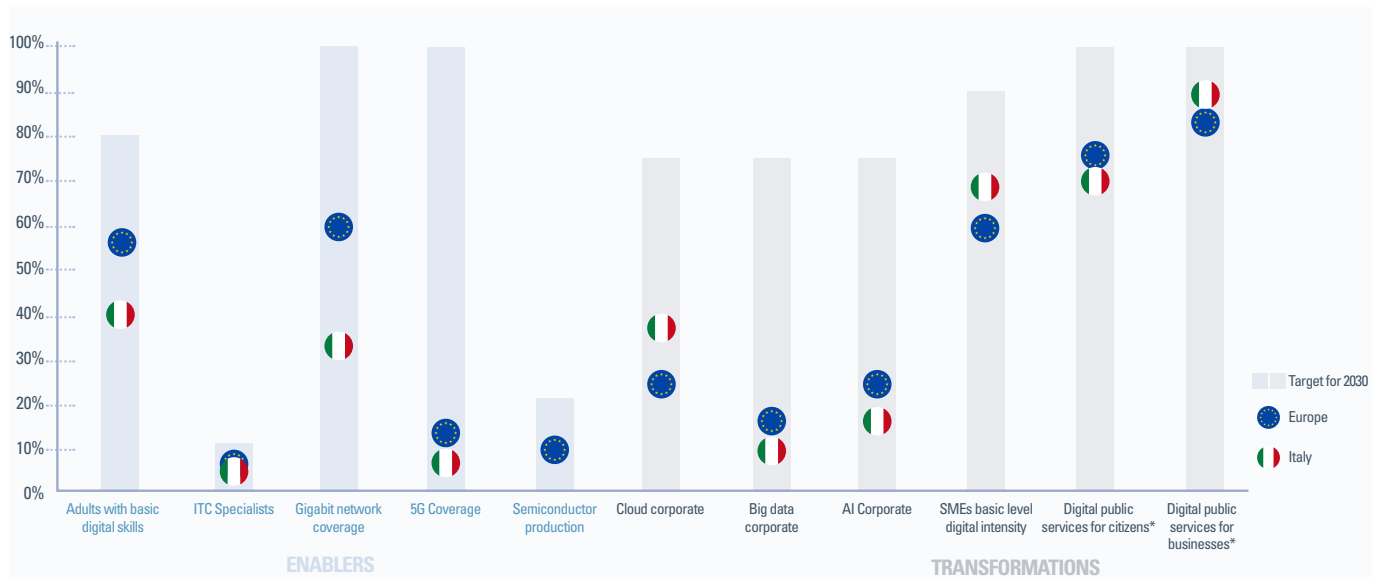
¹⁹Unless otherwise specified, the Digital Economy and Society Index and its components are to be considered at base 100.

On the other hand, the level of **digital intensity of Italian SMEs** (69%) is well above the European average (60%). Also thanks to the introduction of mandatory electronic invoicing and the related legislative measures implemented between 2014 and 2019, Italy ranks tenth in Europe in terms of companies' integration of digital technologies. However, we are still **far from the European average when it comes to the use of Big Data, Cloud services, AI, e-commerce** and the adoption of **specific digitisation measures to reduce environmental impact**.

A **greater propensity of companies to invest in tangible assets related to digitisation, rather than intangible ones**, such as research and development and training, also emerged from the latest census of Italian companies, which confirms the most recent data that only 15% of Italian companies provide digital training to their employees, compared to a European average of 20% of companies.

The objectives set by the Digital Compass for 2030 are ambitious and require Italy to take important steps to close some gaps with other Member States. These efforts should focus, in particular, on the enablers of digitisation (Chart 2).

CHART. 2 – DIGITAL COMPASS: ITALY AND EU, 2021²⁰



Source: CDP on European Commission, 2021; Eurostat, 2021; Agenzia per l'Italia Digitale (Agency for Digital Italy), 2022

*The scale for the two indicators related to digital public services is to be read as a score from 0 to 100 and not as a percentage. Note: the digital identity indicator does not have a baseline for all Member States. However, a benchmark analysis limited to some States is made available by the Digital Innovation Observatories of the Politecnico di Milano²¹.

In response to the European strategies, as well as the pandemic crisis, the Italian National Recovery and Resilience Plan has already adopted numerous initiatives for the digitisation of the country, earmarking about 27% of the available resources allocated to the digital transition²².

In this context, the Ministry for Digital Transition (MITD) has prepared the **"2026 Digital Italy"** strategy, with the ambition of positioning Italy in the leading group in Europe (Figure 2).

The "2026 Digital Italy" strategy is developed along two main axes: the first concerns digital infrastructures and ultra-broadband; the second concerns all measures aimed at the digital transformation of the Public Administration.

²⁰ Chart 2, as well as the commentary available in the text, do not include all the indicators included in the Digital Compass, as they are either beyond the scope of this document or are analysed in the "Sectoral Strategic Guidelines for Technological Innovation" document.

²¹ <https://www.osservatori.net/it/ricerche/infografiche/digital-identity-dont-stop-it-now-infografica>

²² Presidency of the Council of Ministers, National Recovery and Resilience Plan, 2021.


FIG. 2 – THE 2026 DIGITAL ITALY STRATEGY: OBJECTIVES FOR 2026

ULTRABROADBAND CONNECTION 100% OF HOUSEHOLDS	ONLINE PUBLIC SERVICES 80% OF ESSENTIAL PUBLIC SERVICES	CLOUD ADOPTION FOR THE PUBLIC ADMINISTRATION 75% OF THE PUBLIC ADMINISTRATIONS
DIGITAL IDENTITY 70% OF THE POPULATION	DIGITAL SKILLS 70% OF THE POPULATION	

Source: CDP on MITD, 2021

ULTRABROADBAND CONNECTION (100% OF HOUSEHOLDS)

 The 2026 Digital Italy strategy aims to cover **100% of Italian households through ultra-broadband networks with at least one gigabit**, anticipating the European target for 2030, as well as the development and deployment of the 5G mobile network.

 To achieve this goal, in recent years, Italy has introduced a mix of regulations and public policies for the pursuit of connectivity objectives, acting as a stimulus to both demand and supply. From the point of view of the supply, the **National Ultra-broadband Plan ("BUL Plan")**, in its latest version published in May 2021, represents the main operational tool for achieving the European objectives. The BUL Plan identifies three areas of action:

- **"white areas"**, also called "market failure areas", i.e. areas of the country lacking ultra-broadband connections and where private operators do not intend to invest in network deployment in the near future²³. These actions concern areas in 94% of Italian municipalities (7,416 municipalities), covering about 8.4 million housing units, and involve direct public intervention through State aid, totalling 2.8 billion in public resources²⁴. The implementing entity is Infratel Italia S.p.A., an in-house company of the Ministry of Economic Development (MiSE)²⁵, which then entrusted the implementation of the actions to the concessionaire OpenFiber S.p.A.;
- **"grey areas"**, also called "technological failure areas", in which there is a private operator that already has or intends to invest in the development of infrastructures in the near future. In this case, intervention by the public sector as a result of market failure would be justified in order to limit the risk of negative externalities, such as low quality of service (e.g. poor connectivity), as well as service price mechanisms typical of monopolistic markets, with high prices and lower-quality performance compared to those in other similar areas of the country. The actions concern areas located in 43% of Italian municipalities, for 7 million housing units²⁶.
- **"black areas"**, or "competitive areas", in which at least two ultra-broadband network companies are already present or will be investing in the development of infrastructures in the near future. State intervention is therefore not admissible, unless specifically authorised by the European Supervisory Authority, as it would distort market competition. For these reasons, actions under the Ultra-broadband Plan in these areas are limited to actions on the demand side, through incentives for end-users in the form of vouchers²⁷.

²³ The reference period is defined by the European Commission as a time horizon of 3 years from the publication of the State aid measure (Communication of the European Commission 2013/C 25/01 on "EU Guidelines for the application of State aid rules in relation to the rapid deployment of broadband networks"). Market operators' intentions were collected by Infratel Italia S.p.A. through consultation, which, starting from 2019, is launched every year, to update the coverage of the areas of the country.

²⁴ The notification of State Aid SA.41647 (2016/N) for the White Areas Plan, approved by the European Commission by decision C (2016) 3931 final of 30 June 2016, provided for an eligible cost of 941 million euro for actions in white areas. With the update of the Ultra-broadband Strategy in 2021, however, the MITD and MiSE revised the allocations also on the basis of the EU resources made available under the EU Funds (FSC, ERDF, EAFRD).

²⁵ Infratel Italia (Infrastrutture e Telecomunicazioni per l'Italia S.p.A.) is a company supervised by the MiSE and part of the Invitalia Group, which holds 100% of the ownership. Founded in 2005, it is the implementing entity of the Government's Broadband and Ultra-Broadband Plans.


²⁶ Under the State aid rules, in January 2022 the European Commission authorised investments in grey areas under the National Recovery and Resilience Plan, recognising the need to intervene in response to market failures.


²⁷ With respect to the subdivision and definition of the Areas adopted by the European Commission in 2013 with Communication 2013/C 25/01, as part of the Ultra-broadband Plan, Italy has partially redesigned the classification, providing for 4 "clusters" to adequately subdivide the Italian territory. For more information, see: https://www.mise.gov.it/images/stories/documenti/ITALIA_Strategia_BUL-Pia-no_di_investimenti_fin.pdf

 The Ultra-broadband Plan has enabled Italy to make some progress in terms of both better coverage and network development. However, the **fibre implementation rate has slowed down** between 2019 and 2020. To date, only 266 municipalities in the white areas have reached the CUIR (Network Plant Completion Communication) stage, **showing a delay to the initial plan**²⁸.


 Not surprisingly, the 2021 DESI, referring to 2020 data, places Italy in 23rd place among EU Member States in terms of connectivity²⁹. To fill this gap, the resources allocated by the “original” Ultra-broadband Plan of 2015 were subsequently integrated by the National Recovery and Resilience Plan and the **“National Strategy for Ultra-broadband”**³⁰. The resources are deployed into two stages:


- the first, which provides for **state aid in white areas**, with a mix of actions for the construction of **fixed network infrastructure and the deployment of the 5G mobile network**³¹. Although it is still in the implementation phase, this first stage is experiencing significant delays (e.g. extensions to calls for tenders, relatively slow administrative procedures and authorisation processes)³² which risk jeopardising the full achievement of the objectives. Although the intervention is focused on a band less fast than that of the most recent “Italy 1 Giga Plan”³³, it still represents a step forward for reaching the coverage target envisaged by the Ultra-broadband Plan updated to 2021;
- the second mostly concerns grey areas, together with those white areas that have still not been connected according to Infratel most recent mapping dated December 2021. The **“Italy 1 Giga Plan”** is concerned with these interventions, for which the tenders are being awarded, and represent the keystone for the achievement of national and European objectives (i.e. 100% of households covered by at least one Gigabit connection). The resources earmarked for this phase of the Plan amount to 3.8 billion euro³⁴, through the National Recovery and Resilience Plan, and envisage co-participation by the private sector equal to at least 30% of required investments.


 With regard to mobile networks, despite the relatively high rate of preparation for 5G in Italy (60% of the total harmonised 5G spectrum already allocated versus 51% of the European average), only 8% of inhabited areas were covered by 5G in December 2020, a figure lower than the EU average of 14%³⁵.


 In this regard, the 2026 Digital Italy strategy has provided for a specific **Plan**, called **“5G Italy”**, which aims at developing and distributing the 5G infrastructure, with reference to areas of market failure for mobile connection (i.e. areas of the country with 3G connection only and in which the development of 4G or 5G networks is not planned by any private operators). The resources allocated for 5G through the National Recovery and Resilience Plan amount to 2 billion euro. The Plan provides for lines of intervention financed up to 90% of the total cost, and concern two different streams: the first for the realisation of fibre-optic links based on existing 4G networks; the second for the realisation of new mobile network infrastructure.

DIGITAL PUBLIC SERVICES (80% OF ESSENTIAL PUBLIC SERVICES)

 As far as **digital public services** are concerned, while the supply by government entities is increasing, delays are experienced in the actual use of e-government, with only 36% of internet users using it, against a European average of 64%.

 The **2026 Digital Italy** strategy envisages the provision of at least 80% of all **essential public services online** by 2026, both for citizens and businesses, as an intermediate target to the 100% envisaged by the European Digital Compass.

 The usage of services made available through the **AppIO** app can be considered a proxy³⁶. Almost 7,000 public bodies, national and local, joined the App in 2021, for a total of 77,000 new services made available through the channel³⁷.

 In this context, it is relevant to mention the level of implementation of telemedicine services. For example, with regard to the electronic health record, in the first quarter of 2022, all Italian regions had activated the dashboard, albeit with some differences in the level of implementation of services.

²⁸ Infratel Italia, Progress status of the Strategic Plan for Ultrabroadband as of 31 December 2021.

²⁹ European Commission, Digital Economy and Society Index (DESI) 2021, Thematic chapters, 2021.

³⁰ MITD, MiSE, Strategia Italiana per la Banda Ultralarga “Verso la Gigabit Society”, May 2021.

³¹ As will be seen later in the document, the development of 5G technology is the subject of a specific Plan, called “5G Italy”.

³² For further information, reference is made to paragraph 2.2 of this document.


³³ <https://innovazione.gov.it/notizie/articoli/reti-ultraveloci/>

³⁴ MITD, MiSE, Strategia Italiana per la Banda Ultralarga “Verso la Gigabit Society”, May 2021; National Recovery and Resilience Plan.

³⁵ Data referring to 2020 and collected by the European 5G observatory on the basis of the consortium’s own research and national authorities’ reports.


³⁶ The app AppIO is a tool developed by PagoPA S.p.A., aiming to create a common platform for the provision of public services. For more details and information: <https://io.italia.it/>

³⁷ To date, about 54% of Italian public bodies provide at least one service through the app AppIO.


 Looking at the development of telemedicine services, in 2018, the year of the last census by the Ministry of Health, 282 ongoing telemedicine experiences were reported. Of these, 33% were delivered partially using telemedicine; 28% were delivered entirely remotely, and the remaining were still at pilot stage.


 Finally, the enhancement and development of the digital infrastructure for the Public Administration is closely linked to the ability to deliver public services online.


PUBLIC ADMINISTRATION CLOUD ADOPTION (75% OF GOVERNMENT OFFICES)

 On the supply side, the **Italy's Cloud Strategy** envisages that, by 2026, at least 75% of government offices will deliver cloud-based services. The adoption and implementation of the Cloud infrastructure within the Public Administration will reduce risks in terms of security, inefficiencies and costs. To this end, the creation of a **National Strategic Hub ("Polo Strategico Nazionale", PSN)** as a single interface between government offices and Cloud service providers is already underway.


DIGITAL IDENTITY (70% OF THE POPULATION)


 Looking at the demand side, according to the 2026 Digital Italy strategy, at least 70% of the Italian population should have a **digital identity**. To be successful both in terms of effectiveness, efficiency, and quality, the shift towards a public infrastructure based on cloud and interoperability, requires a **single access point, manageable directly by citizens**.

 The Public Digital Identity System (**SPID**), which was introduced in March 2016, has become mandatory from 1 October 2021 in order to access a variety of digital public services (i.e. services provided by the Social Security Agency, INPS, or the Italian Revenue Agency)³⁸. Overall, more than 9,500 public administrations have set up systems that allow their services to be delivered online via SPID. The private sector has also adopted it as a single-entry point for many of their digital services, with almost 90 companies using it in 2021³⁹.

 Compared to February 2019, the number of SPID digital identities has grown by more than 700%, with an increase of 64% over the last year (covering 58% of the eligible population). The average number of accesses per user has also increased (+67%).

 Italy is therefore on track to reach the target for both 2026 and 2030, even if we take into account a physiological slowdown in the years to come, following the boom in requests in the last two years, largely due to the introduction of the de facto mandatory online access to many government services.

 With regard to support for the **digital transformation of businesses**, the National Recovery and Resilience Plan provides for specific measures, which have been channelled into the so-called "**Transition 4.0**" plan. Among others, the Plan provides for tax credit facilities for the purchase of **intangible assets**, such as, for example, software relating to business management; as well as for **the purchase of training services on digital matters**⁴⁰.

 Despite Italy ranking above the European average in the field of digital transformation of business (i.e. 60% of SMEs have reached a basic level vs 56% of the EU 27 average), there is still a long way to go to achieve the European target (set at 90% by 2030). In terms of adopted technologies, the latest ISTAT business census (published in 2021) highlights how companies are indeed investing in basic or access technologies:


- the majority of enterprises have focused on 'infrastructure' investments (e.g. fibre optics and ERP software);
- only 16.6% of companies have adopted at least one advanced technology including the Internet of Things, augmented or virtual reality, Big Data, advanced automation, simulation and 3D printing;


³⁸ The Electronic Identity Card (CIE) and the National Service Card (CNS) are also valid alternatives (at least for the time being) to the use of the SPID digital identity. However, SPID is the only system that complies with the specific EU Regulation governing electronic identification systems (Regulation (EU) No. 910/2014). In addition, the SPID digital identity is the most used authentication tool: since the launch of the app ApplIO in April 2020, 83% of accesses have been made through SPID.


³⁹ CDP Sectoral Strategies and Impact, based on Agenzia per l'Italia Digitale (Agency for Digital Italy) data updated to December 2021, <https://avanzamentodigitale.italia.it/it/progetto/spid>

⁴⁰ These aspects, related to the technological transformation and innovation of enterprises, as well as the adoption of the most advanced digital technology tools by enterprises, will be dealt with in the Sectoral Strategic Guidelines for Technological Innovation Document and in the Sectoral Strategic Guidelines for Strategic Industrial Supply Chains Document.


- the most significant delays are registered in the use of Big Data (9% Italian companies vs. 18% of German and 22% of French companies); and in e-commerce.

 In this context, increasing attention must be paid to **security**, especially with respect to electronic communication services based on 5G and cloud, which the recent Decree Law on Golden Power also defines as being “of strategic importance for the defence system”⁴¹.

 The issue of **cyber defence** has become increasingly important in Italy, in the face of the high number of serious attacks against both private individuals and the Public Administration⁴² (+24% of serious cyber attacks in the first half of 2021 compared to the same period in 2020)⁴³.

 While recognising cybersecurity as a priority for companies and for the country, the level of cybersecurity maturity is still very heterogeneous among public and private Italian companies. The gap increases when, in addition to the technological aspect, the elements of “culture and appropriate behaviour” of employees are taken into account. Different levels of corporate maturity correspond to different levels of IT protection, so that heterogeneous solutions and strategies must be adopted to support companies (but also institutions) along the “**IT security lifecycle**”: from diagnostics to software acquisition; from corporate culture to integrated plans and disaster recovery policies.

DIGITAL SKILLS (70% OF THE POPULATION)

 As already mentioned, bridging the **Italian digital skills gap** is crucial to meeting the challenges described above. In terms of digital skills, Italy ranks 25th out of 27 EU countries. Only 42% of 16-74 year olds have at least basic digital skills (56% in the EU) and only 22% have more than basic digital skills (31% in the EU).

 The digital skills shortage affects also the private sector. Since 2012, the number of IT and digital technology specialists has increased by around 18% in Italy, compared to 77% in France, 50% in Germany, and 35% in Spain⁴⁴. This gap is due not only to the low level of ICT graduates (1% of graduates vs. EU average of 3.6%), but especially to a lower level of commitment in the provision of ICT training courses that Italian SMEs offer to their employees (19% vs. 23% for European SMEs)⁴⁵.

⁴¹ Decree Law No. 21 of 21 March 2022, Urgent measures to counter the economic and humanitarian effects of the Ukrainian crisis. (22G00032) (Official Gazette of the Italian Republic - general series No. 67 of 21-03-2022).

⁴² IAI (Istituto Affari Internazionali) – L'Italia e la difesa cibernetica 2021.

⁴³ Clusit Report 2021.

⁴⁴ <https://www.intesa.it/istat-2021-il-punto-sulla-digitalizzazione-delle-imprese/>

⁴⁵ La digitalizzazione delle piccole e medie imprese in Italia – Modelli per il finanziamento di progetti digitali – EIB (December 2020).



2. Areas of focus and strategic priorities

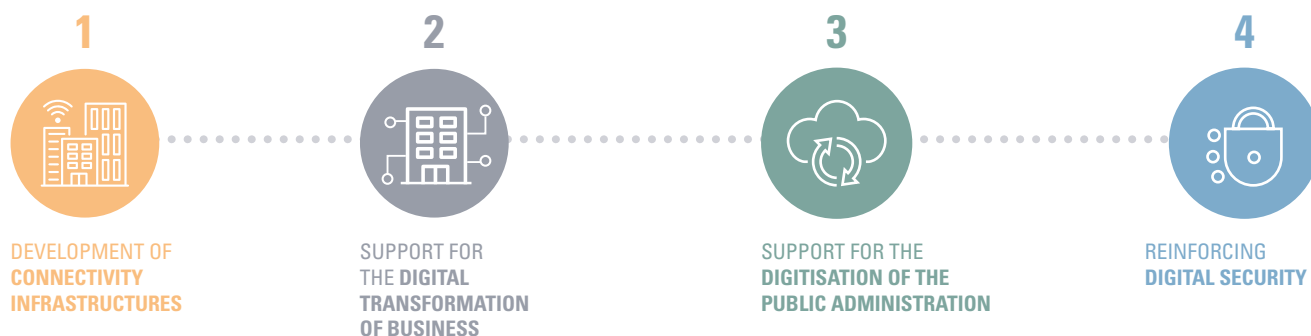
**2.1
Development
of connectivity
infrastructures**

**2.2
Support for the digital
transformation of
businesses**

**2.3
Support for the
digitisation of the
Public Administration**

**2.4
Reinforcing digital
security**

2. AREAS OF FOCUS AND STRATEGIC PRIORITIES



- Aside from the specific targets, **digitisation will play a decisive role in fostering economic and social growth in the post-pandemic context**. It is estimated that, for example, an increase in broadband penetration equal to 10% could produce an increase in GDP equal to about 1%; additionally, as fixed broadband penetration increases, the level of CO emissions decreases⁴⁶.
- Moreover, the **digital market, is vibrant and innovative**: the pandemics has accelerated the adoption of new technologies on one hand and induced significant changes in citizens' habits on the other. **The market for so-called "digital enablers"** (e.g. Cybersecurity, Big data, Cloud, AI) grew in 2020 by approximately 7%, against a growth in the more "traditional" digital sector by around 3%⁴⁷.
- The recently adopted strategies (also by Italy) to achieve the objectives that the European Union has set for the Member States in terms of digitisation, go in the right direction and, at least on paper, could provide the necessary impetus to bridge the gaps that still exist, especially in terms of infrastructures and skills.
- **However, few important elements** persist, potentially slowing down market development, hence hindering the achievement of national and European objectives. In this regard, **it is necessary to support four strategic lines of action**:
 - ▶ development of infrastructure for connectivity;
 - ▶ support for the digital transformation of businesses;
 - ▶ support for the digitisation of the Public Administration;
 - ▶ strengthening digital security.

2.1 DEVELOPMENT OF CONNECTIVITY INFRASTRUCTURES

- **Italy's delay** in the implementation of fixed and mobile ultra-broadband networks is **mainly due to two reasons**:
 - ▶ **market dynamics and policies' failures** in providing telecommunications operators with the right incentives to invest in typically rural, unconnected areas;
 - ▶ **segmentation of the telecommunications market "out-dated"**, and based on mechanisms that do not give due consideration to the development of enabling technologies; or to the increasingly short lifecycle of technological innovations.

⁴⁶ LUISS Business School, Il settore Telco in Italia: assetto normative e analisi di impatto, 2022.

⁴⁷ NetConsulting for Confindustria Digitale, Anitec-Asinform, Il Digitale in Italia 2021. Mercati, Dinamiche, Policy, 2021.

- **Digital connection infrastructures**, unlike others (e.g. energy infrastructures), **become fast obsolete**. Therefore, long-term investments tend not to be profitable from the point of view of private operators⁴⁸.
- At the same time, **competition dynamics** do not help in paying off the initial capital investments. Indeed, on one hand, several players operating according to a different logic (e.g. OTT operators⁴⁹) have entered into the market; and, on the other, **a marginal decreasing utility has impacted revenues, which continue to decline over time**.
- For instance, the revenues of TLC operators in Italy decreased by approximately 37% between 2007 and 2020; at the same time, last year a 7.7% decrease in investments was registered⁵⁰.
- For the mobile network, **the economic impact** of 5G coverage investments alone, i.e. excluding the effects of productivity gains, is **estimated at 140 billion euro for the EU⁵¹ as a whole, creating 2.3 million jobs**.⁵²
- The “Cura Italy” and “Semplificazioni 2021” decree laws are intended to ease some limitations related to the installation of the antennas by local authorities and, as already pointed out, the 5G Italy Plan allocates resources to fill the mobile connection gaps in those areas of the country with market failure.
- At the same time, it is necessary to invest in the 5G connection to help the country’s economic growth. The 5G is indeed key to facilitate innovation processes to be carried out along the strategic value chains in the country. Based on these considerations, **four strategic lines of action are outlined**:

🌐 **supporting operators in connecting white and grey areas of the country**, possibly using “future proof” technologies, i.e. the most advanced, and recovering the delays accumulated since 2015⁵³. With regard to actions on white areas, Open Fiber S.p.A. has planned to cover all areas by 2023, with additional investments equal to approximately 7 billion euro, as outlined in the Strategic Plan presented at the end of 2021⁵⁴. As far as the grey areas are concerned, the Italy 1 Giga Plan envisages the allocation of about 3.8 billion euro. However, Infratel estimates the investment requirement to be equal to 5.1 billion euro for the installation of Gigabit-ready infrastructures in the areas identified in the second phase⁵⁵. In order for the Plan to succeed in the ambitious objectives, it will require support also from private operators⁵⁶. The private sector will have to contribute to at least 30% of the investment, which will potentially be paid off by the opportunity to access to the direct management of the network⁵⁷ - differently from the logic of state aid applying in white areas. Should there be no bidders or offers meeting the minimum requirements for the grey areas calls for proposals, the estimated resource gap could thus widen further. In this context, coordinated management of network roll-out activities, avoiding duplication of infrastructure efforts, is key to optimising financial sustainability of infrastructure development, and to incentivising operators;

🌐 **supporting greater coverage of the 5G network⁵⁸, including the 5G towers; the 5G Stand-Alone (SA); and increasing the availability of the assigned spectrum**. As the pandemics has shown, the current assigned spectrum may not be enough, given the increase in demand and technologies needs. In addition, different spectrum frequency bands enable different services, linked to vertical applications: from the industrial use of IoT and logistics (“low band”), to the healthcare sector and the smart cities (“mid-band”), to manufacturing and automotive sector (“high band”). Therefore, the availability of a wide range of bands is essential to accelerate innovation processes.

While Italy is the only country in Europe that has⁵⁹ already awarded all the bands available to date⁶⁰, some fundamental spectrums for 5G applications, such as 6GHz, should still be released to allow private investments into innovations regarding the

⁴⁸ Matteucci N., The state and prospects of regulation: A long term perspective on Italy and beyond, L’Industria, 2020.

⁴⁹ OTT (Over-The-Top) operators are operators that offer services and/or content via the Internet, bypassing traditional distribution systems.

⁵⁰ AGCOM, 2020 Annual Report on the activities carried out and work programmes, 2020; Asstel, Report on the Telecommunications chain in Italy, 2020.

⁵¹ The estimates are made with an input-output approach and are based on the EU-28.

⁵² European Commission, Identification and quantification of key socio-economic data to support strategic planning for the introduction of 5G in Europe, 2016.

⁵³ With regard to the works related to the connection networks, both fixed and mobile, the strategic support activity of CDP is already exercised through the support to Open Fiber (debt and equity). However, it was deemed appropriate to include connectivity infrastructure works as a strategic priority, even if not within the scope of CDP’s financing activities.

⁵⁴ Open Fiber: the objectives as a FTTH fiber wholesaler: <https://openfiber.it/corporate/chi-siamo/obiettivi/>

⁵⁵ <https://bandaultralarga.italia.it/aree-bianche/obiettivi/>

⁵⁶ With the exception of the works on white areas subject to public intervention and those managed by Infratel Italia S.p.A. in concession to Open Fiber S.p.A.

⁵⁷ <https://www.infratelitalia.it/archivio-news/notizie/bando-aree-grigie>

⁵⁸ With regard to the works related to the connection networks, both fixed and mobile, the strategic support activity of CDP is already exercised through the support to Open Fiber (debt and equity). However, it was deemed appropriate to include connectivity infrastructure works as a strategic priority, even if not within the scope of CDP’s financing activities.

⁵⁹ <https://www.reply.com/it/industries/telco-and-media/understanding-5g-spectrum-frequency-bands>

⁶⁰ The bands awarded in Italy for 5G are 700 MHz, 3.7 GHz and 26 GHz.

most advanced uses of 5G. If the spectrum bands remain unchanged, the impact on the economy could be negative, costing up to 360 billion dollars in global GDP growth⁶¹. In addition, to enable immediate services, such as telemedicine and precision agriculture, it is necessary to support the development of the 5G Stand-Alone (SA) network, i.e. the mobile connection network that does not rely on existing 4G networks⁶². This type of architecture enables full performance of 5G, i.e. lower latency, higher speed and the possibility of implementing more efficient IoT services;

☉ **supporting the development of “vertical”, private 5G markets to the benefit of strategic industrial chains**, balancing digital inclusion with large-scale coverage. **New use-cases can have significant impact on the country’s growth, stimulating innovation in certain key sectors of the economy.** 5G private networks are “non-public networks”, i.e. mobile connection networks that an organisation develops, installs and manages in a well-defined area. The benefits that 5G can bring to some sectors of the economy are manifold and originate from the fact that, compared to its predecessor, the 5G has a⁶³ much lower latency, higher data transmission speed⁶⁴, the ability to support a density of devices connected 10 times higher than 4G, as well as the possibility of splitting the network into “portions” (the so-called slicing), hence limiting the interruptions that may occur along the network. These characteristics are essential, for example, for the optimal use of the most advanced industrial machines or, more generally, of intelligent machinery and vehicles, in the logistics sector. Forecasts indicate that the private 5G market is growing at a rate of 35.7% in the period 2022-2026, reaching 8.3 billion dollars globally in 2026, compared to 1.7 billion dollars recorded in 2021⁶⁵. Moreover, in 2025, it is expected that, globally, 75% of enterprises operating in the manufacturing, logistics and mining sectors will use private 5G networks, in order to increase the reliability and security of digital connectivity networks⁶⁶. A public-private partnership model, appropriately regulated and based on an adequate plan for releasing spectrum frequency, would be a fundamental tool for the development of some strategic sectors, supporting their global competitiveness. Some countries have already developed a model which can be potentially replicated in Italy. For instance, Germany has specifically assigned spectrum bands to the industrial sector, pricing the bands proportionally to the buyer’s features. Or, alternatively, the UK provides for shared and hybrid management of the private networks between the public and private sector, which therefore allows the regulated use of private networks also to citizens, in a win-win logic between private operator and public interest;

☉ **supporting the creation of data centres for cloud development**, as enabler of a range of more advanced technologies⁶⁷. In this regard, Italian companies have taken a big step forward. According to the Digital Compass, Italian companies that adopted cloud solutions in 2021 went from 25% in 2020 to 39% in 2021, exceeding the share of companies at European level, in 2021 equal to 25% of companies⁶⁸.

2.2 SUPPORT FOR THE DIGITAL TRANSFORMATION OF BUSINESSES

- Italy faces significant deficiencies in basic and advanced digital skills that risk limiting the innovative capacity of companies.
- To bridge this gap, the first **"National Strategy for Digital Skills"** was launched in 2020, which defines a coordinated approach to the development of digital skills in Italy.

Agenzia per l’Italia Digitale (AgID - Agency for Digital Italy) estimates that, in the coming years, 30% of the new workforce in Italy will be employed in tasks that require the use of digital technologies, especially for the “green” transformation. This urges the need to undertake initiatives for both innovating business models and workers’ up-skilling and re-skilling. In this regard, the priority for businesses is to:

☉ **finance the acquisition of “intangible” digital tools** (e.g. licenses and management software such as ERP and CRM) **necessary for digital transformation, creating the conditions process re-engineering and optimisation, especially for SMEs.** Only 50% of SMEs in Italy have so far adopted strategies oriented to technological innovations, focusing mostly on “material” investments such as industrial machinery and equipment, less on, for example, software for process efficiency and

⁶¹ GSMA, Socio-Economic benefits of Mid-Band 5G Services, February 2022.

⁶² The 5G SA network requires a 5G terminal connected to a 5G radio network, in turn connected to a 5G core network without additional intermediaries. That is, every component of the network, from the base radio station to the core network, is 5G and the data transmitted will not intersect with those coming from the LTE equipment, avoiding the so-called bottlenecks.

⁶³ “Latency” is the time it takes for data packet to travel from the sender to the receiver. In 4G the latency is around 10 milliseconds, while 5G would guarantee a latency of no more than one millisecond.

⁶⁴ 5G guarantees a transmission speed of 1 Gigabit per second in reception (around 30 megabits per second for 4G) and up to a maximum of 300 megabits per second in transmission (around 12 megabits per second for 4G).

⁶⁵ <https://www.idc.com/eu/events/68493-wireless-wan-e-private-lte-5g-una-rete-a-prova-di-futuro>

⁶⁶ <https://blogs.idc.com/2021/01/15/idcs-worldwide-future-of-connectedness-2021-predictions/>

⁶⁷ For more information on the cloud and related data centres, see section 2.3 on the digitisation of Public Administration in more detail. Context and market elements are in fact equivalent for the Public Administration and businesses.

⁶⁸ https://digital-agenda-data.eu/charts/desi-see-the-evolution-of-two-indicators-and-compare-countries#chart={%22indicator%22:%22desi_idt_cloud%22,%22breakdown%22:%22ent_all_xfin%22,%22unit-measure%22:%22pc_ent%22,%22ref-area%22:%22EU%22,%22IT%22}

on licenses for data analysis⁶⁹. For instance, only 11% of companies with 10 or more employees have fully digitised the exchange of information along the supply chain, compared to 30% in Germany⁷⁰. The acquisition alone is therefore not enough. The most important efforts must focus on **the intensity of use of technologies and on their integration**, in a view at enabling product and process innovations (e.g. for the management of information flows, for ensuring production continuity by preventing faults). The adoption and integration of digital tools are the necessary condition for the development and use of more advanced, innovative technologies (IoT, Artificial intelligence, Big Data/data analytics, blockchain, etc.) which is the immediately next technological challenge that companies are called upon to face (for issues related to technological innovation, see the specific Sectoral Strategic Guidelines). This aspect is particularly relevant for some sectors, such as tourism, in which a rapid digitisation of services and processes would significantly benefit the sector. Not surprisingly, the National Recovery and Resilience Plan also allocates 2.4 billion euro to the so-called “Tourism 4.0”, by means of tax credits, but also by measures aimed at improving supply with an eye to the green and digital transitions⁷¹;

☉ **facilitate the acquisition of the skills necessary for digital transformation**, and qualifying training needs depending on specific industrial sectors, by means of, for example, a National Digital Excellence Programme. Addressing the existing skills gap is a priority if the digital transformation of businesses to achieve its goals. If digitisation initiatives are to bring about a potential improvement in the productivity and competitiveness of companies, they must be accompanied by skills upgrading for those professionals who will manage digital tools. In this regard, a Digital Excellence Programme at national level aims to create a virtuous ecosystem of competences to enable the development and transfer of digital skills through the following actions:

- identification of **digital champions for each industrial sector** that can be adopted as standards within the reference sector;
- support in financing “**digital diagnostics**” services, to help companies in analysing digitisation needs, learning from international experiences of other SMEs⁷²;
- support in financing **training courses** at companies, also in the form of e-learning, in collaboration with universities and research centres, and with a particular focus on SMEs, to support and accelerate their digitisation process and increase their competitiveness.

2.3 SUPPORT FOR THE DIGITISATION OF THE PUBLIC ADMINISTRATION

- The Public Administration has to face many challenges in the coming years, and pace is set by the roadmap outlined by AgID and the Department for Digital Transformation to meet the objectives of the National Recovery and Resilience Plan.
- One of the most relevant actions is the adoption of the “**Cloud First Strategy**”, which entails the adoption of cloud tools and technologies by the Public Administration. The strategy has three main objectives:
 - ▶ encouraging public administrations to adopt cloud computing to offer digital services supported by secure and reliable infrastructures;
 - ▶ consolidating the data centres of central government entities through a common infrastructure;
 - ▶ enabling public administrations to offer digital services.
- In this context, few strategic guidelines emerge:

☉ **supporting public administrations in the process of migrating data and services to the cloud**. In 2019, 95% of data centres relied on by public administrations were found to be inadequate with respect to the basic requirements of security and reliability on the one hand, and data volume management capacity on the other⁷³. The implementation of a single cloud-based infrastructure has numerous benefits. Resilience, interoperability of services and data portability are among the most important ones. The process is already underway and will envisage the creation of the National Strategic Hub (PSN) in 2022, creating

⁶⁹ Assoconsult, Centro Studi Confindustria, 1st Innovation Report – Italy 2021, March 2022.

⁷⁰ Eurostat, European Commission, Table isoc_bde15disc: Integration with customers/suppliers and SCM.

⁷¹ For example, the Integrated Funds; in particular, the “Fondo Nazionale del Turismo” and the EIB Funds for Sustainable Tourism.

⁷² Bpifrance provides traditional SMEs with tools to bridge the knowledge gap and raise awareness of the potential of digital technologies. Bpifrance offers: entrepreneurs education and training (through Bpifrance Université), support for companies (mainly SMEs) in the development of implementation plans and roadmaps through dedicated coaching programmes.

⁷³ <https://censimentoict.it/italia.it/index.html>

data centres throughout Italy, which will host the data and services of central government entities, local health authorities and major local administrations. The National Strategic Hub will also act as a single point of contact with cloud technology providers, thus avoiding potential risks related to the vendor lock-in. In this context, starting from 2023, public administrations will have to start the migration of data and services, according to a roadmap established by the Ministry for Technological Innovation and Digital Transition (MITD), on the basis of the survey carried out by the MITD itself and validated by the National Cybersecurity Agency, regarding the characteristics of the current data centres and the classification of information and services. In this transition, the support to public administrations, including local authorities, will be crucial, both in terms of financial support and in the development of the skills of their workers. Already in 2020, with the so-called “Decreto Rilancio”, 50 million euro were allocated to support public administrations to make services accessible through SPID and CIE, migrate payment systems to the single PagoPA platform, allow access to digital services through the app AppIO. Approximately 92% of Italian municipalities have requested access to funds;

🌐 **supporting the implementation of the National Digital Data Platform (PDND) for the digitisation of the Public Administration**, promoting interoperability and enabling operators to develop citizen-centric services that define a common national standard of reference. Today, most public bodies manage data and information in a manner that is poorly structured, open and interoperable; this makes it difficult for data to be shared between local administrations and to be used by citizens and businesses. It is therefore necessary to improve the way in which public data are generated and managed, and to create public services that are citizen-centred and supported by interoperability between entities. As part of the strategy for the management of public information assets, the three-year Plan for IT in the Public Administration (2020-2022) launched the creation of a National Digital Data Platform (PDND) for which the National Recovery and Resilience Plan invested 646 million euro. The platform and the central catalogue will have to be completed by December 2022, and a complex collaboration among the entities holding the main databases of national interest, led by the Department for Digital Transformation, is therefore underway. At the same time, it is necessary to standardise the services provided by public administrations, developing inclusive and accessible services that meet the different needs of people and individual territories. Furthermore, services will need to be interoperable by design, so that they can operate in an integrated and uninterrupted way throughout the single market, with the appropriate APIs (Application Programming Interface);

🌐 **promoting the deployment of IoT systems in the Public Administration**. The implementation of the Single Platform has the potential to stimulate further innovations in the way and capacity in which the Public Administration offer services to citizens, leveraging the cloud to ensure data security and privacy. In this regard, it is worth remembering that the IoT is one of the cutting-edge technologies on which to channel investments in the years to come, strengthening a path already started by many public administrations, also driven by the initiatives undertaken at European level. In 2020, 42% of municipalities with over 15,000 inhabitants had launched a smart city project. However, most of the projects have remained at the experimental stage (two years after the launch, 46% of the projects are still in the pilot phase), lacking coordination among the various initiatives at national level. In addition, while 65% of municipalities that have launched smart initiatives actually collect data, only 14% of these are able to share them with third parties, whether they are public bodies or private entities. The main benefit of projects related to smart cities consists precisely in making available a substantial amount of data, collected by integrating the sensors installed in the territory in the single PA network, then structuring information collected by companies, citizens and Public Administration. The added value consists in a greater monitoring capacity, improving the management of public assets; from public lighting to the faults prevention; the collection of waste, the irrigation of public green spaces and smart parking. Skills and the scarcity of financial resources are among the barriers to the use of the IoT for the creation of interconnected systems indicated by municipalities as main obstacles;

🌐 **reinforcing digital infrastructure for healthcare facilities**, by both facilitating the upgrade of equipment and infrastructure (e.g. adequate connectivity, cloud) for the implementation of telemedicine and the growth of operators, consolidating the market for telemedicine⁷⁴. In addition to the implementation of the electronic health record, which will also facilitate the efficiency of health services with a significant reduction in management costs⁷⁵, the recent pandemic crisis has accelerated the need to spread and further strengthen telemedicine services⁷⁶. The ultimate goal is to prevent, manage and monitor chronic diseases through by strengthening home care services; reducing the incidence rate of avoidable hospitalisations; and facilitating emergency mobile services, thus optimising both economic and professional resources. In this regard, the upgrading

⁷⁴ Actions to support businesses and start-ups that develop innovative solutions for telemedicine services are included in the “Strategic Guidelines on Technological Innovation” document.

⁷⁵ In this regard, the European Commission estimates that the improvement in the exchange of data among health institutions at European level will allow the saving of about 5.5 billion euro in 10 years deriving directly from the exchange of data among health systems, a further saving of about 5.4 billion euro deriving from the use of health information for research, innovation and policy at the health level; finally, a growth in the market for digital health services between 20% and 30%. For more information, see: European Health Data Space: https://ec.europa.eu/health/ehealth-digital-health-and-care/european-health-data-space_en

⁷⁶ While the pandemic crisis has accelerated digitisation processes, it has also significantly impacted prevention activities, exacerbating the fragility of the national health system. For example, there was a decrease in the number of cervical cancer screening exams (-35.6%), mammography screening exams (-20.3%) and colorectal screening exams (-24.4%): <http://efaidnbmnnnibpcajpcgclefindmkaj/https://www.quotidianosanita.it/allegati/allegato5829392.pdf>

of health infrastructure is the prerequisite for the full implementation of telemedicine services⁷⁷. The National Recovery and Resilience Plan contains some relevant initiatives, including the **“Connected Health” plan**⁷⁸, which invests, as part of the “2026 Digital Italy” strategy, more than 500 million euro to ensure the connectivity of health facilities through ultrabroadband connections. And the creation of the **“National Platform for Telemedicine”**⁷⁹, which aims to reduce territorial disparities in the supply of digital health services, while integrating regional health services with national platforms, leveraging the cloud as the main technology⁸⁰. In this context, it will be of key to support market operators, so that they are in a position to develop and then apply specific innovative digital solutions, for the definition of standards that are as homogeneous as possible at the local level;

🌐 **promoting the dissemination of basic digital skills among civil servants**⁸¹. In order for the digital transition of the Public Administration to achieve its objectives, strengthening civil servants’ digital skills is a priority. If digitisation initiatives bring about a potential improvement in the productivity of the Public Administration, they must be accompanied by skills upgrading for those professionals who will manage digital tools. Over the last year, many initiatives have already been promoted in the framework of the National Recovery and Resilience Plan. In particular, the **“Digital Skills Plan”** for public sector workers, or the operational plan of the «National Strategy for Digital Skills», provides for 17 projects, with the aim of both reviewing recruitment policies and the development of up-skilling programmes for workers missing ICT skills. Among these, the «Syllabus» project, promoted by the Civil Service Department, is the flagship initiative, for which about 2,000 public bodies with a total of more than 320,000 employees - almost one in two employees - have signed up for.

2.4 REINFORCING DIGITAL SECURITY

- Technological innovation, in addition to its benefits, brings about numerous risks, which are greater as the level of sophistication increases.
- Higher levels of digitisation must be accompanied by greater attention to cybersecurity. **Increased sharing of sensitive data inevitably leads to several cybersecurity threats** that can hinder economic growth, create limits to development and massive digital inclusion.
- In the first half of 2021, the **number of “serious” cyber attacks**⁸² globally **grew** by 24% compared to the same period in the previous year, with an estimated impact of 6 thousand billion dollars (from 1,000 billion dollars for the previous year). Attacks in Europe correspond to just under a quarter of the global total, constantly growing since 2018 (13.2% of the global total in 2018 *versus* 24.8% in 2021)⁸³. The most affected sectors in Italy are Finance & Insurance and the Public Administration, which together represent 50% of the attacks recorded in Italy.
- Nevertheless, the ratio between **cybersecurity spending** (1.55 billion euro in 2021) and Italian GDP stands at around 0.08%, placing Italy at the last place among the G7 countries, despite a moderate and stable growth recorded in recent years⁸⁴.
- Ensuring cybersecurity and data privacy, therefore, in addition to being a prerequisite for national security, is crucial in terms of trust and transparency, as it influences user confidence, and therefore the level of technological adoption, both for businesses and the public administrations.
- For these reasons, it is essential to:

🌐 **support the development and consolidation of the market of cybersecurity operators**, favouring the identification and financing of leading national companies and start-ups in the field of cybersecurity, in order to reduce Italy’s vulnerability to cyber attacks. Supporting the cybersecurity market also means strengthening the levels of cybersecurity of the country, the main tool for achieving “technological sovereignty” and the primary objective of the new-born Agenzia Nazionale per la

⁷⁷ With regard to the adequacy of buildings at a structural level, see the “Sectoral Strategic Guidelines for Social Infrastructures” document.

⁷⁸ <https://innovazione.gov.it/dipartimento/focus/piano-sanita-connessa/>

⁷⁹ National Recovery and Resilience Plan, notice published for the national telemedicine platform (salute.gov.it).

⁸⁰ The implementing entity identified is the Agenzia Nazionale per i Servizi Sanitari Regionali (National Agency for Regional Health Services - Agenas).

⁸¹ It should be noted that, although this priority is mentioned as relevant in the initiatives to be undertaken in the field of digitisation, it is not included below among those to which CDP will have to commit, as it is not a fundable activity.

⁸² Clusit, Italian Association for Cybersecurity, monitors, in addition to the number of cyber attacks, also the intensity of their impact, categorising them according to brand image, economic, social or geopolitical impact. Attacks with a critical impact constitute 25% of the total, those with a high impact 49%; those with a medium impact 22%; finally, attacks with a low impact represent only 4% of the cases.

⁸³ Osservatorio Cybersecurity & Data Protection, Politecnico di Milano, 2022.

⁸⁴ Osservatorio Cybersecurity & Data Protection, Politecnico di Milano, Il panorama di riferimento per la cybersecurity e lo scenario di mercato, 2022.

Cybersecurity (National Agency for Cybersecurity - ACN), in the implementation of the National Strategy for Cybersecurity⁸⁵. The cybersecurity market is undoubtedly strategic; however, with average growth rates of around 13% per year, it is still relatively less developed than the markets for other innovative technologies, such as, for example, the IoT and the Cloud, with a value generated in 2020 of about 2.4 billion euro⁸⁶. Moreover, in Italy, cybersecurity is still a matter for typically small- to medium-sized companies, with 1,861 companies registered in the Companies Register including cybersecurity among their activities, of which 65.6% have fewer than 10 employees. On the other hand, only ten⁸⁷ groups in the cybersecurity sector are listed on the stock exchange (including the national defence leader Leonardo, which also oversees the so-called fifth domain, or cyberspace). Considering that 5G and 6G technologies, the future of connectivity, are mainly based on software technologies and are therefore more exposed to cyber attack risks, it will be crucial to help Italian developers, not only in supporting their growth, but also in fostering technology transfer to strategic industrial sectors and the Public Administration, by bringing together companies, start-ups, spin-off developers of cybersecurity technologies with financiers, businesses and public administrations;

🕒 **promote the dissemination of Cybersecurity standards for the Public Administration**, in line with the National Recovery and Resilience Plan and the PSNC (National Cybersecurity Plan). One possible option consists in the development of a dedicated Hub allowing to replicate the process for migrating PA data and services to the Cloud. The Hub will be provided with the tools for adequate attack prevention both at central government and local level. Still, not all public administrations have adopted the Secure Sockets Layer (SSL) protocol for the inspection of encrypted traffic flows, thus exposing systems to cyberthreats⁸⁸;

🕒 **promote the dissemination of a “cybersecurity culture”** including the establishment of Cybersecurity Hubs. For instance, attacks on the healthcare system and in general on “critical infrastructures” are growing; they can paralyse the entire supply chain and therefore adequate IT protection at all levels of the supply chain is essential. A recent sample survey on the level of risk to which Italian transport, health and service infrastructure are exposed showed that out of only 20 infrastructures analysed, more than 2,000 potential vulnerabilities emerged, of which 14% were high risk, 77% medium risk and only 9% low risk. On one hand, an increase in the attention that companies (especially large companies) have devoted to cybersecurity was registered in 2020, so as to register a market boom; however, on the other hand, Italy still ranked twentieth in the Global Cybersecurity Index released by the International Telecommunication Union (ITU), a United Nations agency specialising in the ICT field. First among the European countries are Spain, France, Germany, Portugal, Latvia and Belgium⁸⁹. In this context, Industrial Clusters for Critical Supply Chains would allow to support companies in adopting prevention systems, both with economic incentives but also by spreading a “cybersecurity culture”.

⁸⁵ In this regard, the Public Administration and the Armed Forces are among the critical infrastructure most affected by cyber attacks in Italy in 2021.

⁸⁶ NetConsulting for Confindustria Digitale, Anitec-Asinform, *Il Digitale in Italia 2021*. Mercati, Dinamiche, Policy, 2021.

⁸⁷ Excluding Leonardo, six of the remaining nine companies are also involved in IT security, but it is not their core business. Listed companies include Cyberero, Cy4Gate, Digital Value, Relatech, Reti, Exprivia, Tinexta, Sesa and Wit.

⁸⁸ Swanscan Tinexta Cyber, *Cyber Risk Indicators. Infrastrutture Critiche Italia*, febbraio 2022.

⁸⁹ International Telecommunication Union, *Global Cybersecurity Index 2020, 2021*.



3. Enabling factors and CDP's role

**3.1
Enabling factors**

**3.2
CDP's role**

3. ENABLING FACTORS AND CDP'S ROLE

3.1 ENABLING FACTORS

- The effective pursuit of the strategic priorities outlined above and the achievement of the objectives at national and European level are linked to at least two enabling factors:
 - ▶ **the easing of certain regulatory constraints and the streamlining of authorisation procedures**, in order to strengthen the incentives for economic operators to invest in white and grey areas, respectively under market and technological failure. The realisation of the digital transition must rely on a widespread connectivity infrastructure, possibly using the most advanced, fast and secure technology. In order to speed up the process, and meet these ambitious targets, a series of legislative measures have been taken by the government in recent years. In this regard, we recall the most recent ones, namely the so-called “Decreto Semplificazioni” of 2020 (Legislative Decree 76/2020) and 2021 (77/2021), in addition to Legislative Decree 207/2021, which establishes the European Electronic Communications Code, and introduces a series of regulatory simplifications (e.g. easing of the limitations for the urban planning of Local authorities, introduction of the principle tacit agreement in some authorisation procedures). As of the time of writing, however, they have not yet produced the expected results⁹⁰. The main challenge will be to ensure uniformity in the application of such actions at national level. Furthermore, in order to accelerate the 5G mobile coverage targets, it is essential for Italy **to review the standards for electromagnetic emissions**. Italy applies exposure levels to electromagnetic fields produced by 5G frequencies lower than those recommended by the “International Commission on Non-Ionizing Radiation Protection” (ICNIRP) and supported by the European Union, in discontinuity with other European countries. The limits adopted by Italy would be 10 times lower than those set by ICNIRP in terms of field strength, as well as 100 times lower in terms of power density. This further discourages private operators from investing, as it would lead to sub-optimal levels of spectrum distribution, increased investment costs and restrictions on usable sites, especially in urban areas;
 - ▶ the **dissemination of digital skills**, as the development of an adequate supply of connectivity alone does not allow the achievement of digital transition goals. It is therefore necessary to intervene on demand, providing citizens with the necessary skills to be able to use the tools made available by the most advanced technologies, with particular attention, where applicable, to the use of the “agile” methodology on the one hand and managerial training for digital change management on the other. The recent “National Strategy for Digital Skills”⁹¹ lays down the foundations for further developments in this direction, preparing differentiated actions dedicated to students, the active workforce, ICT specialists and the general public.

3.2 CDP'S ROLE

- In this context, CDP can contribute to bridging the gaps highlighted, intervening **additionally and complementarily** with the market, taking into account the **critical issues** that characterise the digital market, with particular reference to the so-called digital enablers, such as infrastructural initiatives and technologies related to connectivity:
 - ▶ **sub-optimal investment rates**, not only (and up to a certain extent) in white areas with pure market failure for which several initiatives are already undertaken by the public sector; but in grey areas, where, despite the presence (albeit limited) of market operators, the technology in use is already partially outdated. The need for long-term, high-capital investment in networks at high risk of rapid obsolescence is associated with unattractive returns, resulting in a very low marginal propensity to invest;
 - ▶ **negative externalities** due to the poor quality of the service offered, caused by the delay in the infrastructures upgrade;
 - ▶ **mismatch between labour demand and supply**, especially for the realisation of infrastructure works. The skilled workforce available may not be sufficient to meet the substantial investment plan supported by the National Recovery and Resilience Plan⁹²;

⁹⁰ See, by way of example: I-com Istituto per la competitività, Semplificando si innova (e si cresce). L'impatto dei decreti e gli scenari futuri per le tlc, 2022. In addition to: LUISS Business School, Il settore Telco in Italia: assetto normative e analisi di impatto, 2022.

⁹¹ <https://docs.italia.it/italia/mid/strategia-nazionale-competenze-digitali-docs/it/1.0/index.html>

⁹² This criticality concerns in particular the paradox of the “frenzy” linked to the significant acceleration that the National Recovery and Resilience Plan provides in the development of connectivity infrastructure. The call for 5G network coverage should run concurrently with that for grey areas, creating a potential overload from the point of view of the demand for skilled labour and professionalism necessary for the implementation of projects. In addition, the actual geopolitical context, with the Russian-Ukrainian conflict, brings with it shortages of raw materials, as well as an increase in prices for fuels and energy.



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- ▶ **technological lock-in** related to **imperfect information**, with reference to the most advanced technologies, such as, for example, cloud computing. Customers may indeed develop dependency on the same supplier for additional services and applications;
 - ▶ cutting-edge **technology market** fragmented from the operators' point of view, with a **limited presence of Italian companies**.
 - In particular, CDP may intervene - also depending on the degree of autonomy it may enjoy in the various markets/sectors and the specific characteristics of the different counterparties - in order to:
 - ▶ **contribute to bridging investment gaps** in sectors, territories and technologies where market players are unable to mobilise adequate resources and which require long-term commitment capacity, including through the use of blended finance instruments;
 - ▶ **provide support to public administrations** in digital transformation projects and processes, with particular reference to the provision of digital services and the realisation of the single cloud platform;
 - ▶ **support companies in digitisation**, with particular reference to the acquisition of so-called "intangibles" and specialised and managerial training for workers;
 - ▶ **promote the identification and financing of leading companies in the development of solutions for cybersecurity**.
 - To specifically assess the relevance, priority and strategic coherence of actions in the identified areas of focus, CDP is guided by **additionality and complementarity** criteria, identifying the most appropriate operational instruments based on the characteristics of the counterparties (type, geographical location, etc.) and the characteristics of the market (e.g. degree of maturity, profitability) or the technology.

A photograph of a server room with rows of server racks. The racks are filled with equipment, and there are many small lights, some of which are glowing red and blue. The room is dimly lit, with the primary light source being the equipment itself. Two large, semi-transparent blue rectangular boxes are overlaid on the image. The first box is on the left side, containing the text '4. Recommendations'. The second box is on the right side, completely empty.

4. Recommendations

4. RECOMMENDATIONS

For each of the areas of focus, **specific strategic guidelines** are summarised **below for prioritising** (although not exhaustively) CDP actions in **Digitisation**.

AREAS OF FOCUS		DEVELOPMENT OF CONNECTIVITY INFRASTRUCTURES	
	A.1	Supporting operators in the deployment of connectivity , possibly using cutting-edge technologies, and accelerating intervention in white areas	
	STRATEGIC PRIORITIES	A.2	Supporting increased 5G network coverage, including 5G towers , as well as 5G Stand-Alone, and enhancing the availability of assigned spectrum
		A.3	Supporting the development of "vertical" , private 5G markets to support strategic industrial supply chains
		A.4	Supporting the creation of data centres to boost cloud implementation
AREAS OF FOCUS			SUPPORT FOR THE DIGITAL TRANSFORMATION OF BUSINESSES
	B.1	Financing the acquisition of "intangible" digital tools (e.g. licences and management software such as ERP and CRM), necessary for digital transformation	
	B.2	Facilitating the acquisition of basic and specialised skills through specific training courses	

AREAS
OF FOCUS

SUPPORT FOR THE DIGITISATION OF THE PA

STRATEGIC
PRIORITIES**C.1**

Supporting the Public Administration in **migrating data and services to the Cloud**

C.2

Supporting the implementation of the National Digital Data Platform (PDND) for the digitisation of the Public Administration, **promoting interoperability**

C.3

Promoting the deployment of IoT systems in the Public Administration.

C.4

Supporting the development and deployment of **telemedicine services**

AREAS
OF FOCUS

REINFORCING DIGITAL SECURITY

STRATEGIC
PRIORITIES**D.1**

Supporting the development and consolidation of the **market for cybersecurity operators** by identifying and funding leading national companies and start-ups in the cybersecurity field

D.2

Supporting the dissemination of **cybersecurity standards for the Public Administration**

D.3

Supporting the dissemination of **cybersecurity standards for businesses**

cdp 