

**MONITORING PROGRESS IN NATIONAL INITIATIVES
ON DIGITISING INDUSTRY**

Country report

Greece

July 2019



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Summary

Greece performance in terms of digitisation is below the EU average. On the Digital Economy and Society Index (DESI) Greece ranks 27th out of the 28 EU Member States in both 2017 and 2018, indicating a low integration of more sophisticated digital technologies throughout the economy. The country's performance in digital public services and digital skills remains low, a fact that can act as a barrier for further development of the digital economy and society.

To reverse the above negative trends, the Greek government during 2016, established a new Ministry for Digital Policy, Telecommunications, and Media with the responsibility for the policy-making, design, overall coordination and monitoring of the implementation of the ICT investments in the country. This Ministry is thus responsible for setting the horizontal policy, while other Ministries are responsible for implementing various measures in accordance to the National Digital Strategy 2016 – 2021, launched also during 2016. At the same time Greece is gradually recovering from a steep ten-year recession period that reduced GDP by approximately 25%. GDP grew by 1.9% during 2018. The Government's revised growth strategy aims at transforming the country's economic model based on exports and high value-added sectors such as energy, food, agriculture, logistics and life sciences. Digital technologies are considered as a key factor for this transformation, while there is an increased realization by all stakeholders of the need for an industry 4.0 type of strategy and for increasing collaboration between stakeholders. However, the level of coordination between the various ministries and stakeholders is currently rather weak. Overall, at least EUR 341 million have been made available in the period 2017-2018 under the different pillars of the Digitising European Industry (DEI) initiative and support mechanisms.

Further on, while large and multinational companies appear to keep up with technological evolutions, public administration and particularly SMEs seem to fall behind. To address this issue, several initiatives have been launched during 2018 related mainly to pillars 2 and 3 of the DEI, focusing mainly on SMEs and startups, such as the measures a) Digital Step, b) Digital Jump, c) Digital transformation of the agricultural sector and d) Research-Create-Innovate, while a number of important initiatives were also announced with the aim to digitize public administration. Given that these initiatives have only been launched recently, or are still in the phase of implementation, their impact is limited so far, but in time they are expected to increase the pace of digitisation of the Greek economy. The same holds for the increasing number of support mechanisms available particularly for SME's and start-ups, as the tax relief and venture fund schemes. Further initiatives have been launched focusing on upgrading the digital skills of the work force (pillar 5), while gradually the regulatory framework is becoming more conducive to the digital age, following trends across the EU (transposition of EU regulations). However, when it comes to regulation, important barriers still exist impeding the digital transformation, such as conflicting legislation and overlapping responsibilities between various national bodies.

Finally, Government support for the digitisation of industry is expected to gain in momentum in the near future, with several measures already under preparation, such as the National action for the participation of Greek industry in the 4th Industrial revolution, the establishment of a fund under the New Economy Development Fund ("TANEO") for investments in firms active in sectors related to the 4th Industrial Revolution and training schemes in the field of ICT (Software, databases, IT Security etc).

Table 1 presents an overview of the main initiatives identified, that will be presented more analytically in this report, while Table 2 presents a short SWOT analysis of Greece on digitisation.

Table 1: Overview of initiatives

Initiatives	Starting year	Overall strategy/DEI Pillar/support mechanism	Type of initiative	Sectors targeted	Digital technologies targeted	Size of companies targeted	Budget
National Digital Policy 2016-2021 (NDS)	2016	General Strategy	Horizontal Strategy	All	All	All	N/A (EU and National Funds)
Digital Step	2018	Pillar 2	Investment subsidy	All	Social Media, Mobile Services, Cloud, IoT, Cyber Security	SMEs	EUR 50 million. Co-financed by ERDF and by national funds.
Digital Jump	2018	Pillar 2	Investment subsidy	All	Social Media, Mobile Services, Cloud, IoT, Cyber Security	SMEs	EUR 50 million. Co-financed by ERDF and by national funds.
Digital transformation of the agricultural sector	2018	Pillars 2 & 3	Digitisation support - Digital platform	Agriculture	Mobile Services, Cloud, IoT, Big Data and Data Analytics, AI	n/a	EUR 33.5 million. Co-financed by ERDF and by national funds
Research-Create-Innovate	2017	Pillar 3	Research & innovation support	ICT, Agriculture, Health, Energy, Transport, Culture-tourism, Environment, Materials	Robotics and Automation Machinery, Big Data and Data Analytics, 3D-Printing, AI, Cloud, IoT	Micro: 338 Small: 197 Medium: 101 Large: 93	EUR 75.5 million (during 2018) – 729 firms funded. Co-financed by ERDF and by national funds
Directive (EU) 2016/1148	2018	Pillar 4	Other Regulatory measure	Energy, Transport, Banking, Financial market infrastructure, Health, Supply and distribution of drinking water, digital infrastructure	n/a	All	none

Initiatives	Starting year	Overall strategy/DEI Pillar/support mechanism	Type of initiative	Sectors targeted	Digital technologies targeted	Size of companies targeted	Budget
Cloud National Policy	2018	Pillar 4	National working group	n/a	Cloud	All	none
Directive 2014/55/EU	2018	Pillar 4	Other Regulatory measure	Financial market	n/a	All	none
Upgrading digital skills of private sector employees	2018	Pillar 5	Financial Grants for training	Horizontal			EUR 24,000,000 – 15,000 beneficiaries. Co-financed by ERDF and by national funds
STEM	2019 (announced 2018)	Pillar 5	Vouchers	Horizontal	n/a		EUR 13,392,000 – 10,000 beneficiaries. Co-financed by ERDF and by national funds
Creation and provision of large-scale educational programs in Digital Skills and implementation of pan-Hellenic educational and information activities in Digital (Intelligent) Agriculture	2019 (announced 2018)	Pillar 5	Educative platforms	Agriculture	n/a		EUR 9,585,572 – 10,000 beneficiaries. Co-financed by ERDF and by national funds

Initiatives	Starting year	Overall strategy/DEI Pillar/support mechanism	Type of initiative	Sectors targeted	Digital technologies targeted	Size of companies targeted	Budget
Digital Skills for All initiative	2018	Pillar 5	Distance learning/training programmes	Horizontal	n/a		150,000 beneficiaries. Co-financed by ERDF and by national funds
Training and certification of knowledge and skills of workers in the private sector (2nd cycle)	2018	Pillar 5	Training and Certification	Focusing on the nine strategic areas of the new NSRF: agri-food industry, energy, logistics, cultural and creative industries, environment, tourism, information technology and communications, construction and health.	n/a		EUR 70,387,748.44. Co-financed by ERDF and by national funds
Alliance For Digital Employability (AFDEmp)	2017	Pillar 5	Training and Certification	Horizontal	ICT	All	n/a
Article 71A Law 4172/2013	2013	Support mechanism	Horizontal - Tax incentives for patent-based products	n/a	n/a	All	n/a
Article 22A of the Hellenic Income Tax Code (Law 4172/2013)	2013	Support mechanism	Horizontal - Tax exemption for R&D	n/a	n/a	All	n/a

Initiatives	Starting year	Overall strategy/DEI Pillar/support mechanism	Type of initiative	Sectors targeted	Digital technologies targeted	Size of companies targeted	Budget
POL.1210/2017	2017	Support mechanism	Horizontal – Tax exemption for R&D	n/a	n/a	All	n/a
Equifund	2018	Support Mechanism	Venture Capital	All	Robotics and Automation Machinery, Big Data and Data Analytics, 3D-Printing, AI, Cloud, IoT	Start-ups / scale ups	EUR 15 million invested during 2018. It is expected to mobilize over EUR 400 million (EUR 260 million public and EUR 140 million private funds). National - Structural Funds – EIF – EIB – private funding.

Table 2: SWOT of Greece on digitalisation

<p>Strengths:</p> <ul style="list-style-type: none"> • Greece has strong research potential in ICT related technologies (as exhibited by the performance in EU Framework Programmes) • The share of population with tertiary education, that exceeds the EU average. • Increased investments (Public, PPP) in ICT infrastructures, such as rural / urban broadband. (2017 European Broadband Awards winner). 	<p>Weaknesses:</p> <ul style="list-style-type: none"> • Innovation activities of most SMEs in Greece are related to the adoption of off the shelf mature technologies and practices with limited impact to the economy. • Limited cooperation among private companies, universities and research centres. • On connectivity Greece performs below the EU average. • Performance in digital public services and digital skills remains low and can act as barrier for further development of the digital economy.
<p>Opportunities:</p> <ul style="list-style-type: none"> • The setting up of the Ministry for Digital Policy, Telecommunications, and Media responsible for design, coordination and monitoring of implementation of the ICT investments in the country. • The increased realization by all stakeholders of the need for an industry 4.0 type of strategy and for increasing collaboration between stakeholders. • The emerging dynamic start-up ecosystem. • An increasing number of clusters related to digital technologies such as microelectronics, gaming, space, mobile applications, but also shipping and biotechnology. • The launch and design of new initiatives to support the digitisation particularly of SMEs, covering both dynamic and traditional sectors of the economy. 	<p>Threats:</p> <ul style="list-style-type: none"> • Significant brain-drain during the economic crisis period. • The regulatory framework which is not adjusted to the digital era. • The economic structure of the Greek economy characterised by a weak exports base and large number of SMEs focusing on traditional and non - export oriented sectors.

1 General context

The objective of this report is to analyse the current status of national initiatives on digitising industry in Greece. 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

During 2009 Greece entered an unprecedented economic crisis and to a spiral of debt, deficits, high unemployment and GDP decline. After three austerity and reform programmes agreed with the Troika¹, during August 2018 the Greek government officially exited its third bailout programme. Besides austerity and GDP decline, the economic crisis period was also, at large, a period of disinvestment, that lead to a relative disassociation of the Greek economy from the international technological evolutions.

However, the past two years, according to OECD², the economy is recovering, and fiscal credibility has improved. At the same time, employment is rising strongly, with exports leading the expansion. Significant reforms are on track, but much is to be done regarding regulation and lack of finance that still hinders private investments.

In order to support further growth, the Greek government has devised a five-year action plan for sustainable economic growth, called Greece 2021. This plan stipulates the fundamental changes that are required for the Greek economy, in order to transform its economic model based historically on consumption towards an export-oriented model, based on high value-added sectors such as energy, food, agriculture, logistics and life sciences.

Moreover, the Greek economy is a service-based economy. In 2017, the industry had a share of the gross value added (GVA) of about 14.6%, which is well below the EU-average of 19.6%. The same year the ICT sector also accounted for 3.3% of GVA, also below the 5% EU28 average.

Further on, Greece is a Moderate Innovator. Over time performance has remained the same relative to that in the EU28 2010³, with the employment share in high and medium – high-tech manufacturing as well as the value-added share of foreign controlled firms being below the EU average.

The production base in Greece is also characterised by a small number of highly innovative companies that do not rely on public funding and to many SMEs that are resistant to change. Greek firms tend to import mature technology from abroad rather than invest in house or collaborate with Greek research institutions. The export base is also rather limited, with large firms (over 250 employees), accounting for over 70% of total exports⁴, although they account for 0.2% (623 firms) of the total number of firms in Greece⁵.

Finally, the extended economic crisis, the traditional structure of the Greek economy, the mismatch of skills between demand and supply and the inappropriate response of the education system to the market needs lead each year thousands of scientists and young graduates to seek employment abroad.

Status of digitisation

Greece belongs to the low-performing cluster of countries. According to the Digital Economy and Society Index (DESI), Greece ranks 27th during both 2017 and 2018, exhibiting limited progress relative to other Member States over the past few years⁶. However, some positive signs can be seen in the improvement in ranking regarding both the Digital Transformation Enablers and Digital Technology Integration indices, as well as the provision of Open Data (72%), on par with EU average (73%).

Greece was also one of a few EU countries where the ICT sector Value Added growth was lower than GDP during the 2006-2015 period⁷, mainly due to the prolonged recession. At the same time, Business expenditure on R&D (BERD)intensity (BERD/GDP) in the ICT sector was relatively low compared to the EU average.

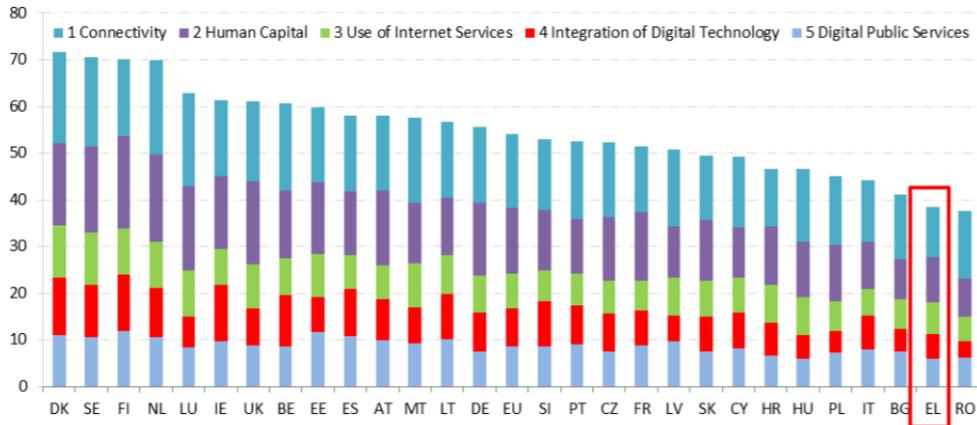
Capital services for selected Knowledge Based Capital assets and ICT equipment provided a key contribution to labour productivity growth in the 2000-14 period, as a percentage of labour productivity growth itself; this was mostly driven by accumulation of software and ICT tangible capital. Nevertheless, the ICT investment intensity in Greece did not change significantly from 2005 to 2015⁸.

Regarding connectivity, the transition to fast broadband connections is slower than in the rest of the EU, while the country's performance in digital public services and digital skills remains low and can act as barrier for further development of the digital economy and society.

Moreover, Greece performs below the EU average in six out of seven dimensions examined in the Digital Transformation Scoreboard 2018, particularly in relation to digital infrastructure and e-leadership, but also in ICT start-ups, digital transformation and supply and demand of digital skills. The only area that Greece performs higher than the EU average is in the field of investments and access to finance, mainly due to the availability of financing (mainly due to ESIF)⁹ and rising private investments.

The figure below presents the position of Greece in the Digital Economy and Society Index (DESI).

Figure 1: Digital Economy and Society Index (2018)



Source: Digital Economy and Society Index 2018, Country Report Greece

Further on, regarding Greece’s readiness for future production, the assessment carried out by the World Economic Forum in 2018 scores Greece with 5 out of 10 for drivers of production and 4.4 out of 10 for the structure of production. A breakdown of drivers is provided in the figure below:

Figure 2: Greece readiness for future production

Readiness Overall Assessment			
Drivers of Production			5.0
Driver	Weighting	Rank	Score /10
Technology & Innovation	20%	57th	4.1
Human Capital	20%	44th	5.3
Global Trade & Investment	20%	52nd	5.4
Institutional Framework	20%	59th	4.9
Sustainable Resources	5%	41st	6.6
Demand Environment	15%	54th	4.6
Structure of Production			4.4
Structure	Weighting	Rank	Score /10
Complexity	60%	51st	5.4
Scale	40%	75th	3.0

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

To sum up, Greece has not captured the benefits of ICT adoption and falls below the EU average in many ICT indicators as presented in the following table.

Table 3: General economic and digital indicators for Greece

	% GDP from manufacturing	% GDP growth	DESI position – and change	DESI sub-indicators Human Capital, Use of Internet and Integration of digital technology
Greece	14.7% (2017)	1.5% (2017)	<ul style="list-style-type: none"> • 27th (2018), same place as in 2017 	<ul style="list-style-type: none"> • Human Capital: 26th (no change compared to 2017) • Use of Internet Services: 22nd (no change compared to 2017) • Integration of digital technology: 24th (2018), one place down compared to 2017.

1.2 National strategy on digitising industry

In order to face the above challenges, during 2016, the Greek Government set up a new Ministry for Digital Policy, Telecommunications, and Media with the responsibility for the policy-making, design, overall coordination and monitoring of implementation of the ICT investments in the country. The Ministry of Digital Policy, Telecommunications, and Media is thus responsible for setting the horizontal policy, while other Ministries are responsible for implementing various measures in the context of the National Digital Strategy 2016 – 2021.

The National Digital Strategy¹⁰ focuses among other things on: 1. Accelerating the digitisation of the economy and 2. the transition of Greek businesses from a traditional to a dynamic mode of operation, with the use of ICT. In this context, the Ministry for Digital Policy, Telecommunications and Media has set four priorities:

- i) Promoting the digitisation of small and medium-sized enterprises (SMEs),
- (ii) Enhancing openness and e-commerce,
- (iii) Promoting Greece’s participation in the 4th Industrial Revolution (supporting actions related to the introduction and expansion of sensor networks, smart grids, autonomous systems, and the implementation of “smart cities” actions),
- (iv) Accelerating the coordination of national policy for the Single Digital Market with the operation of a central structure that will act as a centre of digital excellence.

The table below presents an overview of the national strategy on digitising industry.

Table 4: National strategy on digitising industry

Name	National Digital Policy 2016-2021 (NDS)
Type	Horizontal Strategy / initiative
Starting date	2016
Objective	Restarting and developing the economy, boosting employment, especially in highly specialised fields, aiming to achieve more effective and efficient Public Administration and to improve the quality of life for citizens and strengthen social cohesion.
Ministry/ministries in charge (website, contact person)	Ministry of Digital Policy, Telecommunications, and Media.
Scope of the strategy/action plan	The National Digital Strategy (NDS) is the road map and framework supporting the country's digital development, focusing on seven areas, two of which relate to digitising economy and industry (Area 2: Accelerating the digitisation of the economy, Area 3: Promoting the ICT industry in order to develop digital economy and employment).
Measures included in the strategy/action plan	Promote the digitisation of SMEs - Strengthen outward orientation and e-commerce of SMEs -Cooperation for participation in the 4th Industrial Revolution - Coordinate national policy for the Digital Single Market - Lighthouse City Actions, based on areas of expertise, as indicated by regional and national RIS3 - Boost business exploitation of ICT innovation - Promote ICT innovation in priority sectors of the economy - Create a favourable environment for emerging ICT businesses - Support outward orientation of thematic links & clusters - Use Intellectual Property - Participate in standardisation processes.
Overall funding and distribution by volume and source of funding (public/private, EU/national)	n/a

Complementary to the NDS 2016-2021, Greece has also launched the National Next Generation Broadband Access Plan (NGA Plan) 2014-2020¹¹. The National Next Generation Broadband Access Plan (NGA Plan) is the roadmap in order to i) create an attractive environment for private investors, that will ensure fair competition while limiting risks arising out of low demand of broadband services; ii) support (through state intervention) the development of infrastructure in areas where it is observed that the market fails to provide services meeting the national targets.

Additionally to the above strategies, the promotion of ICT technologies in key economic areas of Greece is included in the national research and innovation smart specialisation strategy (RIS3). It must be stressed that the RIS3 strategy is interconnected with the National Digital Strategy 2016-2021 of the country. The National RIS3 provides for the transformation of the productive sectors through research, technological development and innovation while mitigating regional disparities and creating sustainable employment. ICT technologies play a fundamental dual role, both as an economic domain and as enabler in other domains in the context of RIS3¹².

Further on, Greece has also launched during 2017 its National Cyber Security Strategy¹³, in order to enhance the ability of public and private sector stakeholders to prevent and handle cyber security incidents. The above-mentioned strategy is directly related to the EU 2016/1148 directive, presented in section 2.2 below.

Impacts, challenges and perceptions

In terms of implementation, Greece is half way in implementing the roughly EUR one billion investments planned for ICT investment under ESIF for the period 2014-2020. Regarding the Digital Strategy, up to day more than 220 relevant ICT projects compatible with the NDS, with a total budget of EUR 800 million, have already been approved, but their implementation is hindered by bureaucracy that sets a series of obstacles concerning the fast-pace implementation of these Digital Transformation policies and initiatives¹⁴.

In particular, the NDS focuses on seven areas of intervention with specific priorities in each area. More specifically, with regard to the two areas of intervention in the context of NDS targeting directly the private sector their progress can be summed up as follows¹⁵:

- Intervention area 2 - Accelerating the digitisation of the economy – 40% of the foreseen actions have been implemented, while another 30% of the actions in this intervention area are relative mature and are expected to be launched during 2019.
- Intervention area 3 - Promoting the ICT industry in order to develop digital economy and employment. Most of the actions are at an early stage of implementation, exhibiting relative delays in the launching of several mature actions, due to bureaucracy and to the fact that many actors are involved to their implementation.

This relative delay of launching mature actions has a negative impact on the ICT sector, since many ICT companies in Greece are at large focusing on government projects.

To sum up, based on the private sector stakeholders interviewed, there is a need to speed up the implementation of actions under the NDS related the digitisation of the economy. Further on, interviewees believe that a formulation of an Industry 4.0 strategy for developing specific digitisation plans would give firms a boost in all sectors of the Greek economy, so that the economy could quickly close the gap from the EU average.

1.3 EU cooperation in the field of digitising industry initiatives

According to the government representative interviewed, Greece participates or has announced its participation (not yet signed) in several European initiatives, since the National authorities regard cross-border collaborations as crucial for the digital transformation of the Greek economy. The key initiatives that Greece participates in or announced its participation are the following:

- Greece signed the Declaration creating the **European Blockchain Partnership (EBP)** on May 2018. This is a European Commission initiative, with the aim to ensure the active participation of all Member States in the fields of ICT, Blockchain, Distributed Ledger Technologies.
- During December 2018, Greece is expected to sign with Cyprus, France, Italy, Malta, Portugal and Spain the **Southern European Countries Ministerial Declaration on Distributed Ledger Technologies**, that is expected to lead to enhancement of e-government services but also increased transparency and reduce administrative burdens, and lead to better customs collection and better access to public information.
- Greece signed the **Declaration of cooperation on Artificial Intelligence** in May 2018. This is a European Commission initiative, with the aim to ensure the active participation of all Member States, in a key technology that is expected to become a key driver for economic growth through the digitisation of industry and for society as a whole.

- Also, in May 2018, Greece signed with Bulgaria and Serbia the **5G cross-border corridor** initiative. This collaborative network between the countries will enable a better environment for the testing and deployment of 5G technology, allowing connected automated driving to be tested across borders¹⁶.
- Another positive development during November 2017, has been the participation of Greece as the 12th country member in the European effort for building the next generation of computing and data infrastructures by signing the **High-Performance Computing declaration** (the EuroHPC declaration).
- Greece is also a member of European Space Agency (ESA). The Greek government, in order to fully exploit the benefits of its participation to ESA and potential spillovers to many sectors of the economy (ICT infrastructure, medical applications, environmental monitoring etc.) established during 2018 the Hellenic Space Agency (HSA), with the mission to shape the country's space strategy and to promote the participation of Greece in space programs.
- Greece also participates in the **ECSEL Joint Undertaking**, that funds Research, Development and Innovation projects for world-class expertise in key enabling technologies, essential for Europe's competitive leadership in the era of the digital economy.

Although it is too early to assess the benefits of the country's participation in the above initiatives, it is expected that it will enhance the capabilities of the public and the private sectors of the economy and will lead to the dissemination of advanced digital technologies across many sectors of the economy, creating new business opportunities.

2 Other policy support to digitising industry

2.1 Boosting innovation capacity

Greece's overall performance in the integration of digital technology by businesses is below par, progressing slower than the EU average. This trend can be attributed partly to the economic crisis of the previous decade, partly to the structure of the Greek economy and partly to the overall policy framework and priorities, according to industry representatives.

Nevertheless, the information and communication technologies (ICT) sector is an important sector of the Greek economy, while the country has the potential on the long run to become an ICT hub for the wider region. Moreover, even though ICT industry turnover decreased compared to 2007 by 45%, today digital technologies contribution are an important growth factor for GDP¹⁷, with more than 5,300 firms and 260,000 highly skilled employees.

According also to a recent survey¹⁸, around 7000 firms in Greece have an online sales channel, with 2/3 of these firms employing more than 10 people, while 5000 firms in Greece use digital channels for their supply line. Further on, around 18% of business R&D in Greece is performed in the ICT equipment and information service industries - a similar proportion to the United Kingdom and Denmark; this is mostly driven by the information industries¹⁹.

The table below presents an overview of the main initiatives to boost innovation capacity (pillars 2 and 3 of the DEI).

Table 5: National initiatives to boost innovation capacity

Name	Research-Create-Innovate	Digital transformation of the agricultural sector	Digital Step	Digital Jump
Type	Research & innovation support	Digitisation support - Digital platform	Investment subsidy	Investment subsidy
Starting date	2017	2018	2018	2018
Objective	Increase the competitiveness of enterprises by promoting research activities in key selected domains (such as ICT) and synergies with public research organizations.	Installation of 6500 land monitoring sensors across the country, for collecting data that will reduce farming costs and improve food produce quality.	The initiative aims at digital upgrading and digital transformation of SMEs of all sectors. Amount of funding per project EUR 5,000 to EUR 50,000.	The initiative aims at digital upgrading and digital transformation of SMEs of all sectors. Amount of funding per project EUR 55,000 to EUR 400,000.
Relevant for Pillar 2 ²⁰ or Pillar 3 ²¹ or both	Pillar 3	Pillars 2 and 3	Pillar 2	Pillar 2
Short description	Promote RTDI projects and collaborations through a) funding research activities in enterprises and collaboration between firms and public research organizations, b) Integrating mature research results into the production process and c) fostering patenting of innovative products and services.	The National Smart Agriculture Infrastructure is a technology platform for collecting data on agricultural production - data on soil, crop, air, water and agricultural exploitation - resulting in the significant improvement of both the quantity and the quality of the country's agricultural produce.	Upgrade SME's digital competences. Focus on small interventions with the aim to familiarise SME's with digital technologies.	Upgrade SME's digital competences. (More extensive and ambitious investments compared to digital step measure, aiming at SME's already acquainted with digital technologies).
Granting organisation	General Secretariat for Research & Technology (GSRT), Managing and Implementation Authority for Research, Technological Development and Innovation (MIA-RTDI)	Ministry of Digital Policy, Telecommunications and Media	Ministry of Economy and Development	Ministry of Economy and Development
Participating organisations		Hellenic Ministry of Rural Development and Food		

Name	Research-Creat-Innovate	Digital transformation of the agricultural sector	Digital Step	Digital Jump
Sectors targeted	ICT, Agriculture, Health, Energy, Transport, Culture-tourism, Environment, Materials	Agriculture	All sectors	All sectors
Technologies targeted	Robotics and Automation Machinery, Big Data and Data Analytics, 3D-Printing, AI, Cloud, IoT	Mobile Services, Cloud, IoT, Big Data and Data Analytics, AI	Social Media, Mobile Services, Cloud, IoT, Cyber Security	Social Media, Mobile Services, Cloud, IoT, Cyber Security
Funding (split by private/public and national/EU), state period/annual funding	EUR 75.5 million. Co-financed by ERDF and by national funds	EUR 33.5 million. Co – funded by EU structural funds	EUR 50 million. Co-financed by ERDF and by national funds	EUR 50 million. Co-financed by ERDF and by national funds
Current status of initiatives	729 firms funded during 2018	The project has guaranteed the funding in 2018 and was announced in December 2018, but the tender will end beginning of 2019	Proposals evaluation stage	Proposals evaluation stage

As seen in the table above, several initiatives have been launched during 2018, focusing mainly on SMEs and start-ups, such as the measures a) Digital Step, b) Digital Jump, c) Digital transformation of the agricultural sector and d) Research-Create-Innovate, in the context of the National Digital and RIS3 strategies

Complementary to the measures presented in the table above, another measure was also informally announced during 2018 and is expected to be launched during 2019. This is namely the National action for the participation of Greek industry in the 4th Industrial revolution (Testbeds, research & innovation support, public-private partnerships). The initiative will motivate the Greek Industry to use new technologies like AI, with 270 firms expected to benefit from its implementation. Public funding is expected to be approximately EUR 20 million. Further information will be available as soon as the measure will be formally announced.

In addition, there are eight Digital Innovation Hubs in Greece (and four in the stage of preparation), based in three out of 13 regions of Greece, namely in Attica, Central Macedonia and Western Greece. These DIHs cover many sectors of the economy through a large spectrum of technology areas such as 3D printing, location-based technologies, organic and large area electronics, MEMS, NEMS, robotics, autonomous systems, Cloud Computing, Big Data, Blockchain etc. The impact of these hubs is rather limited so far, with a small number of firms currently benefiting from their services.

Another priority of the Greek government is nurturing start-ups and technology clusters for sectors like microelectronics, gaming, space, shipping and biotechnology. Since 2012, over 500 start-ups have been established that attracted more than EUR 270 million investments and were supported by approximately 20 incubators and accelerators and 10 Venture funds²². The most successful of these firms (Taxibeat, Innoetics, etc.) became targets of acquisition from large foreign multinational firms like Samsung and Daimler AG.

The support of start-ups and scale-ups is increasingly becoming a priority in the national policy agenda, with a number of measures focusing on supporting them, like the development of the fund of funds – Equifund (see Section 2.4 on support mechanisms)- during 2017, that will direct approximately EUR 450 million to start-ups and scale-ups through 10 intermediary funds (technology transfer, accelerator, early stage / seed and growth stage private equity funds)²³.

Impacts, challenges and perceptions

Despite the above-mentioned initiatives, SMEs in Greece are still lagging considerably in terms of digitisation, compared to the EU leading countries. In contrast, 82% of large Greek and multinational corporations²⁴ run a project that is part of digital transformation roadmap, while 50.8% have a department with its main role around digital transformation and innovation.

Further on, another recent study²⁵ highlights the willingness of large enterprises (80% of respondents) to increase innovation investments over the next two years. During the past two years, investments were directed towards areas such as cloud computing, data analytics, digital networks, Robotic Process Automation and IoT sensors, while the next couple of years investments are expected to gradually shift towards emerging technologies, such as blockchain and cognitive computing & artificial intelligence (AI).

However, these investments refer only to a small fraction of Greek firms, as is exhibited by another recent study by ELSTAT²⁶, indicating that out of a sample of 29,401 enterprises employing 10

persons and over, only 830 enterprises used robotics, (570 enterprises used industrial robots and 342 service robots) and 546 enterprises used 3D printers in Greece during 2018.

The above-mentioned studies also indicate the lack of technical skills, the limited organisational ability of many firms to undertake digital transformation projects, the lack of financing and cultural resistance to change as the main obstacles blocking digital transformation in Greek companies.

In order to reverse the above negative trends, industry representatives propose the development of digital platforms in priority sectors, the speeding up of 5G national plans and other important infrastructures, the launching of further measures that will enable Greek firms to integrate more mature digital technologies into their business models, the promotion of Public Private Partnerships and the establishment of a more favorable regulatory framework for the use of open data. With regard to current initiatives, the perception of the industry representatives consulted is that Government support is regarded as useful but not sufficient (average score of 3 on a 1-5 scale).

2.2 Regulatory framework for digital age

The major driver for formulating a legal framework conducive for the digital age in Greece, appears to be the transposition of EU regulations into the national framework. However, gradually the national authorities appear to be also stepping up various national initiatives that will facilitate the digital economy in Greece, despite the fact that the pace of technical change creates perpetually new challenges.

As mentioned above, Greece has also launched during 2017 the National Cyber Security Strategy. Moreover, security measures will be issued periodically for all operators of essential services for the sectors under Greek NIS law.

Greece is following all EU initiatives on data and according to government interviewees it will fully comply with the relevant regulation measures in order to stand as a competitive data economy within the Digital Single Market. Further on, according to the government interviewees, the Ministry of Digital Policy Telecommunications and Media is considering in consultation with relevant stakeholders, such as the Ministry for Development and Economy and Ministry of Finance, the scope of introducing regulatory measures relating to tax reliefs, tax exemptions, tax returns in order to stimulate firms to increase the rate of digital investments.

In this context, Greece:

- Has already concluded the transposition into national law of Directive (EU) 2016/61 concerning low cost measures of installation of high-speed electronic communications encouraging enterprises to have access to high-speed internet.
- Is promoting the National portal for the codification and reform of existing legislation that is already under development and aims to create a clear, encouraging and favourable environment for businesses.
- Has broadened the use of 'one stop shop' for public service delivery for the seamless interaction of businesses with the public sector.
- Has already scheduled and proceeded to the relevant preparatory actions for the update of the National Interoperability Framework according to the European and International Standards.

- Has issued the Ministerial Decision (GOG 1164/B/2018) which introduces National Coalition for skills to the national legal order (see also Section 2.3 on skills development).

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

Table 6: Overview of regulatory initiatives

Name	Directive (EU) 2016/1148	Cloud National Policy	Directive 2014/55/EU
Type	Cybersecurity legislation	National policy/national working group	Working group
Starting date	2018	Working group started in 2018 – final policy in 2019	Working group started in 2018 – transposition and final working group deliverables are scheduled for 2019
Objective	Adopt a national strategy on the security of network and information systems – Establish a National Cyber Security Authority - Create a National Computer Security Incident Response Team (CSIRT) that will actively participate in the CSIRT network – Determine the security requirements and incident notification mechanism for network and information systems.	A national working group has been established with the aim to: a) establish a memorandum of cooperation between relevant stakeholders; b) manage the consultation process of the relevant national policy; c) lay down a new structure of governance for GCloud infrastructure and establish the relevant monitoring mechanism.	A national working group has been established with the aim to: a) determine the architecture and format of eInvoicing for contract payment in the public sector, based on the European Norm; b) determine the appropriate format, so as to attach the potential to widen its use in the private sector, in conformance with the processes set by national Tax and Audit Authorities
Short description	Legal measures to boost the overall level of cyber security, establishing a high common level of security of network and information systems.	Formulation of National policy for Greece Cloud infrastructure	Legal measures in order to establish and accelerate the use of eInvoicing in public procurement
Sectors targeted	Energy, Transport, Banking, Financial market infrastructure, Health, Supply and distribution of drinking water, digital infrastructure	Public sector (with the aim to emerge as a best practice for private sector also)	Financial market

Impacts, challenges and perceptions

According to the public authorities' interviewees, the main remaining regulatory barriers at national level impeding digital transformation today are conflicting legislation and overlapping responsibilities between various national bodies.

This opinion is also shared by the private sector stakeholders, that also note that Greece cumbersome regulations and bureaucracy hinder the necessary technology-based investments that are required (average score of 3 on a 1-5 scale).

2.3 Skills development

The Greek National Coalition for Digital Skills²⁷ and Jobs was launched on 11 June 2018. The Greek Coalition is led by the Ministry of Administrative Reconstruction. Members of the coalition include Central Government agencies, Local Government agencies, businesses, social partners and NGOs.

The National Coalition 2018 action plan²⁸ contains 54 actions ranging from the design and development of accessible digital educational material, upgrading education infrastructures, subsidising job positions in ICT enterprises, training in digital marketing for SMEs in the tourism industry, launching vocational training programmes in the field of ICT etc. Some of the most emblematic actions included in the action plan are:

- Training in digital marketing for SMEs to enhance the extension of tourist season in regions of Greece (with the support of GOOGLE).
- Creation of job positions in ICT enterprises for 12 months. The total number of beneficiaries will be 500 young unemployed aged 25 to 29 years old. The budget for the programme will be EUR 7,000,000.
- Measures regarding training, certification and up-skilling in the field of ICT at Regional Level, for 3000 unemployed for the 18-24 age cohort and 1250 already employed.
- Digital Skills for All initiative: Short Learning Programmes (SLPs) developing digital skills to encourage people to be active in the context of the digital society. The initiative is launched in Cooperation with the Ministry of Digital Policy, with the support of the Hellenic Open University (HOU), targeting 150,000 people.

The table below presents an overview of the main measures for the development of digital skills (Pillar 5 of the DEI).

Table 7: Overview of initiatives to improve digital skills

Name	Alliance For Digital Employability (AFDEmp)	Upgrading digital skills of private sector employees	Digital Skills for All initiative	Training and certification of knowledge and skills of workers in the private sector (2 nd cycle)	STEM	Creation and provision of large-scale educational programs in Digital Skills and implementation of pan-Hellenic educational and information activities in Digital (Intelligent) Agriculture
Type	Training and Certification	Financial Grants for training	Distance learning/training programmes	Training and Certification	Vouchers	Educative platforms
Starting date	2017	2018	2018	2018	2019	2019
Objective	The Alliance For Digital Employability (AFDEmp) is an initiative that aims to reduce unemployment and eliminate the gap between demand and supply through re-skilling 500,000 candidates in ICT within the next 10 years, primarily in Greece. Coursework is taught by industry and academic experts.	The programme supports the ICT up-skilling of employees in various sectors of the economy.		Design and implementation of employee training programmes in the private sector and certification of knowledge acquired.		Preparing/training farmers in order to be able to exploit/use intelligent agriculture systems.
Short description	Through a 12 or 24-week intensive training course,	Training of private sector employees in	As part of the EC's Digital Skills and Job Coalition, the	- Designing of vocational training programmes in	Graduate students, postgraduates, PhD candidates in the	Development of MOOCs and four special platforms

Name	Alliance For Digital Employability (AFDEmp)	Upgrading digital skills of private sector employees	Digital Skills for All initiative	Training and certification of knowledge and skills of workers in the private sector (2 nd cycle)	STEM	Creation and provision of large-scale educational programs in Digital Skills and implementation of pan-Hellenic educational and information activities in Digital (Intelligent) Agriculture
	<p>previously unemployed candidates with no ICT background, are re-skilled and certified, in cooperation with PeopleCert World Certifications, as full-stack developers in Java or C#. Candidates are selected through a rigorous process.</p>	<p>order to upgrade their ICT skills</p>	<p>Hellenic Open University (HOU) has developed curricula - Short Learning Programmes (SLPs) developing digital skills (based on the DigComp Framework)</p>	<p>selected disciplines based on labour market needs and in particular on the basis for the development of new skills and enhanced knowledge.</p> <ul style="list-style-type: none"> -Providing training based on the above training programmes. - Certification of acquired qualifications / skills of the aforementioned programmes, through the assessment of their knowledge and capacity by accredited certification bodies, according to the international 	<p>fields of science, technology, engineering and mathematics (STEM) will be able to enhance their professional skills in the field of programming, development and management of IT systems.</p>	<p>dealing with intelligent / digital agriculture. These platforms will form the framework for the development of modules and training material on modern digital farming.</p>

Name	Alliance For Digital Employability (AFDEmp)	Upgrading digital skills of private sector employees	Digital Skills for All initiative	Training and certification of knowledge and skills of workers in the private sector (2 nd cycle)	STEM	Creation and provision of large-scale educational programs in Digital Skills and implementation of pan-Hellenic educational and information activities in Digital (Intelligent) Agriculture
				standard ISO / IEC 17024 or EOPPEP.		
Granting organisation	AFDEmp	Managing Authority of the Operational Programme “Competitiveness, Entrepreneurship & Innovation” (EPAnEK)	Ministry of Digital Policy, Telecommunications and Media	Managing Authority of the Operational Programme “Competitiveness, Entrepreneurship & Innovation” (EPAnEK)	Ministry of Digital Policy, Telecommunications and Media	Ministry of Digital Policy, Telecommunications and Media
Participating organisations	Currently participating companies 234	Union of Hellenic Chambers (KEEE)	Hellenic Open University (HOU)	Scientific and professional public entities, Institutional Stakeholders, Sectoral bodies, Chambers of commerce and Business Associations, Worker Federations		Agricultural University of Athens
Sectors targeted	Horizontal	Horizontal	Horizontal	Focusing on the nine strategic areas of the new NSRF: agri-food industry, energy, logistics, cultural and creative industries, environment,	Horizontal	Agriculture

Name	Alliance For Digital Employability (AFDEmp)	Upgrading digital skills of private sector employees	Digital Skills for All initiative	Training and certification of knowledge and skills of workers in the private sector (2 nd cycle)	STEM	Creation and provision of large-scale educational programs in Digital Skills and implementation of pan-Hellenic educational and information activities in Digital (Intelligent) Agriculture
				tourism, information technology and communications, construction and health.		
Funding (split by private/public and national/EU), state period/annual funding	n/a	Co – funded by EU structural funds (EUR 24 million) – 15,000 beneficiaries	150,000 beneficiaries	Co – funded by EU structural funds (EUR 70,387,748.44)	Co – funded by EU structural funds (EUR 13,392,000) – 10,000 beneficiaries	Co – funded by EU structural funds (EUR 9,585,572) – 10,000 beneficiaries
Current status of initiatives	Programme launched during 2017. Until today, 97% are hired as entry-level, full-stack developers by top companies.	Programme launched on 17/10/2018. Training will start during 2019	Started in 2018	Launched during 2018. Period of implementation 2018 – 2020.	Announced in 2018. First year of granting 2019	Announced 2018. First year of granting 2019

Impacts, challenges and perceptions

Despite the above presented actions and while in Greece the population with tertiary education exceeds the EU average²⁹, the country still faces important challenges, accentuated by brain drain, as is the lack of ICT specialist and the low percentage of people with at least basic digital skills. This shortage of ICT specialist and basic ICT skills³⁰, coupled with the relative low ICT task intensity³¹, can prove important obstacles for future growth.

Furthermore, the proportion of SMEs providing ICT training to their employees has decreased from 2016 to in 2017 which is affecting the ICT skills of the Greek workforce³², since according to estimations, the use of ICT is needed in more than 90 % of workplaces.

In terms of Human Capital, Greece's performance remains well below the EU average, but it is making progress in terms of share of the Greek population using the internet on a regular basis and share of ICT specialists. On the other hand, the number of people with at least a basic level of digital skills is stagnating and Greece remains far below the EU average in this area.

Based on a recent study³³ by the Foundation for Economic & Industrial Research (IOBE), an increase by 80,000 of the number of Greeks with advanced digital skills could result in the creation of 500 new firms, an increase by EUR 35 of the average wage and in EUR 1.2 billion in terms of exports. In the same study, it is estimated that the increase by a thousand of the ICT specialists available in the country could lead to an increase of GDP by EUR 480 million.

Finally, based on the private sector interviewees, there is a need to reconfigure the educational and vocational training system closer to the needs of the economy, to expand on the job training programmes and provide incentives to firms to increase training of their employees. With regard to current initiatives, the industry representatives consulted perceive that Government support is useful but not sufficient (average score of 3 on a 1-5 scale).

2.4 Support mechanisms

EU structural funds remain the major source of funding (in terms of subsidies) for the digital transformation of the Greek economy and the skills upgrading of the work force. The Greek government is focusing mainly on providing tax incentives, creating a business environment conducive to innovation and Venture funding to support start-ups and scale ups. In this context, the most important support mechanisms, not covered in the previous sections, are the following:

- Tax incentives for patent-based products, (Government Gazette A' 167/2013 – Article 71A Law 4172/2013). This regulatory framework provides income tax exemption to company's profits from the sale of a product (tax for three consecutive years), for the production of which an internationally recognized patent (in the name of the same company) is used.
- The Greek parliament adopted a new legislation on 11 December 2018 that introduces an exemption from the 1% tax on capital formation, provided the capital is invested exclusively in research and development (R&D) activities. The law amends article 22 of L.1676/1986 by adding the new capital tax exemption to the list of existing exemptions. Trading companies, associations, cooperatives and branches of foreign companies qualify for the exemption provided a cash contribution is directed to the implementation

of scientific and technological expenditure (as defined in article 22A of L.4172/2013 and joint ministerial decision 109343/12/29-06-2017).

- In addition, Article 22A of the Hellenic Income Tax Code (Law 4172/2013) states that expenditure on scientific and technological research -which includes depreciation on equipment and instruments used to carry out scientific and technological research- is deductible from the gross revenues of businesses during the year the expenditure is incurred, augmented by 30%.
- Equifund launched in 2018 by the Ministry of Economy and Development. The initiative aims at supporting start-ups and scale-up companies. It provides support of start-ups and scale-ups through 10 intermediary funds (technology transfer, accelerator, early stage / seed and growth stage private equity funds). It is expected to mobilize over EUR 400 million. It is co-financed by EU and national funds, EIF and EIB, through the European Fund for Strategic Investments (EFSI). Strategic partners such as the Onassis Foundation and the National Bank of Greece have also committed to EquiFund supported funds. Under this scheme, 15 million were invested during 2018. The fund is expected to support investments in many cutting-edge fields such as Robotics and Automation Machinery, Big Data and Data Analytics, 3D-Printing, AI, Cloud, IoT.
- Upcoming new framework for strategic investments (under public consultation until December 17th). The new framework will cover issues like short-term licensing, stable taxation and tax exemptions.

Impacts, challenges and perceptions

The above tax exemptions are not widely used by enterprises, mainly due to the structure of the Greek economy, while Greece has not attracted significant foreign direct investments, due to bureaucracy, among other factors. Indicatively, as stated by a government interviewee, only 17 companies (mainly multinational and large firms) took advantage of the benefits provided by 71A Law 4172/2013, during 2018.

3 Conclusions

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

Table 8: Breakdown of the financing of the 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)
Digital Step	EUR 50 million (2019)			
Digital Jump	EUR 50 million (2019)			
Digital transformation of the agricultural sector	EUR 33.5 million (2018 & 2019)			
Research-Create-Innovate		EUR 75.5 million (2018)		
Directive (EU) 2016/1148			n/a	
Cloud National Policy			n/a	
Directive 2014/55/EU			n/a	
Upgrading digital skills of private sector employees.				EUR 24 million (2018 & 2019)
STEM				EUR 13.4 million (2018 & 2019)
Creation and provision of large-scale educational programs in Digital Skills - (Intelligent) Agriculture				EUR 9.6 million (2018 & 2019)
Digital Skills for All initiative				n/a
Training and certification of knowledge and skills of workers in the private sector (2nd cycle)				EUR 70.4 million (2018 & 2019)
Alliance For Digital Employability (AFDEmp)				n/a
Tax incentives for patent-based products,	n/a			
Exemption on capital formation, invested exclusively in R&D.	n/a			
Depreciation of R&D expenditure (Law 4172/2013)	n/a			
Equifund	EUR 15 million (2018)			
Total spending 2018 – 19 *	At least EUR 341.4 million			

*This amount is expected to be higher, both due to the speeding up of the implementation of measures like Equifund (with a total budget of EUR 400 million), but also due to new measures expected to be launched during 2019.

As the results of the DESI index show, Greece performs below the EU average with regard to digitisation, with moderate results in terms of human capital and digitisation of public services.

SMEs are the focus of most policy initiatives regarding digitisation. To support these companies the Ministry of Digital Policy, Telecommunications and Media, in collaboration with other government organisations, launched several measures aiming to upgrade SME's digital competences, like the measures Digital Step and Digital Jump. The nine Digital Innovation Hubs

active across the country also target mainly SME's, with relative limited impact this far (Pillar 2&3 of the DEI).

At the same time Greece cooperates with different European initiatives, notably the European Blockchain Partnership (EBP), the Southern European Countries Ministerial Declaration on Distributed Ledger Technologies, the European Commission initiative on Artificial Intelligent and the 5G cross-border corridor initiative in collaboration with Bulgaria and Serbia (Pillar 1 of the DEI).

Regarding the regulatory framework (Pillar 4 of the DEI), the major driver for formulating a legal framework conducive for the digital age in Greece appears to be the transposition of EU regulations into the national framework, while gradually the national authorities appear to be also stepping up various national initiatives that will facilitate the digital economy in Greece. However, many legislative and bureaucratic barriers remain, impeding progress and investments.

Furthermore, in the face of weak performance in terms of digital skills, Greece appears to be stepping up initiatives to increase both basic and advanced digital skills (Pillar 5 of the DEI). However, these initiatives are relative recent, so that their impact cannot be assessed yet.

To sum up, by creating the new Ministry of Digital Policy, Telecommunications and Media in 2016, the government has set digitisation of the economy in the forefront of its policy priorities. The increasing number of policy measures launched particularly during 2018 and the measures already announced for 2019 can be seen as the translation of this priority into concrete actions.

However, the progress of the National Digital Policy 2016-2021 (NDS) has been moderate. Further steps should be taken in order to increase the pace of implementation. Given the recent adoption of the measures and the limited impact so far, no measure could yet be put forward as a best practice.

To conclude, the table below provides a general overview of the main digitisation initiatives implemented in Greece, the level of take-up and perception of their impacts and the overall progress Greece has made so far with regard to digitisation.

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)	Digital Step (2018), Digital Jump (2018)	, Research – Create – Innovate (2017)	Directive (EU) 2016/1148 (2018), Directive 2014/55/EU (2018), Cloud National Policy (2018)	Upgrading digital skills of private sector employees (2018), STEM (2019), Digital Skills for All initiative (2018), Intelligent Agriculture (2019), Training and certification of knowledge and skills of workers in the private sector
		Digital transformation of the agricultural sector (2018)			

		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)
					(2018), AFDEmp (2017).
	Funding (total amount and period)	More than EUR 209 million between 2018 and 2019			More than EUR 117 million between 2018 and 2019
	Industries addressed	Mainly SMEs in all sectors	ICT, Agriculture, Health, Energy, Transport, Culture-tourism, Environment, Materials	Energy, Transport, Financial sector, Health, digital infrastructures	Most measures are horizontal, while some focus on the nine strategic areas of the new NSRF
	EU programme involved	Yes	Yes	Yes	Yes
Usage	Perception of initiative	Government support is regarded as useful but not sufficient (3/5).		Gradually improving but not yet fit for the digital age	The government initiatives on digital skills are perceived as rather useful
	Take-up	Moderate uptake	Moderate uptake		Expected number of beneficiaries between 2018 – 2019 is estimated to exceed 50,000
Outcomes	Perception of outcomes	The level of take up of digital technologies is perceived rather low (2/5)	The level of innovation in digital industries is perceived as moderate (3/5)	The regulatory framework is gradually becoming fit for the digital age but with barriers remaining (3/5)	The lack of digital skills and of specialized ICT employees seen as a key barrier for future growth (3/5)
	Outcome metrics	<ul style="list-style-type: none"> - ICT spending below the EU average. - R&D expenditure during 2017 accounted for 1.14% of GDP (Provisional data³⁴). - Greece belongs to moderate innovators. - At least 500 start ups established during the 2012 – 2016 period, most of them exploiting digital technologies. 		R&D intensity constantly rising, from 0.67% of GDP in 2011, to 1.14% during 2017. Number of startups increasing. Support mechanisms (VCs, incubators) also increasing.	The proportion of SMEs providing ICT training to their employees has decreased from 14.0 % in 2016 to 10.7 % in 2017. Greece still has the lowest proportion of ICT specialists (1.4 %) in the EU.
	Change in outcomes	ICT spending remains stagnant. Greece ranks 27th during both 2017 and 2018, exhibiting limited progress relative to other EU members.			
End-goal	Productivity growth	Labour productivity is declining in Greece since 2008 (the onset of the economic crisis), while 2017 it stabilized after the 10 years (0 growth) ³⁵ .			
Summary		Greece has recently launched several initiatives with focus on pillars 2 ,3 and 5, while its gradually modernizing its regulatory environment and enhancing the support mechanisms. However, the country still has to cover a considerable distance in order to approach the EU average.			

ANNEX 1 List of stakeholders interviewed

Type of stakeholder	Name of organisation
Government representative	Ministry of Digital Policy, Telecommunications and Media / General Secretariat of Digital Policy
Government representative	Ministry of Economy and Development / General Secretariat for Industry
Government representative	General Secretariat for Research & Technology of Greece / Directorate for Research & Innovation Policy Planning
Industry association	Hellenic Federation of Enterprises (SEV)
Industry association	IME GSEVEE - The Small Enterprises' Institute of the Hellenic Confederation of Professionals, Craftsmen and Merchants

ENDNOTES

¹ A joint ad hoc ECB, EC and IMF support schemes created for a bail out agreement to help the country who was unable to borrow at the international financial markets.

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