

# MONITORING PROGRESS IN NATIONAL INITIATIVES ON DIGITISING INDUSTRY

## Country report

*Italy*

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## Summary

Ranking 25<sup>th</sup> out of the 28 EU Member States, Italy belongs to the group of countries that are catching up in terms of digital development. Furthermore, compared to the previous year, Italy did not gain any position in the 2018 Digital Economy and Society Index (DESI) – highlighting a period of digital stagnation<sup>1</sup>. Whereas Connectivity in the private sector and the integration of Digital Technologies and Digital Public Services are the main drivers of digital progress, the main challenge in Italy is the low level of digital skills among the population, demonstrated by the fact that Italy dropped one place on the Human Capital dimension.

Italy belongs to the group of countries most hardly hit by the recent economic crisis. However, in recent years, the country showed signs of a timid recovery: GDP is growing since 2014 – reaching a record +1.6% in 2017 – and unemployment rates have started falling off since 2015. In this context, the national legislator put in place an organic strategy on digitisation of industry as of 2016. The national industrial plan called “Piano Nazionale Industria 4.0” (hereinafter PNI 4.0) provides for several measures and support mechanisms able to deal with the different pillars of the Digitising European Industry (DEI) initiative and support mechanisms. In the years 2016-2018 it has received a total amount of public funding of ca. EUR 40 billion.

With regards to Pillar 1 of the DEI, projects in collaboration with other Member State (Germany, France and UK) and involving EU programmes (Blockchain partnership, ECSEL, etc.) have been implemented. In addition, the Ministry of Economic Development has launched several initiatives to support companies in their digital transformation as well as to adopt new technologies and increase synergies and innovation (Pillars 2 and 3 of the DEI). First and foremost, these include fiscal tools such as Super and Hyper-depreciation, Tax credit for Research and Development, Nuova Sabatini, Innovation and Development agreements, and the establishment of eight Competence Centres (amounting to a total of ca. EUR 10 billion). Moreover, PNI 4.0 provides for some measures that aim at renovating the regulatory framework (Pillar 4 of the DEI). The general objective of the regulatory initiatives arisen from within the PNI 4.0 is to create favourable conditions for the development of a new business culture inclined towards innovation. This is for instance the main goal of the Innovative SMEs and Start-ups legislative framework. In order to (re)qualify the labour force (Pillar 5 of the DEI), PNI 4.0 seeks to contribute to the empowerment of skills by strengthening vocational training and skills development with two important initiatives: Tax Credit for Training and the Strengthening of Technical Schools. In addition, since the digital gap does not solely affect the workforce, starting from 2019 small and medium enterprises willing to set off on the path towards digitisation will be granted a voucher to secure an innovation manager (Pillar 5 initiatives have been funded for a total amount of ca. EUR 624 million). Measures concerning Pillars 1,2,3,4 and 5 have been funded for a total amount of EUR 12.178 billion.

Overall, PNI 4.0 represents a major opportunity for all companies that are ready to take advantage of the unprecedented incentives offered by the Fourth Industrial Revolution. Although still lacking behind in terms of digital skills, Italy has become one of the most financially attractive countries in Europe for those companies investing in innovation. However, due to the will of the current Government to direct a larger share of the public expenditure to other issues (such as income security), the total amount of investment on the above-listed measures is supposed to decline in the coming years.

Table 1 presents an overview of the main initiatives identified, that will be further detailed in this report. Table 2 presents a short SWOT analysis of Italy on digitalisation.

**Table 1: Overview of initiatives in Italy**

Initiatives	Starting year	Overall strategy/ DEI Pillar/support mechanism	Type of initiative	Sectors targeted	Digital technologies targeted	Size of companies targeted	Budget
Piano Nazionale Industria 4.0	2016	Overall strategy	National strategy	All, with a focus on the manufacturing sector	All	All, with a focus on SMEs	National and public, ca. EUR 40 billion
Super and Hyper-depreciation	2016/2017	Pillar 2	Amortisation scheme	All, with a focus on the manufacturing sector	Cloud, IoT, Robotics and Automation machinery, Big data and Data analytics, AI	All	National 2016: EUR 170 million 2017: EUR 943 million 2018: EUR 2,532 million
Tax credit for Research and Development	2015	Pillar 2	Research and Innovation support	All, with a focus on the manufacturing sector	Cloud, IoT, Robotics and Automation machinery, Big data and Data analytics, AI	All	National 2015: EUR 255 million 2016: EUR 598 million 2017: EUR 1,462 million 2018: EUR 2,532 million
Nuova Sabatini	2015	Pillar 2	Funding	All, with a focus on the manufacturing sector	Cloud, IoT, Robotics and Automation machinery, Big data and Data analytics, Cybersecurity, RFID, 4D manufacturing	SMEs	National 2016-2018: EUR 1,274 million 2019: EUR 48 million 2020-2023: EUR 96 million/ year 2024: EUR 48 million
Innovation and Development agreements	2016	Pillars 2&3	Research and Innovation support	All, with a focus on the manufacturing sector	ICT, Nanotechnologies, Advanced materials, Biotechnologies, Advanced technologies	All	National and regional 2016: EUR 206 million
Competence Centres	2019	Pillar 2	Competence Centres	All, with a focus on the manufacturing sector	Cloud, IoT, Robotics and	All	National 2019: EUR 72 million

Initiatives	Starting year	Overall strategy/ DEI Pillar/support mechanism	Type of initiative	Sectors targeted	Digital technologies targeted	Size of companies targeted	Budget
					Automation machinery, Big data and Data analytics, AI		
Direttiva NIS	2018	Pillar 4	IT security regulation	Energy, Transport, Banking, Healthcare, Water supply and distribution, Digital infrastructure, Search engines, Cloud services, E-commerce platforms	N/A	All	N/A
Innovative SMEs and Start-ups legislative framework	2012	Pillar 4	Industrial policy	Technology	N/A	SMEs and start-ups	National 2012-2017: EUR 30 million/year 2018: EUR 50 million <sup>2</sup>
Patent Box	2017	Pillar 4	Copyright regulation	Science and Technology	N/A	All	National 2017 and 2018: EUR 400 million/year
Tax Credit for training	2017	Pillar 5	Subsidy for staff training	All, with a focus on the manufacturing sector	N/A	All	National 2017 and 2018: EUR 250 million/year
Strengthening of technical schools (ITS)	2017	Pillar 5	Digital skills certificate	All, with a focus on the manufacturing sector	N/A	All	National and regional 2017-2019: EUR 33 million/year
Innovation Manager Voucher	2019	Pillar 5	Voucher	All, with a focus on the manufacturing sector	N/A	SMEs	National 2019: EUR 75 million
SMEs Guarantee fund	2000	Support mechanism	Guarantee fund for loans	All	All	SMEs	N/A
Digitisation Vouchers	2015	Support mechanism	Voucher	E-commerce, ICT	All	SMEs	National 2018: EUR 50 million European 2018: EUR 50 million

**Table 2: SWOT of Italy on digitalisation**

<p><b>Strengths:</b></p> <ul style="list-style-type: none"> <li>• Increasing number of innovative start-ups</li> <li>• Growing industrial investments</li> <li>• Growing R&amp;D investments</li> <li>• Robustness of manufacturing sector</li> <li>• Strong policy framework for innovative start-ups</li> <li>• High fiscal attractiveness for digital investments</li> <li>• Key role of illustrious universities and research centres in development and innovation</li> <li>• Strong cultural traits of finished products</li> </ul>	<p><b>Weaknesses:</b></p> <ul style="list-style-type: none"> <li>• Traditional methods of doing business sometimes preferred to implementation of digital and innovative techniques</li> <li>• Few digitised enterprises</li> <li>• Poor digital culture</li> <li>• Outdated education system</li> <li>• Lack of managerial skills (particularly in SMEs)</li> <li>• Unwillingness of SMEs to open up to the global market</li> <li>• Limited number of industry champions able to coordinate the evolution process of value chain</li> <li>• Few large industrial and ICT private players able to lead Italian manufacturing transformation</li> </ul>
<p><b>Opportunities:</b></p> <ul style="list-style-type: none"> <li>• Productivity and competitiveness gains – due to the current digital gap and to the potential of the Italian economy linked to digitisation</li> <li>• Emergence of new jobs</li> <li>• New business models focused on integrated services</li> </ul>	<p><b>Threats:</b></p> <ul style="list-style-type: none"> <li>• Lack of innovation culture</li> <li>• Productivity loss in comparison with the EU countries if technologies are not adopted</li> <li>• Slow economic recovery</li> </ul>

# 1 General context

The objective of this report is to analyse the current status of national initiatives on digitising industry in Italy. The analysis has been conducted against the background of the Digitising European Industry (DEI), which was the first industry-focused initiative of the Digital Single Market launched by the European Commission in 2016.

Similar country reports will be produced for each of the 28 EU Member States. These national reports allow to:

- Monitor the development of national initiatives on digitising industry;
- Compare different national approaches; and
- Identify best practices of national initiatives.

Monitoring and reporting back on the development of the existing national initiatives is an important element of the DEI initiative, and this report should be seen as one part of it.

For more details about the DEI and our methodological approach for the country report, please consult the document attached.

## 1.1 Economic context and status on digitisation

### *General economic context*

Italy has officially exited the period of economic downturn in 2014. Since then, the GDP has been growing at a slow but steady pace: +0.1% (2014), +0.9% (2015), +1.1% (2016), +1.6% (2017)<sup>3</sup>. Although being below the EU average, the growth rate has expanded throughout the years showing virtues (and shortcomings) of the industrial policies implemented by the national governments. Similarly, since 2014, the employment rate has witnessed a timid increase: +0.2% (2014), +0.6% (2015), +0.9% (2016), +0.8% (2017)<sup>4</sup>. Its main drivers were a contested pension reform (that gradually prolonged working lives) and the introduction of temporary contracts in order to pursue flexibilization<sup>5</sup>. Only recently unemployment rates have started falling off. In 2015 the percentage of labour force without a job was about 12% (vs an average of 9.4% of EU-28 countries), whereas in 2017 it was about 11.2%<sup>6</sup>. Nonetheless, according to OECD, GDP growth is projected to drop to +0.9% in 2019 and 2020. Further, private consumption is expected to moderate, as lower employment growth and rising consumer price inflation temper real household disposable income gains and offset the positive effect of expansionary fiscal policy put in place by the newly elected coalition government<sup>7</sup>.

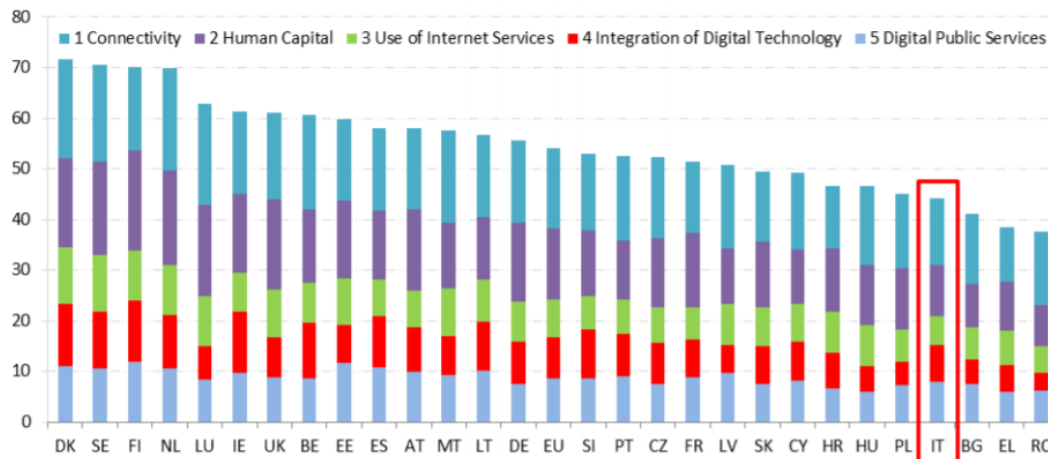
Historically, Italy has showed rather high GDP growth rates (reaching the peaks of its economic development at the end of the 1980s and in the early 2000s)<sup>8</sup>. Despite having been greatly affected by the latest economic recession, the Italian economy still represents the 4th EU economy and the 8th worldwide one. The engine of the economy is the manufacturing sector which accounts for 70% of the Italian exports<sup>9</sup>.

An existing threat that hangs above the Italian economy is represented by the enormous public debt owned by the State. With the 3<sup>rd</sup> largest debt among OECD countries (153% of GDP)<sup>10</sup>, and given the strict fiscal rules regulating the Eurozone, Italy can pursue expensive policies only to a small extent.

## Status on digitisation

According to the 2018 DESI Report, Italy ranks 25<sup>th</sup> out of 28 EU Member States, belonging *de facto* to the new comers of digitisation. Although making progress over the last few years, the DESI ranking remained unchanged compared to 2017.

Figure 1: Italy in the DESI ranking (2018)



Source: DESI 2018 Country report - Italy

The drivers of Italy's digital strategy are the Integration of Digital Technology (business digitisation and e-commerce) and Digital Public Services (eGovernment and eHealth). However, the picture on e-commerce is still rather mixed as despite an increase in the number of SMEs selling online, the revenue from e-commerce has dropped (from 6.4% in 2017 to 5.8% in 2018).

Regarding eGovernment, Italy is making slow but steady progress, as it occupies the 19<sup>th</sup> place since 2017. Although, availability of e-services is above average, Italy performs badly in the sub-category of eGovernment users (percentage of users needing to submit forms), as it ranks last.

Another positive aspect is its performance on next generation access (NGA) coverage, which is much improved. Despite an overall inadequate performance in terms of connectivity, the fast broadband covers 87% of the households in the country. In light of this, Italy moved up by ten positions (from 23<sup>rd</sup> in 2017 to 13<sup>th</sup> in 2018).

Similarly to the previous years, the main barrier to digital improvement is related to the low level of e-skills. On the DESI indicator "Human Capital", Italy dropped one place, further slipping towards the bottom of the ranking (from 24<sup>th</sup> to 25<sup>th</sup> position). Although the number of internet users and ICT specialist increased (+2% and +0.1%), it did not do so as much as in other EU countries. In addition, the share of graduates in Science, Technology, Engineering and Mathematics (STEM) decreased to 1.3 % in the 20-29 age group.



The overall challenging picture is confirmed by the Digital Transformation Enablers' Index (DTEI)<sup>11</sup>. It provides a ranking for Member States based on the assumption that infrastructure, access to finance, and the demand and supply of skills are the most important factors driving digital transformation. According to the resulting index of enabling conditions for digital transformation, Italy ranks below the EU-28 average. Looking at the Digital Technology



Integration Index (DTII) – that measures the digitisation of businesses and e-commerce – the situation is similar.

For what concerns Italy's readiness for future production, the assessment carried out by the World Economic Forum in 2018 scores the country with 5.9 out of 10 for drivers of production and 7.0 out of 10 for the structure of production. A breakdown of drivers is provided in the figure that follows:

**Figure 2: Italy's readiness for future production**

Drivers of Production		5.9	
Driver	Weighting	Rank	Score /10
 Technology & Innovation	20%	27th	5.7
 Human Capital	20%	32nd	5.9
 Global Trade & Investment	20%	30th	6.0
 Institutional Framework	20%	48th	5.2
 Sustainable Resources	5%	28th	6.9
 Demand Environment	15%	8th	6.6
Structure of Production		7.0	
Structure	Weighting	Rank	Score /10
 Complexity	60%	18th	7.7
 Scale	40%	16th	5.9

Source: World Economic Forum, Readiness for the Future Production Report 2018

The table below summarises some of the economic and digital indicators for Italy.

**Table 3: General economic and digital indicators for Italy**

Country	% GDP from manufacturing	% GDP growth	DESI position – and change	DESI sub-indicators Human Capital, Use of Internet, Integration of Digital Technology in 2018
Italy	16.6% (2017)	1.6% (2017)	25 <sup>th</sup> in 2017 and 2018	<ul style="list-style-type: none"> <li>Human Capital: 25<sup>th</sup> (24<sup>th</sup> in 2017)</li> <li>Use of Internet Services: 27<sup>th</sup> (27<sup>th</sup> in 2017)</li> <li>Integration of Digital Technology: 20<sup>th</sup> (19<sup>th</sup> in 2017)</li> </ul>

## 1.2 National strategy on digitising industry

Launched in late 2016, the PNI 4.0 is Italy's national strategy for digitising industry. It encompasses a wide range of policy measures to spur both domestic and international investment, and boost innovation-driven economic growth. The following table summarises the key initiatives foreseen by PNI 4.0.

**Table 4: National strategy on digitising industry**

Name	Piano Nazionale Industria 4.0
Type	National strategy
Starting date	2016
Objective	<p><u>Investments on Innovation</u>: Stimulate private investments in technologies 4.0; boost private spending in R&amp;D and innovation; strengthen financial instruments to support innovative SMEs and start-ups; ensure adequate network infrastructure for businesses;</p> <p><u>Digital Innovation Hubs actions</u>: Support technology transfer and a broader cooperation between the academia and businesses;</p> <p><u>Competences 4.0</u>: Support acquisition of 4.0 competences within enterprises and among employees; stimulate the focus of university's curricula and vocational trainings on topics related to 4.0 technologies; stimulate the acquisition of innovative managers by SMEs</p>
Ministry/ministries in charge (website, contact person)	MiSE (Ministry of Economic Development), MEF (Ministry of Economy and Finance)
Scope of the strategy/action plan	National and multi-sectorial
Measures included in the strategy/action plan	<ul style="list-style-type: none"> <li>• Hyper and super depreciation; Tax credit for Research and Development; Patent Box; Tax incentives for investments in innovative start-ups and SMEs; Nuova Sabatini; Innovation and Development agreements; Ultra Broadband Plan;</li> <li>• Digital Enterprise Points (PID), Digital Innovation Hubs (DIH), Competence Centres;</li> <li>• Strengthening of vocational training programs; Innovation manager vouchers; Tax credit for workforce training</li> <li>• Innovative SMEs and Start-ups legislative framework, Patent box</li> </ul>
Overall funding and distribution by volume and source of funding (public/private, EU/national)	National and public, ca. EUR 41 billion

### ***Piano Nazionale Industria 4.0***

The PNI 4.0 was launched in 2016 and was largely supported by the 2017 and 2018 Budget Laws. The Plan puts in place horizontal measures by addressing all types of enterprises (regardless of their size and sector) with the purpose of boosting the investment in new technologies, research and development, and improve the competitiveness of Italian companies in the global market. In addition, it seeks to contribute to the empowerment of skills of entrepreneurs, employees and future generations through the strengthening of education programs, vocational trainings, skills development, Competence Centres, DIH and technology clusters.

The main actors involved in the implementation and provision of the measures foreseen by the PNI 4.0 are several Ministries – with the leading role of the Italian Ministry of Economic

Development (MiSE) – and the Regions. They are supported by universities, research centres, industrial associations and trade unions.

The objective of the National Plan is to modernise the country and address some of the issues raised in the previous years, such as: the decline in industrial investments, the low quality of investment allocation, the poor performance of students and graduated in STEM subjects, and the poor connectivity of companies.

### ***Impacts, challenges and perceptions***

The newly promulgated 2019 Budget law has introduced some changes to the PNI 4.0, which imply a change of course to what previous governments used to do. For example, some of the measures that provided for tax cuts to stimulate private investments in technologies 4.0 (software, machineries, etc.) have been reduced (hyper-depreciation, tax credit on R&D) or suppressed for a limited period (super-depreciation). On the other hand, the coming months are going to witness the implementation of eight Competence Centres. Moreover, the 2019 Budget law provides a fund for the implementation of the Innovation Manager Vouchers<sup>12</sup>. In addition, it contains several measures aimed at boosting the venture capital market, including the establishment of a national venture capital matching fund on innovation (Fondo Nazionale per l'Innovazione) whose financial endowment is expected to reach EUR 1 billion. National strategies on AI and blockchain are currently in planning.

The PNI 4.0 is in line with the Smart Specialisation Strategy of Italy, which focuses on the following priority domains: Aerospace; Agrifood; Blue Growth; Green Chemistry; Design, creativity and made in Italy; Energy; Smart Factory; Sustainable Mobility; Health; Smart, Secure and Inclusive Communities; Technologies for Living Environments; and Technologies for Cultural Heritage.

## **1.3 EU cooperation in the field of digitising industry initiatives**

In the field of digitising industry, Italy has implemented a trilateral cooperation with Germany and France (Plattform Industrie 4.0 and Alliance Industrie du Futur). The coordination of the national initiatives is focused on three major objectives: 1) the identification of relevant standards for the digitisation of the manufacturing industry and the harmonisation of the regulatory framework; 2) the digitisation of SMEs; 3) the exchange of best practices in the field of public policies. In such an effort, the trilateral initiative is currently working jointly on the standardisation of the administrative shell, on issues regarding industrial data ownership, and on data sharing among enterprises. First and foremost, the cooperation is expected to benefit SMEs willing to internationalise their services and make use of digital technologies<sup>13</sup>.

More recently, the EU Commission has approved a plan by France, Germany, Italy and the UK to give EUR 1.75 billion to joint research and innovation projects in microelectronics. The project's overall objective is to enable research and develop innovative technologies and components (e.g. chips, integrated circuits, and sensors) that can be integrated in a large set of downstream applications. These include consumer devices, for example home appliances and automated vehicles, and commercial and industrial devices, for example the management systems for batteries used for electric mobility and energy storage. In particular, the project is expected to stimulate additional downstream research and innovations in particular in relation to the broad area of IoT and to connected or driverless cars.

Furthermore, Italy is one of the 22 EU countries taking part in to the Blockchain partnership. The collaboration is aimed unifying the approaches towards the technology by sharing technical and regulatory expertise among Member States, as well as creating ways to promote blockchain applications across the Digital Single Market.

Lastly, Italy has joined the Coordinated Plan on Artificial Intelligence (in order to develop a national strategy on AI in collaboration with other Member States), and participates in the ECSEL joint undertaking (a research initiative or electronic components and systems).

## **2 Other policy support to digitising industry**

### **2.1 Boosting innovation capacity**

The PNI 4.0 introduces a set of fiscal tools that private companies can use to foster investment in innovative technologies and capital goods. They represent the core measures of the national industrial strategy in Italy. According to the 2018 Digital Tax Index, as a result of these measures, Italy's fiscal framework for innovative companies is now the most attractive in the world<sup>14</sup>. Therefore, the cornerstone of the PNI 4.0 is the five fiscal measures described below. Alongside these initiatives, the national legislator provided for the set-up of specific organisations aimed at supporting technology transfer and cooperation between academia and businesses (e.g. Competence Centres).

These measures not only boosted the innovation capacity of firms. They also helped the national legislator to create awareness of the digital revolution among the economic operators. Thus, the initiatives work also as a decoy to create culture and innovation.

The table below presents an overview of the measures to boost innovation capacity (Pillars 2 and 3 of the DEI).

**Table 5: Boosting innovation capacity**

Name	Super and Hyper-depreciation	Competence Centres	Tax credit for Research and Development	Innovation and Development agreements	Nuova Sabatini
Type	Amortisation schemes	Competence Centre	Research and Innovation Support	Research and Innovation Support	Funding
Starting date	2016 and 2017	2019	2015	2016	2015
Objective	Stimulate private investments in technologies 4.0	Provide guidance, training and support to innovative enterprises willing to use advanced technologies in order to boost their products and services (in the manufacturing sector)	Boost private spending in R&D and innovation	Financial support to those companies that work on innovative projects/researches which are relevant on a national scale	Leverage more credit for innovation investment
Relevant for Pillar 2 <sup>15</sup> or Pillar 3 <sup>16</sup> or both	Pillar 2	Pillar 2	Pillar 2	Pillars 2 and 3	Pillar 2
Short description	Super and Hyper depreciation entail an increase in the ordinary depreciation resulting in a large tax cut	8 research centres with three main functions: guidance, training and study, and implementation of projects for companies. Competence Centres also provide testbeds facilities. They can contribute with up to EUR 200,000 to each industrial innovation project.	Tax credit on R&D allows firms doing research to benefit from a 50% tax credit	Financial support targeting big, medium and small companies willing to implement projects in the area of industrial research and experimental development aimed at creating new products or services.	Support SMEs requesting bank loans to invest in new capital goods, machinery, plant, factory equipment for use in production and digital technologies (hardware and software)
Granting organisation	MiSE	MiSE	MiSE	MiSE	MiSE
Participating organisations		54 Universities			
Sectors targeted	All, with a focus on the manufacturing sector	All, with a focus on the manufacturing sector	All, with a focus on the manufacturing sector	All, with a focus on the manufacturing sector	All, with a focus on the manufacturing sector
Technologies targeted	Cloud, IoT, Robotics and Automation machinery, Big data and Data analytics, AI	Cloud, IoT, Robotics and Automation machinery, Big data and Data analytics, AI	Cloud, IoT, Robotics and Automation machinery, Big data and Data analytics, AI	ICT, Nanotechnologies, Advanced materials, Biotechnologies, Advanced technologies	Cloud, IoT, Robotics and Automation machinery, Big data and Data analytics, Cybersecurity, RFID, 4D manufacturing

Name	Super and Hyper-depreciation	Competence Centres	Tax credit for Research and Development	Innovation and Development agreements	Nuova Sabatini
Funding (split by private/public and national/EU), state period/annual funding	National 2016: EUR 170 million 2017: EUR 943 million 2018: EUR 2,532 million	State funding. 2019: EUR 72 million	National 2015: EUR 255 million 2016: EUR 598 million 2017: EUR 1,462 million 2018: EUR 2,532 million	State funding. 2016: EUR 206 million	State funding. 2016-2018: EUR 1,274 million. 2019: EUR 48 million 2020-2023: EUR 96 million/year 2024: EUR 48 million
Current status of initiatives	Hyper-depreciation will be tailored to SMEs as from 2019 (the smaller the investment, the larger the fiscal benefit)	The 8 Competence centres have been launched in 2019 and have involved already more than 350 companies.	The 2019 Budget Law reduces the tax cut by 50%. The expenditure ceiling covered by the measure has been reduced from 20M to 10M.	The measure's budget has been increased by EUR 200,000,000.	Total endowment: 1.75 billion / Amount earmarked so far: 1.9 billion (74%) / Amount available: 0.46 billion (26%)

### ***Impacts, challenges and perceptions***

PNI 4.0 introduces a set of fiscal tools that private companies can use to foster investment in capital goods. The **super** and **hyper-depreciation** scheme consists in a 40% and 150% increase of the ordinary depreciation deduction for investments in new industrial machinery, meaning that acquisition costs are raised by an equivalent share for accounting purposes. As assets are subject to fiscal depreciation over the years, this leads to a substantial, long-lasting reduction in taxable income, and thus of the effective tax rate<sup>17</sup>. Despite the good use of the measures made by firms, the 2019 Budget Law foresees the annulment of the super-depreciation scheme (which is going to be introduced again with the 2019 Growth Decree<sup>18</sup>) and a cut of the hyper-depreciation. If until 2018 the tax cut was fixed at 140%, from 2019 it will variate as follow: 170% for investments up to EUR 2.5 million; 100% for investments between EUR 2.5 million and EUR 10 million; 50% for investments above EUR 10 million and below EUR 20 million<sup>19</sup>.

**Nuova Sabatini** is a measure specifically designed for SMEs and start-ups, i.e. for those enterprises that have greater difficulties accessing credit. Nuova Sabatini is thus a facilitation provided by the Ministry of Economic development to those companies willing to upgrade plants, buy new equipment, invest in hardware and software, and digital technologies. It consists of a State grant to partially cover interests on bank credits requested by small enterprises to purchase capital goods as mentioned before<sup>20</sup>. At present times, the measure has been confirmed for the following years until 2024<sup>21</sup>.

**Tax credit for Research and Development** consists on a 50% tax credit for companies that increase their R&D expenditure in the 2017-2020 period, with an annual ceiling of EUR 20 million. The measure applies to basic research, industrial research and experimental development – including personnel expenditure, research agreements with other entities – and IP costs. Moreover, the tax credit can be used to offset a wide range of taxes and contributions, even if companies report losses<sup>22</sup>. Contrarily to what provided by the previous Budget laws, the 2019 one reduces the tax cut by 50%. In addition, the expenditure ceiling covered by the measure has been reduced from EUR 20 million to EUR 10 million<sup>23</sup>.

Both Nuova Sabatini and Tax credit for Research and Development were conceived before the implementation of a national industrial strategy such as the PNI 4.0. However, since its very first promulgation, they have been presented as some of the core measures of the national strategy.

These amortisation and funding schemes aim at improving the positioning of Italy along two main indicators: the EU Digital integration Index (DTII), which sees the country in the bottom half with an overall score of 33, and the evolution of ICT investment as a percentage of total investment. The latter has been following a downward path as it amounted to 12.9% in 2015 and it dropped to 12.3% in 2017 (OECD 2019).<sup>24</sup> Again, in the years 2015-2016, the share of enterprises with high levels of digital intensity has dropped from 12.4% to 11.7% while the share of enterprises with very low levels has increased from 50% to 53.1% (Eurostat 2018)<sup>25</sup>. In spite of these negative trends, stakeholders perceive the financial tools as having a positive impact on companies' ability to adopt technologies (4 in a 1-5 scale).

Consequently, the perception of the level of take-up of digital technologies (especially by non-ICT industries) is moderate among industry representatives<sup>26</sup> (3 in a 1-5 scale). This is, however, also the result of a negative attitude of some managers towards change that turns into a rejection *a priori* of the adoption of new technologies (and possibly new ways of doing business). Often the appeal to tradition is deemed correct on the basis that it is correlated with some past or present tradition<sup>27</sup>. The launch of PNI 4.0 has thus revealed a singularity of the Italian economic system: the lack of a set of managerial skills fit for the digital age.

**Innovation and Development agreements** finance those projects in the area of industrial research and experimental development aimed at creating new products/services or at the improvement of existing products/services. The measure, then, fosters the development of the following technologies: ICT, Nanotechnologies, Advanced materials, Biotechnologies, Advanced technologies. To be eligible to the fund, projects have to forecast costs higher than EUR 5 million and lower than EUR 40 million<sup>28</sup>.

**Competence Centres** are research centres launched in 2019 with three main functions: guidance, training and study and implementation of projects for companies. The first function, guidance for businesses, takes place - as stated in the Official Gazette<sup>29</sup> - "through the provision of a range of instruments to support companies in assessing their level of maturity and digital technology". The second area of activity is the "training for companies, in order to promote and disseminate the competences in Industry 4.0 through training in the classroom and on the production line and on real-world applications, using, for example, demonstration production lines and development of use cases for the purpose of aiding comprehension by enterprises that enjoy concrete benefits in terms of lower operating costs and increase in the competitiveness of the offer". Lastly, the third function represents the "implementation of innovation projects, industrial research and experimental development, proposed by companies, including those of inter-company cooperation and the provision of technology transfer services in the area of Industry 4.0, and also by taking steps to stimulate the demand for innovation on the part of businesses, especially those of small and medium size".

Overall, PNI 4.0 provides for different types of organizations that can be reached out by companies and that are responsible for the diffusion of knowledge about technologies 4.0 and the associated benefits. The network, whose final piece is represented by the Competence Centres, comprises: Digital enterprise Points (PID), established by the Italian Chambers of Commerce; Digital Innovation Hubs (DIH), set up by Confindustria, one of Italy's largest business associations; and Competence Centres, funded by the MISE. The figure below summarises these functions<sup>30</sup>.

**Figure 3: PID vs DIH vs Competence Centres**

Activities	PID	Hub	Center
Spreading knowledge about technologies for Industry 4.0 Industry			
Mapping of digital maturity of enterprises			
Training courses on basic skills			
Orientation towards Innovation Hub & Competence Centre Servicesand			
Sector specific courses on advanced skills			
Guide to the digital transformation facilities, technology transfer centers and Competence Centers			
Advanced training through pilot production lines			
Development of industrial research and development projects projects			

Source: Analysis of National initiatives for Digitising Industry. Italy: Piano Nazionale "Industria 4.0"



In addition to this, PNI 4.0 has provided for the establishment of several DIHs throughout the territory (amounting to about 100 in 2018). They constitute the doorway for companies to industry 4.0 technologies, as they provide services to companies willing to adopt e-infrastructures. PIDs, instead, operate like info-points providing for the diffusion of basic knowledge and for the development of basic skills related to the digital era.

Since the beginning of 2019, 8 Competence Centres have been launched, with the involvement of 54 universities and research centres. The most recent figures show that despite their recent implementation, already 350 companies have taken advantage of the services provided by the Competence Centres<sup>31</sup>. The perception on the outcome of the measure in terms of uptake of digital technologies is overall positive among stakeholders. There is a general feeling that Competence Centres will strongly contribute to the digitisation of companies. However, it is not clear whether the initiative will mostly benefit big or small-sized companies<sup>32</sup>.

In addition to the network of PID, DIH and Competence Centres, Italy has launched some pilot projects such as the Lighthouse Plants. Developed by the cluster “Fabbrica Intelligente”, a Lighthouse Plant is a production system which evolves through time as smart manufacturing technologies develop. In doing so, it becomes a role model for those firms willing to embrace those technologies enabling digital businesses. The implementation of the Lighthouse Plant programme is a strong and proper action for Italy in support of those companies willing to strengthen their international competitiveness in the manufacturing sector<sup>33</sup>.

## **2.2 Regulatory framework for digital age**

The table below presents the main initiatives related to a digital regulatory framework (Pillar 4 of the DEI).

**Table 6: Regulatory framework for a digital age**

Name	Innovative SMEs and Start-ups legislative framework	Patent Box	Direttiva NIS
Type	Industrial policy	Copyright regulation	IT security regulation
Starting date	2012	2017	2018
Objective	Creating a favourable legislative framework for the flourishing of innovative SMEs and start-ups.	<ul style="list-style-type: none"> <li>• Encourage the attraction to Italy of immaterial goods currently held abroad by Italian or foreign companies;</li> <li>• Promote investments in research and development.</li> </ul>	Security of network and information systems
Short description	<p>Innovative start-ups benefit from a special legislative framework in the following matters administrative simplification:</p> <ul style="list-style-type: none"> <li>• labour market regulations;</li> <li>• tax benefits;</li> <li>• access to credit;</li> <li>• access to risk capital.</li> </ul> <p>These measures are extended to those SMEs operating in the field of technological innovation.</p>	It is a special fiscal regime consisting of a 50% reduction in corporate tax on income deriving from direct and indirect use of intangible assets (i.e. industrial patent rights, industrial design and models, know-how and copyrighted software).	<p>The Decree foresees the adoption of a national strategy on cybersecurity. The strategy will have to focus on:</p> <ul style="list-style-type: none"> <li>• response and recovery of cyber-incidents;</li> <li>• risk assessment plan about IT risks;</li> <li>• training and awareness-rising programs.</li> </ul>
Sectors targeted	Technology	Science and Technology	Energy, Transport, Banking, Healthcare, Water supply and distribution, Digital infrastructure, Search engines, Cloud services, E-commerce platforms.

### ***Impacts, challenges and perceptions***

While only recently the legislative framework has started embracing digital-friendly measures, such as regulation on cybersecurity and free flow of data, the general objective of the regulatory initiatives arisen from within the PNI 4.0 was to create favourable conditions for the development of a new business culture inclined towards innovation. To reach these goals, since 2012 the Italian Government has been engaged in the creation of a coherent, all-encompassing legislation intended to promote the establishment and the growth of new innovative enterprises with a high technological value. More specifically, the term “Innovative SMEs and Start-ups” refers to two major legislative acts: the Law Decree 179/2012 (The Italian Start-up Act) that provides for the legal definition of innovative start-up, and the Law Decree 3/2015 (the Investment Compact) that provides instead for the legal definition of innovative SME. For the first time, an extensive regulatory framework has been arranged in favour of these two types of companies, without imposing any sectorial or age-related restriction, as it is commonplace in other national legislations<sup>34</sup>.

Innovative start-ups are defined as newly founded (less than 5 years old) unlisted limited companies, which have an annual turnover lower than EUR 5 million, and a focus on technological innovation. This means that the enterprise complies with at least one of the following indicators: significant R&D expenditure (>15% of total annual costs); highly qualified team; IP rights. Those companies that fulfil the requirements can register as innovative start-ups at their local Chamber of Commerce and benefit from a vast array of policy measures. These include: digital, cost-free incorporation procedure; cuts through red tape and waiver on Chamber of Commerce fees; a more flexible corporate management; easier procedure to cover losses; special rules on fixed-term contracts; stock options and work-for-equity schemes not taxed as income; targeted support from the Italian Trade Agency; a Start-up Visa for non-EU tech entrepreneurs<sup>35</sup>.

Innovative SMEs are instead defined as small and medium sized enterprises whose R&D expenditure reaches at least 3% of the company’s expenses or turnover (the largest value is considered); at least 1/5 of the total workforce are PhD students, PhD holders or researchers; alternatively, 1/3 of the total workforce must hold a Master’s degree; the enterprise is the holder, depositary or licensee of a registered patent (industrial property) or the owner of a program for original registered computers. Similarly to innovative start-ups, the companies fulfilling these requirements can benefit from the following measures: exemption from stamp duty; flexible corporate management; extension of terms for covering losses; exemption from regulations on dummy companies; remuneration through stock options and work for equity scheme; Tax incentives for investments in innovative SMEs; possibility to collect capital through equity crowdfunding campaigns on authorised online portals; fast-track, simplified and free-of-charge access to the SME Guarantee Fund (this measure is presented in Section 2.4)<sup>36</sup>.

By creating a regulatory framework congruent with the needs of all the players involved in the Italian innovation ecosystem, the Law Decrees part of the Innovative SMEs and Start-ups transcend a simple law-making exercise. In fact, they constitute a comprehensive, coherent policy, which regards innovative entrepreneurship as a key path for industrial policy to follow.

The innovation-friendly legislative framework started in 2012 has benefited start-ups, that amounted to 9,633 in 2018 (+14.8% compared to the previous year)<sup>37</sup>. The same goes for innovative SMEs: according to the “Osservatorio Open Innovative PMI”<sup>38</sup> (University of Pisa), at the end of 2018 there were 877 firms in total (+35% compared to 2017). The measure has certainly boosted the flourishing of new entrepreneurial activities in the field of innovation technology.

At the end of 2018, the OECD published an independent impact assessment on the Italian Start-up Act<sup>39</sup>. According to it, the companies that benefited from the policy, compared to a control

sample, showed: a 10-15% increase in turnover, value added, patent activity and investments in tangible and intangible assets; increased likelihood of obtaining bank loans at a lower interest; a higher probability (more than 2 times higher) of receiving venture capital in the first 3 years of age.

Overall, the initiative is perceived as moderately positive by the stakeholders (3 in a 1-5 scale), as they mostly appraise the simplification of administrative processes for smaller enterprises in the field of technology 4.0. As most stakeholders were not familiar with the initiatives labelled as Patent Box and Direttiva NIS, a perception on the outcome could not be caught.

### **2.3 Skills development**

The low performance in digital skills risks acting as a brake on the further development of the Italian digital economy and society. As a response to this criticality, the national strategy PNI 4.0 provides for two main kind of measures: it intervenes within the labour market aiming at updating workers digital skills (Tax Credit for training), and it intervenes in the field of education by strengthening the provision of technical curricula (Strengthening of technical schools). The table below presents the main initiatives related to skills development (Pillar 5 of the DEI).

**Table 7: Overview of main initiatives to develop digital skills**

Name	Innovation Manager Voucher	Tax Credit for training	Strengthening of technical schools (ITS)
Type	Voucher	Subsidy for staff training	Digital skills certificate
Starting date	2019	2017	2017
Objective	Sustain the digitisation of small and medium sized enterprises.	Stimulate staff training in the use of those technologies relevant for the digital transformation of enterprises.	Main goal is to train the next generation in accordance to the demand of skills in the labour market.
Short description	Innovation manager vouchers are lines of credit provided by the government to SMEs. Small and medium sized enterprises are thus supported in the purchase of the services provided by a specialist consultant able to guide the firm and digitise the business.	Tax credit of 40% on staff training related expenditure. The measure addresses enterprises/non-commercial entities resident in Italy, companies doing business abroad but with permanent establishment in Italy.	Technical schools are the only alternative to tertiary education. With their dedicated focus on technologies, the employability rate of young graduates is very high. The strengthening of such schools aims at promoting the occupational integration of young professionals by increasing their level of digital skills.
Granting organisation	MiSE	MiSE	MiUR
Participating organisations			
Sectors targeted	All, with a focus on the manufacturing sector.	All, with a focus on the manufacturing sector.	All, with a focus on the manufacturing sector.
Funding (split by private/public and national/EU), state period/annual funding	National EUR 25 million	National 2017 and 2018: EUR 250 million/year	National and regional 2017 and 2018: EUR 33 million/year
Current status of initiatives	To be implemented from 2019.	Measure has been confirmed by the latest Budget law. Nonetheless the tax credit is no longer fixed but varies according to the dimension of the company: 50% for small enterprises, 40% for medium enterprises, 30% for big enterprises.	

### ***Impacts, challenges and perceptions***

The **Tax Credit for training** is an initiative by the Ministry of Economic Development aimed at the development of digital skills among the workforce<sup>40</sup>. Although being well-calibrated towards the needs of companies, at present times the measure has not spurred the know-how of workers yet. Given the below EU-average level of Individuals with basic or above basic digital skills (in 2017, 48% in Italy vs 57% in Europe), and as confirmed by some of the stakeholders from the industrial sector, the measure should become structural to achieve better results.

The **Strengthening of Technical Schools (ITS)** is instead a measure influencing the offer of tertiary education paths in the country. Its main goal is to provide vocational trainings with a strict focus on digital skills in order to spread knowledge about digital processes<sup>41</sup>. Although – according to the perception of stakeholders – several are the ITS focused on the provision of digital skills, the measure alone cannot cope with the digital skills gap between Italy and Europe. The number of science and technology graduates is below the EU average in Italy. Furthermore, similarly to the tax credit for training, the measure has not been made structural yet. It is, however, assessed positively by most stakeholders interviewed (4 in a scale 1-5).

Another way in which the Italian government is planning to address the catch up on small and medium sized enterprises in the digital sector, is by implementing the **Innovation Manager Voucher**<sup>42</sup>, an initiative part of PNI 4.0 and launched in 2019. It allows SMEs to cover labour costs of managers and consultants in digital transformation processes. More specifically, the benefit consists of a non-repayable grant (voucher) fixed between 30% and 50% to help cover expenses for consulting firm or consultants (which have to be registered in a specific list set up by a Decree of the Minister of Economic Development) for their advice on digital and technology topics; the annual maximum amount is fixed between EUR 25,000 and EUR 80,000 depending on the beneficiary business qualification<sup>43</sup>.

Although too early to be evaluated, the measure is perceived as positive among industry representatives (4 in a scale 1-5). In fact, it will enable the diffusion of innovation practices especially among those firms that do not possess yet the specific managerial expertise to upgrade their business in the digital era and boost their competitiveness. According to the Italian National Statistical Office (ISTAT), 63% of Italian companies shows indifference towards digitisation, while only 3% are fully digitised. The consequences of this are not only reflected in the productivity of companies, but also in their capacity to expand and create jobs. As reported by ISTAT, those companies keen to digitisation have witnessed an average increase in employment of 3.5% (way above the national average).<sup>44</sup>

## **2.4 Support mechanisms**

### ***Guarantee Fund and Digitisation Vouchers***

Several support mechanisms were presented in the above-sections because they are core measures of the umbrella national strategy PNI 4.0, namely: Nuova Sabatini, Super and Hyper-depreciation (Sections 2.1) and the Innovation Manager voucher (Section 2.3). In addition, this section presents two additional mechanisms: The SMEs Guarantee fund and the Digitisation Vouchers.

The SMEs **Guarantee fund** is a State-guaranteed fund established in 2000 and revolving funds for small and medium sized enterprises<sup>45</sup>. By providing a guarantee that may cover up to 80% of the loan for a maximum amount of EUR 2.5 million, it helps those SMEs that cannot offer enough security to obtain a standard commercial loan. Although the first operation in support of a SMEs dates back to 2013 (the fund was not solely addressing SMEs before), since then 2,506 innovative start-ups have requested a guarantee – summing up to almost half of the total amount of

operations. The above-mentioned Decree-Law 179/2012 on “Further urgent measures for Italy’s economic growth”, also known as “Decreto Crescita 2.0” (“Growth Decree 2.0”), turned the Guarantee Fund into a measure which also addresses innovative SMEs and start-ups’ needs.

Although being a measure such as the ones presented in Section 2.1, the Guarantee Fund does not belong to the core initiatives developed along the PNI 4.0. Existing since the early 2000s, it represents a fiscal tool which is not necessarily tailored to the digital needs of companies. Rather, the Guarantee Fund is a mean for micro, small and medium enterprises to gain access to bank financing exclusively for their business investments and liquidity.

The **Digitisation Vouchers** is a grant scheme aimed at the adoption of digital technologies, skills and processes by Italian SMEs. The intervention is aimed at supporting through the voucher of the maximum value of 10,000 euros , the purchase of software, hardware or services that allow: the improvement of business efficiency, the modernization of the organization of work, such as to favor the use of technological tools and forms of flexibility, including teleworking, the development of e-commerce solutions , broadband and ultra- broadband connectivity , connection to the Internet via satellite technology, qualified training in ICT, staff above-mentioned small and medium-sized enterprises. Each subject will receive a voucher of no more than EUR 10,000, up to a maximum of 50% of the total eligible expenses and within the limits of the financial resources allocated (EUR 100 million).

### 3 Conclusions

The following table provides an overview on how the different digitisation initiatives implemented in Italy have been funded.

**Table 8: Breakdown of financing of initiatives**

	Pillar 2	Pillar 3	Pillar 4	Pillar 5
	Digital Innovation for all	Partnerships and industrial platforms	Regulatory framework for digital age	Preparing for digital future (skills)
Super and Hyper-depreciation	2016: EUR 170 million 2017: EUR 943 million 2018: EUR 2,532 million			
Tax credit for Research and Development	2015: EUR 255 million 2016: EUR 598 million 2017: EUR 1,462 million 2018: EUR 2,532 million			
Nuova Sabatini	2016-2018: EUR 1,274 million. 2019: EUR 48 million 2020-2023: EUR 96 million/year 2024: EUR 48 million			
Innovation and Development agreements	2016: EUR 206 million			
Competence Centres	2019: EUR 72 million			
Direttiva NIS			N/A	
Innovative SMEs and Start-ups legislative framework			2012-2017: EUR 30 million/year 2018: EUR 50 million	
Patent Box			2017: EUR 400 million 2018: EUR 400 million	
Tax Credit for training				2017: EUR 250 million 2018: EUR 250 million
Strengthening of technical schools (ITS)				2017: EUR 33 million 2018: EUR 33 million 2019: EUR 33 million
Innovation Manager Voucher				2019: EUR 25 million
Guarantee fund	N/A			
Digitisation Vouchers	2018: EUR 100 million			
Total spending	EUR 12.178 billion (2015-2024)			

When it comes to digitisation, Italy's overall performance is adverse among EU Member States. Ranking 25<sup>th</sup> out of 28 countries, Italy belongs to the group of countries that are catching up in terms of digital development (DESI 2018). This is even more concerning when looking at specific



indicators: in the years 2017-2018 the share of graduates in STEM subjects decreased by -0.1% (DESI 2018); ICT investment as a percentage of total investment dropped by -0.6% in the years 2015-2017 (OECD 2019); in 2016, the share of enterprises with high levels of Digital intensity decreased by -0.7% while the share of enterprises with very low levels of Digital intensity increased by 3.1% (Eurostat 2018).

Nonetheless, thanks to the implementation of a set of fiscal tools that private companies can use to foster investment in innovative technologies and capital goods, Italy's fiscal framework for innovative companies is now one of the most attractive in the world (see Digital Tax Index 2017). These measures (Hyper-depreciation, Tax Credit for R&D, etc.), belonging to Pillar 2, are the main drivers of the digital strategy in the country and not just because of the fiscal advantages enjoyed by firms. They also helped the national legislator to raise awareness of the digital revolution among the economic operators. Thus, the initiatives work also as a decoy to disseminate knowledge and competences in the market. Also measures belonging to Pillar 4 have boosted the capacity of enterprises to innovate. This is for instance the case of the Innovative SMEs and Start-ups legislative framework, which helped the establishment and the growth of SMEs and Start-ups willing to digitise their business. The innovation-friendly legislative framework has benefited both kind of enterprises (start-ups and SMEs grew of respectively 14.8% and 35% in 2018).

However, both quantitative data and stakeholders' opinions confirmed that what is holding back Italy's digital strategy is a low level of digital and managerial skills among employees and managers. Whereas the former is being addressed through the strengthening of trainings for workers and technical schools for students, the latter has only recently been formally recognised as an issue. The Innovation Manager Voucher has the objective of diffusing innovation practices among those firms that do not possess yet the specific managerial expertise to upgrade their business in the digital era and boost their competitiveness. However, given its recent implementation, outcomes are still difficult to assess. In sum, the main initiatives belonging to Pillar 5 are: Tax Credit for training, Strengthening of technical schools (ITS), and Innovation Manager Voucher. As pointed out during one of the interviews conducted, the lack of managerial skills is often due to a negative attitude of some managers towards change. This turns into a rejection *a priori* of the adoption of new technologies (and possibly new ways of doing business). Against this background, Italy is in need of a cultural revolution.

The table below presents a good practice from Italy.

### **Box 1: Good practice**

#### **Super and Hyper-depreciation**

The two amortisation schemes consist in a 40% and 150% increase of the ordinary depreciation deduction for investments in new industrial machinery, meaning that acquisition costs are raised by an equivalent share for accounting purposes. In spite of the good use of the measures made by firms, the 2019 Budget Law foresees the annulment of the super-depreciation scheme and a cut of the hyper-depreciation. If until 2018 the tax cut was fixed at 140%, from 2019 it will variate as follow: 170% for investments up to EUR 2.5 million; 100% for investments between EUR 2.5 million and EUR 10 million; 50% for investments above EUR 10 million and below EUR 20 million.

In spite of recent changes, Super and Hyper-depreciation are considered two examples of good practices because, together with other fiscal tools presented in section 2.1, they improved Italy's fiscal profile to a great extent. According to the 2017 Digital Tax Index, as a result of

these measures, Italy's fiscal framework for innovative companies is now one of the most attractive in the world.

This is also confirmed by a more recent ISTAT publication (Report on the competitiveness of productive sectors 2018) which claims that in 2017 62% of manufacturing enterprises decided to take advantage of super-depreciation, whereas 48% used the financial incentives offered by hyper-depreciation.

In conclusion, the table below provides a general overview of the main digitalisation initiatives implemented in Italy and the overall progress the country has made so far with regard to digitalisation.

There are several measures put in place by the national legislator, and they involved a strong State intervention (both in terms of funding and organisational support). The drivers of the Italian digital agenda are certainly the several fiscal measures/amortisation schemes implemented with the final goal to contribute to the attractiveness of technologies 4.0. Overall, they are very appreciated among entrepreneurs, especially in the manufacturing sector. Similarly, the regulatory framework is considered to have constantly improved since the legislative framework has started embracing digital-friendly measures.

However, the outcome of PNI 4.0 is still unclear. If, on one side, fiscal measures have made Italy a very attractive country for businesses, on the other side the national strategy has poorly addressed the development of employees' digital competencies. As a matter of fact, the set of skills required by companies are usually hard to find in the national labour market. This in turns affect the ability of the national industry to grow and create wealth.

**Table 9: Total input-output overview**

		Pillar 2	Pillar 3	Pillar 4	Pillar 5
		Digital Innovation for all	Partnerships and industrial platforms	Regulatory framework for digital age	Preparing for digital future (skills)
Application	Name of key initiatives (start dates in brackets)	Super and Hyper-depreciation (2016), Tax credit for Research and Development (2015), Nuova Sabatini (2015) Competence Centres (2019) Innovation and Development agreements (2016)		Direttiva NIS (2018) Innovative SMEs and Start-ups legislative framework (2012), Patent Box (2017)	Tax credit for training (2017), Strengthening of technical schools (ITS) (2017), Innovation Manager Voucher (2019)
	Funding (total amount and period)	2015-2024 : EUR 10.524 billion		2012-2018: EUR 1,030 million	2017-2019: EUR 624 million
	Industries addressed	All, with a focus on manufacturing	All, with a focus on manufacturing	All, with a focus on manufacturing	All, with a focus on manufacturing
	EU programme involved	N/A	N/A	N/A	N/A
Usage	Perception of initiative	Government support for digital transformation is rated very high (5/5)		The regulatory framework is considered to be much better than before	Perception of usefulness of government initiatives on digital skills is high (4/5)
	Take-up	100 DIH in 2018 Value of Innovation Manager Voucher: EUR 40,000	5 Lighthouses	/	N/A
Outcomes	Perception of outcomes	Perception of level of take-up of digital technologies is high (4/5)	Perception of level of innovation in digital industries is medium (3/5)	The regulatory framework is considered fit for the digital age (3/5)	The required skills and labour resources are considered poorly available (2/5)
	Outcome metrics	Italy's overall DESI position remained 25 <sup>th</sup> in 2017 and 2018		Number of start-ups: 8,391 in 2017, 9,633 in 2018, 10,075 on April 1 <sup>st</sup> , 2019.	Persons employed with specialist skills: 584,800 in 2016, vs 602,700 in 2017. Share of enterprises providing training to develop ICT skills: 12% in 2016, 13% in 2017
	Change in outcomes	Italy's DESI ranking in terms of Integration of Digital Technologies has decreased from 19 <sup>th</sup> in 2017 to 20 <sup>th</sup> in 2018.			
End-goal	Productivity growth	Italy's labour productivity has fluctuated between 2015 and 2017, with an increase in 2015 and 2017 (by 0.3% and 0.4% respectively) but a decrease in 2016 (by 0.2%).			
Summary		Italy has been running the national industrial strategy (known as PNI 4.0) since 2016. A Major focus of the country's digitization strategy lies on the implementation of financial tools aimed at boosting the level of digital innovation of companies (especially SMEs). As a result, Italy's fiscal framework for innovative companies is nowadays one of the most attractive in the world. Contrarily, the initiatives put in place for the enhancement of digital skills among people are still too weak and unable to cope with the overall lack of digital know-how of the workforce.			

## List of stakeholders interviewed

Type of stakeholder	Name of organisation
Government representative	MiSE (Ministry of Economic Development)
University	Politecnico di Milano
Industry association	Confindustria
Industry association	UCIMU
Industry association	ASTER

## ENDNOTES

<sup>1</sup> Digital Economy and Society Index (DESI) 2018. Country Report Italy. Available at: [http://ec.europa.eu/information\\_society/newsroom/image/document/2018-20/it-desi\\_2018-country-profile\\_eng\\_B4406C8B-C962-EEA8-CCB24C81736A4C77\\_52226.pdf](http://ec.europa.eu/information_society/newsroom/image/document/2018-20/it-desi_2018-country-profile_eng_B4406C8B-C962-EEA8-CCB24C81736A4C77_52226.pdf)

<sup>2</sup> See “The Evaluation of the Italian Startup Act”, OECD DSTI, 2018: ‘Given the number and variety of different policy instruments, it is not straightforward to calculate precisely the total fiscal cost of the policy. However, it is possible to calculate an approximate estimation for the main instruments, most of which is foregone tax revenues (more details are available in Italian Ministry of Economic Development 2017): • Exemption from duty stamps and other fees otherwise due to the Chamber of Commerce: around EUR 10 million • Tax breaks for equity investment: EUR 11.6 million in fiscal year 2015, EUR 7.6 million in fiscal year 2014, EUR 3.7 million in fiscal year 2013. • Public Guarantee Fund: guarantee activated or losses repaid amount to around EUR 6 million (up to 30 June 2017), out of a total guarantees amount of EUR 372 million. • CIPAQ (2012-14): around EUR 2 million • Administrative cost (mostly dedicated staff): less than EUR 2 million • Other measures not included in the original 2012 “Start-up Act”: o Smart&Start Italia: allocation by EUR 267 million; pre-assigned resources EUR 159 million; resources actually lent by 30 June 2017: EUR 14.6 million o Invitalia Ventures matching fund: total public allocation: EUR 50 million Therefore, a back-of-envelope calculation gives an aggregate fiscal cost of around EUR 30 million for the period 2013-16 for the 9 000 start-ups that have ever been registered into the policy up to 30 June 2017, which corresponds to around EUR 3 300 for each start-up. This estimate excludes the last two measures not included in the original 2012 “Start-up Act”.

<sup>3</sup> Eurostat (2018). Real GDP Growth rate – volume. Available at: <https://ec.europa.eu/eurostat/web/products-datasets/-/tec00115&lang=en>

<sup>4</sup> ISTAT (2018). Tasso di occupazione – livello ripartizionale. Available at: [http://dati.istat.it/Index.aspx?DataSetCode=DCCV\\_TAXOCCU1#](http://dati.istat.it/Index.aspx?DataSetCode=DCCV_TAXOCCU1#)

<sup>5</sup> <https://ec.europa.eu/info/sites/info/files/2018-european-semester-country-report-italy-en.pdf>

<sup>6</sup> <https://data.oecd.org/italy.htm>

<sup>7</sup> OECD Economic Outlook, Volume 2018 Issue 2. – Preliminary Version. OECD 2018 Available at: <http://www.oecd.org/eco/outlook/italy-economic-forecast-summary.htm>

<sup>8</sup> <https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?end=2017&locations=IT&start=1987>

<sup>9</sup> Analysis of National Initiatives for Digitising Industry. Italy: Piano Nazionale “Industria 4.0” (2017). Available at: [https://ec.europa.eu/futurium/en/system/files/ged/it\\_country\\_analysis.pdf](https://ec.europa.eu/futurium/en/system/files/ged/it_country_analysis.pdf)

<sup>10</sup> <https://data.oecd.org/gga/general-government-debt.htm>

- <sup>11</sup> European Commission (2018). Digital Transformation Scoreboard. Available at: [https://ec.europa.eu/growth/tools-databases/dem/monitor/sites/default/files/Digital%20Transformation%20Scoreboard%202018\\_0.pdf](https://ec.europa.eu/growth/tools-databases/dem/monitor/sites/default/files/Digital%20Transformation%20Scoreboard%202018_0.pdf)
- <sup>12</sup> Available at: <https://www.agendadigitale.eu/industry-4-0/industry-40-tutto-quello-che-c-e-da-sapere-su-piano-e-attuazione/>
- <sup>13</sup> Available at: <https://www.mise.gov.it/index.php/it/industria40/cooperazione-italia-francia-e-germania>
- <sup>14</sup> PwC (2018). Digital Tax Index 2018: Locational Tax Attractiveness for Digital Business Models. Available at: [http://ftp.zew.de/pub/zew-docs/gutachten/Digital\\_Tax\\_Index\\_2018.pdf](http://ftp.zew.de/pub/zew-docs/gutachten/Digital_Tax_Index_2018.pdf)
- <sup>15</sup> Measures facilitating the adoption of new technologies by industry
- <sup>16</sup> Measures to develop technology building blocks
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