DIGITISATION: ECONOMIC AND SOCIAL IMPACTS IN RURAL AREAS

NATIONAL POLICY ANALYSIS

GREECE

TO BE SUBMITTED BY 11TH OCTOBER 2021

DESIRA receives funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 818194.

National Policy Analysis | Greece

Project name	**DESIRA | Digitisation: Economic and Social Impacts in Rural Areas**
Project ID	818194
H2020 Type of funding scheme	Research and Innovation Action (RIA)
H2020 Call ID & Topic	H2020-RUR-2018-2 / RUR-02-2018 Socio-economic impacts of digitisation of agriculture and rural areas
Website	www.desira2020.eu
Document Type	Working document
File Name	WD 4.2– National Policy Report | Greece
Status	Final
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Content

Executive Summary

This paper reflects on Greece's digital status and reports the most important initiatives deployed during the past 5 years, maintaining focus on policies-programmes and initiatives that aim to boost the digital transformation of the agricultural sector and rural areas of the country. A number of important European and national initiatives have been announced during this period that have contributed to the country's steady progress towards achieving a digital and technological readiness necessary for entering the post covid-19 period. Greece's participation to the EU digital transformation landmark initiatives, the crucial financial support funnelled from the ERDF, EARDF, ESF and other structural and cohesion funds as well as whole scale organised actions to transpose the country's legal and policy framework to match the European standards, signify fitting preconditions for the country's transition towards a digital era. However, Greece's public sector structural deficiencies and demographic profile, impede the fast-paced implementation of digital transformation policies and initiatives, facts that are also reflected in the country's significantly low rankings among the EU member states basing on the DESI and NRI indexes. When it comes to rural and agricultural digitalisation, Greece is putting effort to close the gap with the rest of the European states by implementing national scale horizontal measures. On the other hand, omits the focus on the individual challenges that the rural regions present, lacks mechanisms to capitalise on channelling the local experience and tacit knowledge into the policy making process, while at the same time suffers from the absence of a concrete data management plan that would help accelerate the smart, green and digital transition of the county's agricultural sector.

1. Introduction

Greece is a country that underwent severe austerity measures the past decade of deep economic crisis, a fact that undoubtedly affected the deployment of the country's development plans. Nowadays, on the verge of the 4th industrial evolution, Greece is facing new development priorities from deploying policies that will stimulate the digital transformation of its main economic sectors, to the improvement of business and business ecosystems while tackling in parallel the environmental challenges that arise. At the same time, these new priorities must also address existing social challenges and alleviate growing inequalities.

Creating the basic conditions for digitalisation & Adapting digitalisation to different contexts

Greece has realised the necessity of its transition to the digital economy and society, the county's digital transformation is an immediate need and priority. In this context, Greece has developed a national strategy for digital transformation aiming to align with landmark digital European policies and set specific targets that will benefit Greek society and economy. Greece's strategy for digital transformation[1] is encapsulated in 7 individual targets, 1) Fast and secure broadband access for everyone 2) Digital governance that will be able to offer better digital services for citizens 3) Development of the citizen's digital skills 4) Facilitate the digital transformation of every Greek business 5) Support the digital economy 6) Effective exploitation of public data 7) Inclusion of digital technologies in every sector of the Greek economy.

Favouring digital inclusion & developing digital ecosystems

Greece has been actively involved into initiatives like Digital Step and Digital Jump supported by the Cohesion Structural Fund that play a pivotal role in strengthening the country's low rank of digital skill level. Moreover, the implemented digital transformation actions and policies do not focus solely in supporting the SME's and centralised cities economy, though also expands in promoting sustainable development and improving the quality of life in rural Greece and increase the effectiveness in achieving national and European policies objectives. *'Digital Transformation of the agricultural Sector', 'implementation of pan-Hellenic educational and information activities in Digital Agriculture*', '*Smart Rural Areas and Villages',* pose some of the primary national policies that promote horizontal digital transformation actions to support rural stakeholder and boost the development of sustainable economic activities and provide comprehensive digital skill educational programs that will cover a vast scope of business interactions of the rural economy actors[2].

Developing adaptive governance models & Designing policy tools for sustainable digitalisation

Greece's national digital strategy adopts, specialises, and implements the basic directions and commitments engulfed in the 2017 'eGovernment declaration' that marks political commitments at EU level on significant priorities towards ensuring high quality, user-centric digital public services for

[1] Greece - Digital Transformation Strategy 2020-2025. Available at: https://digital-skills-jobs.europa.eu/en/actions/national-initiatives/national-strategies/greece-digital-transformation-strategy-2020-2025

[2] EU, VVA & Wik-Consult, (2019). '*MONITORING PROGRESS IN NATIONAL INITIATIVES ON DIGITISING INDUSTRY: Country Report Greece*'

citizens and seamless cross-border public services for businesses. Additionally, other landmark European policies like the EU eGovernment Action plan 2016-2020 and the New EU Interoperability Framework shape the broader national policymaking direction towards citizen-centered planning and provision of digital services as well as cross-border business services. Therefore, Greek policy must ensure the participation of citizens and businesses, both in terms of developing feedback mechanisms and increased consultation as well as in the design, development and continuous improvement of new as well as existing services[3].

Anchoring digitalisation to sustainable development

Greece must create the proper conditions for a radical change in its urban and rural economy by developing a policy plan that will attract funding and digital innovation investments in order to carry out, the necessary restructuring of the local and national economy while strengthening the social cohesion, promote green circular economy mechanisms and retrain affected workers and younger generations involved into future innovative business pathways. The current situation offers a unique opportunity for a green digital transition aligned with the European Green Deal, the National Energy and Climate Plans and the EU Governance of the Energy Union and Climate Action along with other strategies like Farm-to-Fork and the biodiversity recovery strategy (Biodiversity for 2030). As a head start, through Green Deal Greece will receive significant economic support from the EU Recovery fund, that must be funneled for the digital transformation of Greek economy based on up-to-date and innovative methods already applied in the rest of Europe.

When it comes to digital and sustainable transition of the rural areas, Greece's involvement in the Green Deal and other landmark EU policy initiatives should aim in the reformation of the Common Agricultural Policy (CAP), the contribution of farmers to circular economy and biodiversity (on the basis of the "farm-to-fork strategy"), the digital upskilling of the country's workforce, the enhancement of rural sustainability, the food security, and the biodiversity's restoration.

For the aforementioned purposes, the expansion of the resources of the Fund for Agricultural Development in the framework of the economic recovery plan as well as the resources of the 2021-2027 period are totally connected with a shift to the Greek CAP and particularly through digital innovations and eco-patterns in agriculture.

2. Context for (rural) digitalisation

2.1. Current context for digitalisation

Greece is showcasing a steady performance in digital transformation. It remains however well below the EU average and towards the bottom of the list of EU member states. The country's connectivity infrastructure and level of digital skills as well as the degree of digitisation of businesses and digital public services score among the weakest in the EU. Greece has relatively weathered the after-effects

[3] Digital Government Factsheets – Greece (2019). Available at: https://joinup.ec.europa.eu/sites/default/files/inline-files/Digital_Government_Factsheets_Greece_2019.pdf

pandemic with positive digital transformation actions to upgrade the public sector, utilise and further exploit the advantages of digital technology through the Covid-19 crisis. Greece increased the availability of digital public services, launched a national-scale portal (gov.gr) to unify more than 500 services under its 'umbrella', and facilitated the services for teleworking for a vast number of employees in the public sector. On the other hand, the private sector ranks 24th in the EU when it comes to integration of digital technology. Electronic information sharing and use of big data are the strongest digital dimensions of Greek businesses, while the use of cloud services and SME's selling online are Greek businesses weakest points. A positive countermeasure to the private sectors lagging performance are the 9 Digital Innovation Hubs operating in the country that operate in a range of different sectors such as agriculture, fishing, construction, manufacturing, transport and electricity, and experimenting with a variety of advanced technologies such as additive manufacturing, AI and cognitive systems, cybersecurity and blockchain, big data and photonics. In terms of digital infrastructures, Greece ranks last with respect to overall connectivity metrics and overall use of internet services, while when it comes to digital skills Greece converged with the EU average on the human capital dimension of digital skills (measured by DESI), referring to 2019 data, 51% of individuals between 16 and 74 had at least basic digital skills, narrowing the gap with the EU average still though ranking 25th among the EU member states[4].

Network Readiness Index (NRI)

Greece ranks 45th out of the 134 economies included in the NRI 2020[5], the country's main strength relates to Technology as showcased by the indicators of Tertiary enrolment, e-commerce legislation, and Computer software spending. In contrast, Greece showcases weak economy related indicators that include freedom to make life choices, Investment in emerging technologies, and Government promotion of investment in emerging technologies. Greece is ranked 43rd in the group of high-income countries and ranks in the 30th position within Europe outperforming the average in Europe in two of the twelve sub-pillars: Access and Individuals.

[4] Foundation of Economic and Industrial Research, (2020). '*Greece 2020- Factsheet on digital transformation.*'

[5] The Network Readiness Index 2020, 'Accelerating Digital Transformation in a post-Covid Global Economy'

	Rank (out of 134)	Score
Network Readiness Index	**45**	**55.20**
A. Technology pillar	**39**	**51.37**
1st sub-pillar: Access	37	78.91
2nd sub-pillar: Content	36	46.79
3rd sub-pillar: Future Technologies	62	28.42
B. People pillar	**46**	**52.95**
1st sub-pillar: Individuals	25	68.24
2nd sub-pillar: Businesses	61	46.02
3rd sub-pillar: Governments	64	44.59
C. Governance pillar	**49**	**61.80**
1st sub-pillar: Trust	62	44.55
2nd sub-pillar: Regulation	44	72.95
3rd sub-pillar: Inclusion	54	67.91
D. Impact pillar	**55**	**54.67**
1st sub-pillar: Economy	67	25.29
2nd sub-pillar: Quality of Life	63	66.08
3rd sub-pillar: SDG Contribution	42	72.64

Figure 2-1: Greece's Network Readiness Index 2020

Digital Economy and Society Index (DESI).

Digital Economy and Society Index (DESI) is composed of a set of qualitative and quantitative dimensions that reflect the digital evolution of Greece. It should be noted that, DESI index is a ranking index, it does not reflect Greece's performance in absolute terms, but its performance compared to other countries. Therefore, the fall of a country in the European ranking does not directly translates into progress halt, it probably signifies that other countries progress in a faster pace.

Greece along with Romania, Bulgaria and Poland, showcase the lowest overall scores based on the 2019 DESI Index[6]

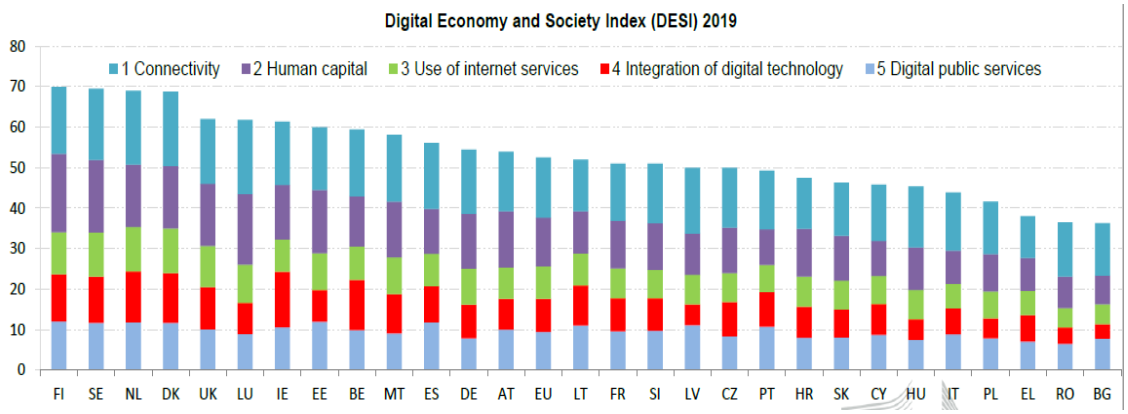

Figure 2-2 European Digital Economy & Society Index 2019 rankings

Investigating further in national level the five different areas that compose the DESI, the following observations can be highlighted[7]

[6] DESI 2019, European Commission

[7] Βίβλος Ψηφιακού Μετασχηματισμού 2020-2025

Connectivity

In the 2020 survey, which concerns data for the year 2019, Greece is ranked last among the 28 EU countries. in the DESI dimension in terms of connectivity, with a score of 33.4 points against 50.1 of the European average. In Greece, the increase in the availability of fixed broadband connections is still evolving slowly at a rate of 76% (below the EU average of 78%). On the other hand, the penetration of broadband communications speed of at least 100 Mbps increased slightly, from 0.3% in 2018 to 0.8% in 2019. Greece is moving very fast in the coverage of high-speed broadband communications (Next Generation Access - NGA), after making significant progress of 15 percentage points in 2019 and reached 81%, ie just 5 percentage points below the EU average of 86%. In addition, the country does not have a significant level of infrastructure in high-speed broadband networks. In addition, the country began to participate in the development of very high-capacity networks and despite the fact that the coverage of fixed networks of very high capacity reached 7% from 0% last year, Greece is well below the EU average which is 44%. While the penetration of mobile broadband has increased by 11 points, the current number is 86 subscriptions per 100 people, much lower than the EU average of 100 subscriptions per 100 people. However, Greece's performance in terms of 4G technology is better, as the average coverage is 97%, slightly exceeding the EU average. (96%).

Human Capital

Greece is ranked 4th from the end in the Human Capital sector for the 2010 report with a rate of 34.8%, which is 29.4% lower than the European average. The main sub-indicators that evaluate the field of Human Capital highlight important deficiencies in relation to the digital skills of the Greek population. In 2019, 51% of people aged 16 to 74 had at least basic digital skills (58% in the EU), a rate equivalent to an increase of more than 5 percentage points over the course of a year, much higher than the average rise by 1 percentage point in the EU The percentage of people with at least basic software skills is also growing satisfactorily, from 52% in 2018 to 56% in 2019, at a faster rate than the EU average. However, Greece has, over time, recorded quite low percentages in employees specialising in Information and Communication Technology (ICT). Indicatively, based on 2019 data collected for the 2020 report, the price of the above variable reached only 1.8% (of all employees in the country) compared to 3.9% of the EU average, while this percentage is even lower for women, ie 0.5% compared to 1.4% of the EU average. Finally, in terms of the percentage of ICT graduates, ie 2.9% of all graduates, the performance of Greece is far behind the EU average, which is 3.6%. The low skills in relation to science, technology, engineering and mathematics (STEM) of Greek students are highlighted, among other things, by the International Program PISA11, the large educational research conducted by the OECD every three years, which evaluates the students' performance in three cognitive subjects (science, mathematics and text comprehension).

Use of Internet Services

In terms of the use of internet services, Greece ranks last (25th) in all 28 Member States12, although the number of Greeks using the internet has an increasing trend. The main reasons for using the internet are information, making video calls and using social networks. Also, Greeks' trust in online shopping and banking services seems to remain low. Indicatively we mention that the use of electronic banking services reached 40% compared to 66% of the European average, while in the field of electronic shopping the usage rate reached 51% for the data of 2019 (collected for the 2020 report),

quite lower than the EU average which reaches 71%. It is possible that this picture will change as a result of recent implementations and the availability of digital solutions to tackle the coronavirus pandemic.

Integration of Digital Technology

The application and adoption of digital technologies is no longer an optional action for businesses but a key survival factor. Nevertheless, the country's ranking is low, 24th among the 28 EU member states, with a score of 28.2 points against 41.4 of the European average. In the 2020 report, the percentage of the use of social media amounts to 19%, compared to 25% of the EU average, while there is a slow integration of the use of cloud technologies, with our country recording a percentage only 7% compared to 18% of the European average. In December 2019, Greece continued to show commitment to the promotion of new digital technologies - in line with the "Digital Europe" program - by signing the declaration on cooperation for the development and installation of European quantum communications infrastructure. Following the signing of the declaration on cooperation for artificial intelligence in 2018, Greece is now developing a national strategy for artificial intelligence, in consultation with stakeholders, and is working on issues related to data collection and quality, the ethical dimension of Artificial Intelligence and Artificial Intelligence Skills. At the beginning of 2020, Greece had 14 digital innovation hubs (9 fully operational and 5 additional in preparation), covering various market sectors, such as agriculture, fisheries, construction, manufacturing, transport and electricity. through a wide range of advanced technologies, such as prosthetics, artificial intelligence and knowledge systems, cybersecurity and the array chain, mass data and photonics.

Digital Public Services

Greece is ranked 27th among the 28 EU member states, with a score of 51.5 against 72.0 of the EU average. Greece performs satisfactorily in relation to the open data maturity index with a percentage of 66% equal to the European average, in the 2020 report concerning data of 2019. In relation to the provision of online public services, in the sub-index concerning the existence In recent years, Greece has made progress in recent years in terms of digital services, but still lags far behind the EU average. More specifically, in the sub-index of the use of pre-filled documents, Greece scores 25 points against the European average of 59 points. The number of internet users who are active users of e-government services stands at 39% and is still much lower than the EU average of 67%, despite an increase of 3% in 2019. Availability digital public services for businesses increased (to 63 in 2019), but not enough to approach the EU average. (88 in 2019).

The Women in Digital Scoreboard 2020

A particularly interesting issue for Greece, is the steady closing of the gap between the participation of men and women in the digital sector. Wage inequality is steadily restored, while the number of women taking top management positions is increasing.

However, like women in Europe, Greece showcases a significant lag behind men in specialised digital skills and work in this field. The below data is confirmed by the scoreboard Women in Digital

Scoreboard 2020 [8]of the European Commission where Greece lies in the 26th place, above Romania and Bulgaria with merely 18% of Information and Communication Technologies experts being Women. Regarding the digital skills of Women, Greece scores with 40.5 against an average of 54.5 in the EU, while Women specialists make up only 16.4% of the workforce in Information and Communication Technologies, compared to an average of 17.7% in the EU.

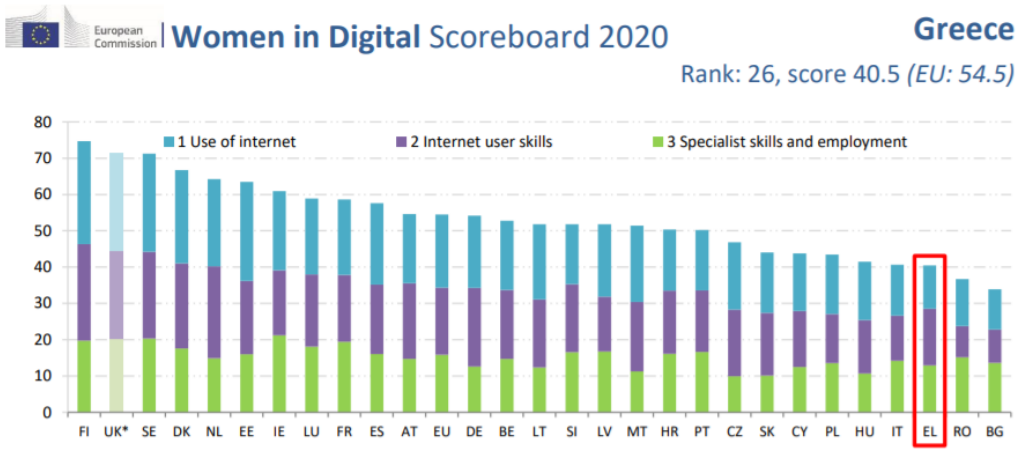

Figure 2-3 Greece's rank of Women in Digital Scoreboard 2020

[8] European Commission, Women In Digital Scoreboard 2020

	Greece Women value	rank	Men value	EU Women value	Men
1 Use of internet					
1.1 Internet users % individuals, 2019	72%	24	*75%*	84%	86%
1.2 People who have never used the internet % individuals, 2019	24%	27	*20%*	10%	9%
1.3 Online banking % internet users, 2019	36%	26	*45%*	65%	67%
1.4 Doing an online course % internet users, 2019	7%	21	*8%*	11%	11%
1.5 Online consultations or voting % internet users, 2019	3%	28	*5%*	12%	12%
1.6 e-Government users % internet users submitting forms, 2019	37%	27	*41%*	66%	68%
1 Use of internet Score (0-100)	36	27		60	
2 Internet user skills					
2.1 At least basic digital skills % individuals, 2019	49%	21	*52%*	56%	60%
2.2 Above basic digital skills % individuals, 2019	22%	24	*25%*	31%	36%
2.3 At least basic software skills % individuals, 2019	55%	18	*57%*	59%	63%
2 Internet user skills Score (0-100)	47	21		55	
3 Specialist skills and employment					
3.1 STEM graduates Per 1000 individuals aged 20-29, 2018	14.5	8	20.5	14.3	26.3
3.2 ICT specialists % total employment, 2019	0.6%	28	*2.4%*	1.6%	6.2%
3.3 Unadjusted gender pay gap % difference in pay, 2018	NA			18%	
3 Specialist skills and employment Score (0-100)	39	21		48	
Women in Digital Index Score (0-100)	40.5	26		54.5	

Figure 2-4 Greece-EU data comparison of Men & Women skills and internet usage

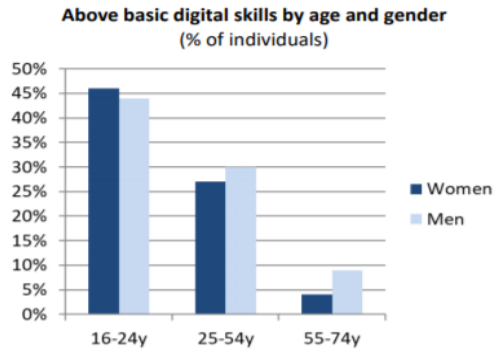

Figure 2-6 Greece's basic level of digital skills divided by age and gender

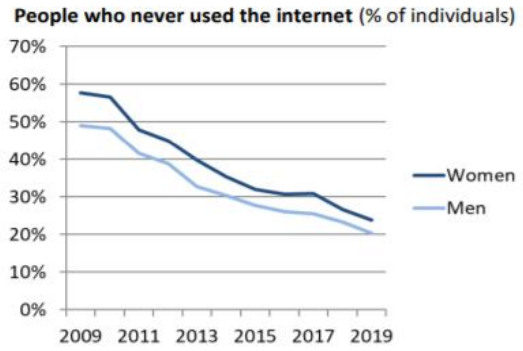

Figure 2-7 Greece's percentage of Individuals that do not use internet divided by gender

3. Policy framework for (rural) digitalisation

3.1. European Digital Policies

Greece actively promotes the priorities set by the EU Digital Agenda, as they are reflected in several framework programmes and initiatives such as the multiannual framework programmes, European

regional development fund (ERDF), European social fund (ESF), European social fund (ESF), Cohesion fund (CF), European agricultural fund for rural development (EAFRD), European maritime and fisheries fund (EMFF), NextGenerationEU – Recovery and Resilience Facility.

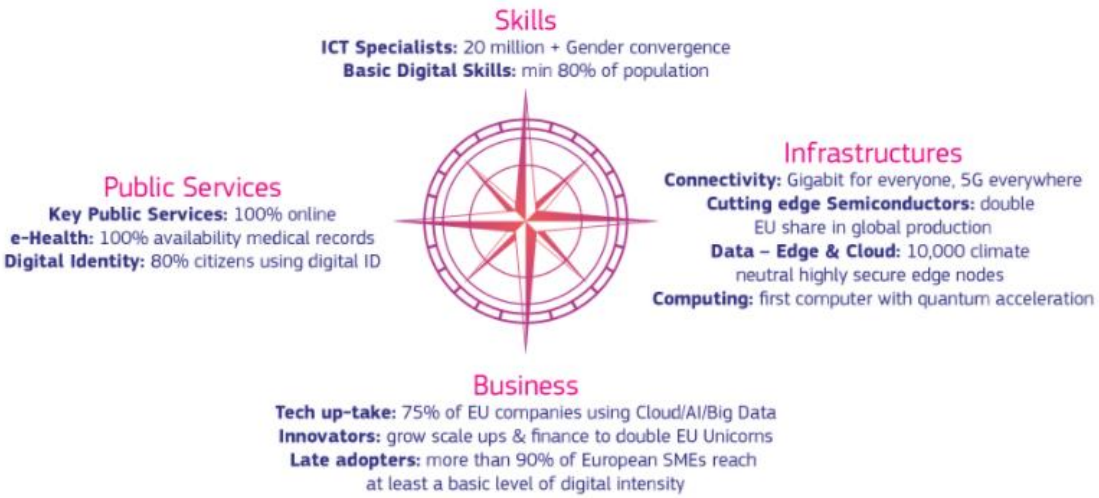

Figure 3-1 EUs Digital Compass (https://digital-strategy.ec.europa.eu/en/policies/europes-digital-decade)

As part of the beforementioned framework programmes, below are mentioned several noteworthy key digital initiatives that Greece participates in or has announced its future participation:

- *European Blockchain Partnership (EBP)* which Greece signed on May 2018. This is an EU initiative, aiming to ensure the active participation of all Member States in the fields of ICT, Blockchain, Distributed Ledger Technologies.
- During December 2018, Greece took part in the *Southern European Countries Ministerial Declaration on Distributed Ledger Technologies*, that is expected to lead to enhancement of e-government services while increasing transparency and reducing the administrative burdens, that will lead to better access to public information.
- Greece, has also signed In May 2018 the *Declaration of cooperation on Artificial Intelligence*. 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.
- 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.
- Following the EU landmark initiatives, though not directly focused on digital transformation, Greece participated in the EU's Green Deal growth strategy that aims to transform the Member states economies by reducing the coupling of economic growth from the use of resources. Green Deal will promote a series of actions and provide the financial tools to enable the transformation in almost all the sectors of Greek economy. The transformative policies

that aim to the adoption of 'clean' technologies by the private sector, reduction of pollution and environmental risk mitigation, are expected to directly affect the degree of digitalisation in various aspects of private, public business practice and governance.

Moreover, Greece strives to transpose several other regulatory policies in its national framework while at the same time trying to alleviate regulatory barriers at national level that impede digital transformation. Some indicative examples are:

- The deployment of a National Cyber Security Strategy,
- Adoption of EU initiatives on data to increase the county's competitiveness in the data economy within the Digital Single Market,
- The transposition of Directive (EU) 2016/61 into national law concerning low-cost measures of installation of high-speed electronic communications.

It is expected that the country's participation in the landmark EU initiatives 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, it is however too soon to be able to clearly define the benefits of participation in the beforementioned initiatives.

3.2. National Policies boosting digitalisation

3.2.1. National Digital Agenda or similar strategies

During 2016, the Greek Government set-up the Ministry of Digital Policy, Telecommunications, and Media to assume the duties of policy-making, policy-design, and overall coordination and monitoring of implementation of the ICT investments in the country, as well as the horizontal implementation of measures planned inside the context of the National Digital Strategy 2016-2021[9].

The main scope of National Digital Strategy engulfs a) the acceleration of digital uptake in the economic sector, b) the utilisation of ICT to facilitate the transition of Greek businesses to a more dynamic mode of operation. Within this frame of reference, the Ministry for Digital policy has concluded to four distinctive priorities to serve as a general guideline in the planning and implementation of the National Digital Strategy:

1) Promoting the digitisation of small and medium-sized enterprises (SMEs)
2) Enhancing openness and e-commerce
3) 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)
4) 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.

[9] Greek Ministry of Digital Policy, (2016). 'National Digital Policy 2016-2021'.

To further assist the National Digital Strategy 2016-2021, Greece has also proceeded in launching the National Next Generation Broadband Access Plan 2014-2020. The National Next Generation Broadband Access Plan served as the roadmap to create an attractive environment for private investors, that will ensure fair competition while limiting risks arising out of low demand of broadband services and furtherly support the development of infrastructure in areas where it is observed that the market fails to provide services meeting the national targets.

Moreover, Greece has also launched a National Cyber Security Strategy in 2017[10], 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.

The National Research and Innovation Smart Specialisation Strategy (RIS3)[11] was also launched during the period 2016-2020 to boost the promotion of ICT in key economic areas and assist the transformation of the productive sectors through research, technological development and innovation while mitigating regional disparities and creating sustainable employment.

In terms of implementation, Greece is half-way in implementing the rough amount of one billion Euro in investments planned for the ICT sector under ESIF for the period 2014-2020. Regarding the Digital Strategy, up-to-day more than 220 relevant ICT projects compatible budgeting 800 million Euros, have already been approved, but their implementation is hindered by bureaucratic issues that set a series of obstacles concerning the smooth implementation of digital transformation policies and initiatives.

Regarding focused policies to support digitalisation in the rural areas Greece launched the programme *Broadband Network Development in 'Rural White Areas' of Greece*[12], a European Network for Rural Development activity that took place from 2014 to 2019, funded by ERDF, EAFRD, National and Private funds and budgeted the total of 139.506.050 Euros. The project developed a broadband infrastructure network that covers rural white areas located in the northern, central and southern regions of Greece, including 17 Prefectures of Southern Greece. It covered approximately 45% of the Greek territory in terms of geographical coverage, providing connectivity to 5.077 villages/settlements in mountainous and insular rural areas, populated by approximately 525 287 residents. 16.000 households have now been connected to a broadband high-capacity network in former rural white areas.

Future policies and strategies focused in supporting rural digitalisation are embedded in the national digital agenda of Greece.

3.2.2. Policies and strategies to boost digital literacy and tackle the digital divide

[10] National Cyber Security Strategy- Version 3.0 (2017) Available online: https://www.enisa.europa.eu/topics/national-cyber-security-strategies/ncss-map/national-cyber-security-strategies-interactive-map?selected=Greece

[11] National Research and Innovation Strategy For Smart Specialization 2014-2020 Executive summary. Available online: http://www.gsrt.gr/Financing/Files/ProPeFiles19/Executive%20Summary-2015-09-17-v04.pdf

[12] Broadband Network Development in 'Rural White Areas' of Greece 2014-2019. Available at: https://enrd.ec.europa.eu/sites/default/files/project/attachments/rr-el_rr-02_rural_broadband_20190326_0.pdf

The Greek Ministry of Digital Governance plan to boost the development of digital skills and reduce the digital divide, aims at capturing and analyzing the current situation at the political, social, economic and technological level, but also involving public and private digital skills training providers. For this reason, it has presented a detailed plan for the digital transformation of Greece[13].

This plan is based on the deployment of two main initiatives 1) the implementation of the project 'Citizen's Digital Academy', through which it is provided to every citizen and every professional, free access to educational programs that develop digital of skills 2) the reactivation of the 'National Coalition for Digital Skills', an action that is part of the wider European 'New skills Agenda for Europe'.

Greek National Coalition for Digital Skills

This initiative was initially founded on May 2018 and operates under the surveillance of the Ministry of Digital Governance. Its mission is the dissemination of European digital skills policies in Greece, the cooperation of stakeholders for information sharing, raising public awareness on the need for the development of digital skills, as well as the planning of actions enhancing digital skills and tackling digital gap in all sectors of the Greek economy and society. This initiative engulfs Greek ministries, government agencies, municipalities, regions, companies, IT companies, collective bodies, while its future goal is to include even more members from the business sector, especially small and medium-sized enterprises, start-ups, as well as NGOs and groups of civil society.

The course of action of this initiative is organised in four thematic units, which will also be supported by respective working groups:

1)Education, 2)Training, 3) ICT Professionals, 4) Citizens.

Its members will develop action plan focusing on the education of the unemployed, upskilling and workforce reskilling, acquisition and upgrading digital skills of students and teachers, and activating young people for ICT-related careers, while at the same time, focus will also be given in promoting the acquisition of digital skills for citizens of all age groups.

Some of the landmark actions included in the initiative's action plan contain:

- Training in digital marketing for SMEs to enhance the extension of tourist season in regions of Greece.
- 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

[13] Greek Ministry of Digital Governance (2020), 'Digital Transformation Bible 2020-2025'

in Cooperation with the Ministry of Digital Policy, with the support of the Hellenic Open University (HOU), targeting 150,000 people.

Citizen's Digital Academy

The 'Citizen's Digital Academy' project is designed with the purpose of being the central coordination hub of all public and private digital skills-education providers, aiming to facilitate a wider escalation of digital actions for the acquisition of digital skills from the public. More specifically, it will act as a collaboration platform that will help coordinate, the national 'digital skills' action plan and achieve the acquisition of digital skills from the civilians in both basic, intermediate but also advanced level. The targeting of the Citizen's Digital Academy is focused to specific needs that cover the development of digital skills in various sectors of the Greek economy and society, such as, tourism, social justice, trade as well as, the primary sector. At the same time, it will incorporate training actions aimed at specific population groups taking into account various regional criteria, that will help cover the needs that exist in local scale.

The creation of this project is a reference point that will serve in the future as a mechanism to gather data on digital education and function as an observatory for the implementation of the national strategy for digital skills.

Table 3-1: Programmes and initiatives addressing digital literacy and digital divide. (*) International, National, Regional or Local

Initiative	Objective	Key words	Period	Area of impact	Link	Public / Private	Scale of action *	Rural / General
Citizen's Digital Academy	Coordination of public and private digital education providers under a common national strategic vision.	National digital literacy, digital education providers, National Gateway for digital skills	2020	Greece	https://nationaldigitalacademy.gov.gr/	Public	National	G
Digital Skills and Jobs Coalition	Facilitation in European level of the cooperation of member states and public-private actors for the alleviation of digital skills gap inside the EU.	Digital competence framework, Digital tools adoption, upskilling & reskilling	2018	European Members States	https://digital-strategy.ec.europa.eu/en/policies/digital-skills-coalition	Public	International	G
National Digital Skills Framework and Certification System	Development of a framework for reporting and assessing digital skills in line with the European Digital Skills Framework	digital skills, education programmes, certification framework	2020-2025	Greece	https://digitalstrategy.gov.gr/project/anaptyxi_ethnikou_plaisioy_dexiotiton_kai_pistopoiisi	Public	National	G
Establishment of a National Registry of Digital Skills Providers	Recording of all educational services providers for the provision of digital skills in the Public and Private Sector in collaboration with the Digital Skills and Jobs coalition	Digital Service providers	2020-2025	Greece	https://digitalstrategy.gov.gr/project/ethniko_mitrwo_parohon_dexiotiton	Public	National	G
Upgrade of the Digital Skills of Local Government and Civil Society employees	Strengthening the digital skills of employees as a key condition for the development of new innovation actions and digital transformation of the public sector.	Digital skills, upskilling civil servants and public officials	2020-2025	Greece	https://digitalstrategy.gov.gr/project/enischysi_ton_psifiakon_dexiotiton_ton_dimosion_ypallilon	Public	National	G

3.2.3. Policies and strategies that incentivise digital innovations

'*Smart Rural Areas and Villages'* has been identified as the latest and primary national policy which engulfs horizontal digital transformation actions that take place during the programming period of national digital strategy 2020-2025. As described in the Digital Transformation 'Bible' of Greece, the focus of digital transformation actions and policies does not limit only on cities but expand also in rural and agricultural areas. The different living and economic conditions between cities and rural areas, as well as the different environmental challenges that exist in remote geographical locations, suggest specialised adaptation of digital innovations and transition of villages and rural areas. The planned interventions aim at:

i) promoting sustainable development and improving the quality of life in rural Greece

ii) increase the effectiveness in achieving national and European policies objectives, with cutting-edge technologies.

Such sub-projects and specialised actions include among others, smart farming and precision farming, smart and distance medical care, lifelong distance learning, smart and sustainable tourism, remote cultural development, Smart Market Management System utilising IoT for automated (real-time) monitoring, Intelligent Transport systems, customised dashboards for monitoring the circular economy indicators in regional level, risk management-prevention control systems.

'Digital Transformation of the agricultural Sector' is another Greek landmark initiative funded with 33.5 million EUR in 2018 by EU structural funds that runs under the surveillance of the Greek Ministry of Digital Policy. This initiative aims to the Installation of 6500 land monitoring sensors across the country that will serve as the foundation of a National Smart Agriculture digital platform for collecting data on agricultural production, soil, crop, air, water and agricultural exploitation, resulting in the significant improvement of both the quantity and the quality of the country's agricultural production.

Another landmark initiative under the surveillance of Greek Ministry of Digital Policy is the *'Creation and provision of large-scale educational programmes in Digital Skills and implementation of pan-Hellenic educational and information activities in Digital Agriculture*'. This initiative is similarly funded on 2018 by EU structural funds budgeting for 9.585,572 EUR, aiming at the training of 10.000 individual beneficiaries/farmers for acquiring skills that will enable them to use smart agricultural systems, as well as the development of four specialised platforms that will provide the framework for the development of modules and training material on modern digital farming.

Finally, the Ministry of Rural Development and Food, following the related European policies, has set up the National Rural Network[14], in the frame of the Greek Rural Development Programme 2014-2020. The goal of the network is to support the sustainable rural development through the exchange of knowledge and information between all stakeholders. It thereby strives to achieve the best possible results for the Rural Development Programs, co-financed by the European Agricultural Fund for Rural Development (EAFRD).

[14] https://ead.gr/home-en/

Table 3-2: Policies influencing digitalisation in rural areas

Initiative	Brief Description	Objectives	Area of impact	Period of implementation	Budget (if any)	Public / Private	Are rural areas specifically mentioned or addressed? Y/N	Link
Smart Rural areas -Smart Villages	Development of standards and examinations of living conditions of rural areas, further examination of economic conditions, and particular environmental challenges, of remote geographical locations, as well as rural development models.	Promote sustainable development and quality of life in rural Greece. Increase efficiency in achieving national and European policy objectives using cutting-edge technologies.	National	2020-2025		Public	Y	https://digitalstrategy.gov.gr/project/exipnes_agrotikes_perioxes_xoria
Law 4635/2019 on Geospatial Data	Public sector bodies will be obliged to provide the competent authorities with electronic access to all geospatial data they hold within their competence in digital form. Public agencies are required to ensure accurate and up-to-date information on geographic data and arrange for the conversion of all their geospatial data into digital form.	Collect and centralise geospatial data, such as land use and building planning.	National	2019		Public	N	https://www.klclawfirm.com/wp-content/uploads/Newsletter-N.-4635.2019-05.12.19_NEW.pdf
Smart Cities	Development of digital applications and installation of smart equipment in municipalities of the country, to upgrade public life, improve the daily lives of citizens, protect the environment, tackle climate change and reduce the energy footprint.	Development and operation of systems that improve the parking and movement of vehicles in cities, public safety, better waste management, measurement of environmental parameters in public space and better management of water resources	National	2020-2025		Public	Y	https://digitalstrategy.gov.gr/project/Smart_Cities
National Reference Sets (Law 3882/2010	The geospatial data used and stored in national institution databases have different non interoperable standards. A typical example is the geospatial cadastral data	Create a common digital background that will be used by all Public Administration in order to exploit and combine geospatial data.	National	2020		Public	N	https://www.e-nomothesia.gr/kat-periballon/n-3882-2010.html

	agricultural parcels and those of agricultural holdings and subsidies. Goal of this initiative is to create common data standards and interoperate spatial data used from public administration agencies.							
Digitisation of the National Land Registry of Hellenic Cadastre	Digitisation of the Land Registry is an integral part of the wider national digital transformation associated with critical areas such as spatial planning, land use, environmental planning and real estate.	390 mortgage offices will be transformed into 92 modern new Cadastral Offices. Documents and maps for all real estate legal transactions will be recorded in digital form. Offer new digital services of: Geo-Portal, Single digital map and nation-wide digitisation of mortgage documents.	National	2021-2024	160-200 milion euros	Public	N	https://www.ktimatologio.gr/posts/etos-orosimo-gia-to-ktimatologio-to-2021-erhetai-to-oloklirimeno-psifiako-ktimatologio
Broadband Network Development in 'Rural White Areas' of Greece	'White areas' are areas of Europe that are identified as having no current internet infrastructure. They are usually remote, mountainous, island or peripheral regions. Unfortunately, the broadening digital divide can have a negative impact on local business and social activities in these areas. In order to specifically target these sparsely populated areas of Greece, the rural broadband project focuses on the development of access networks, the installation of backhauling networks that connect local access networks with regional concentration points, as well as concentration/termination points in locations where multiple network operators (retail ISPs) already exist.	The project developed a broadband infrastructure network that covers rural white areas located in the northern (19 prefectures), central (15 prefectures) and southern (17 prefectures) regions of Greece.	National	2014-2019	139 506 050 million euros	Public/Private	Y	https://enrd.ec.europa.eu/projects-practice/broadband-network-development-rural-white-areas-greece_en
CAP Priority 1: FOSTERING KNOWLEDGE, INNOVATION AND DIGITALISATION IN AGRICULTURE	CAP aim in advancing research, knowledge-sharing, and innovation as essential elements for securing a smart and sustainable agricultural sector. Furthermore, aims	Support cooperation projects, including the framework of the European Innovation Partnership, as well as by stimulate the development of supply chain	National	2014-2020	Under the programming period 2014-2020, Greece programmed 5.7% of their total rural development envelope (EAFRD + national contribution) under M01: knowledge	Public	Y	https://ec.europa.eu/info/sites/default/files/food-farming-fisheries/key_policies/documents/rdp-factsheet-greece_en.pdf

	at incorporating stronger agricultural knowledge and innovation systems (AKIS) to boost the development of innovation projects, disseminate their results, and encourage their use as widely as possible	partnerships in the agri-food sector as well as enhance knowledge transfer in the fields of environmental awareness, innovative technologies, and research to encourage practical implementation on farms and in forests.			transfer and information actions, M02: advisory services, farm management and farm relief services and M16: Co-operation-EIP. This is above the EU-28 average of 3.63%.			

3.3. Contributions from the Structural and Investment Funds and the Cohesion Policy

Greece in the 2007-2013 programming period received support from ERDF and Cohesion Fund that amounted to EUR 15.8 billion, equivalent to about 19% of total Government capital expenditure, or 202 EUR per capita. The EU co-financing rate was increased markedly from 75% to 99.8% during the period to reduce the counterpart national co-financing rate and, accordingly, the national contribution to funding programmes. This allowed for a faster absorption of the funds, notwithstanding the austerity measures taken, but inevitably diminished substantially the total funds available for regional development. The ERDF and Cohesion Fund were mainly used to support transport infrastructure as well as RTD, innovation and SMEs, though support for environmental infrastructure was also important. Over the period, important shifts in funding occurred, both between and within policy areas. Overall, the measures co-financed over the period led directly to the creation of over 21 000 jobs, of which around 1 500 were in research. This was achieved in part through the support given to 561 RTD projects, more than 25 000 projects to help firms finance investment and another 2 600 projects to start-up businesses[15].

During the period of 2014-2020 financial framework of European Structural and Investments Funds, Greece was allocated a total of €21.38 billion, which, added to a national contribution of €4.76 billion, reaching a total budget of €26.14 billion to be invested in various areas. Thanks to an overall allocated budget of over €3.3 billion, of which the biggest share is held by the ERDF (€1.8 billion alone), Greece was able to fund 20 national and regional programmes that aimed to:

- Enhance competitiveness and outward-looking entrepreneurship;
- Promote sustainable and quality employment, especially for those excluded like young and old people;
- Address structural problems in the labour market and promote active inclusion;
- Improve the transition to an environment-friendly economy, through the promotion of renewable energy and energy efficiency, effective waste management, recycling promotion and protection of water resources;
- Promote social inclusion and fight against poverty;
- Improve the education and training systems and the transition to the labour market;
- Develop the national transport system and promote combined transport;
- Enhance institutional capacity, the efficiency of public authorities and self-government;
- Develop ICT infrastructures for enterprises and single-users[16].

[15] EU (2016). 'Ex post evaluation of Cohesion Policy programmes 2007-2013, focusing on the European Regional Development Fund (ERDF) and the Cohesion Fund (CF): Country Report Greece'

[16] https://www.b2eu-consulting.eu/news-detail/country-profile-greece

Figure 3-4 depicts in charts the contribution of the European Structural and Investment Funds in the respective national Goals set.

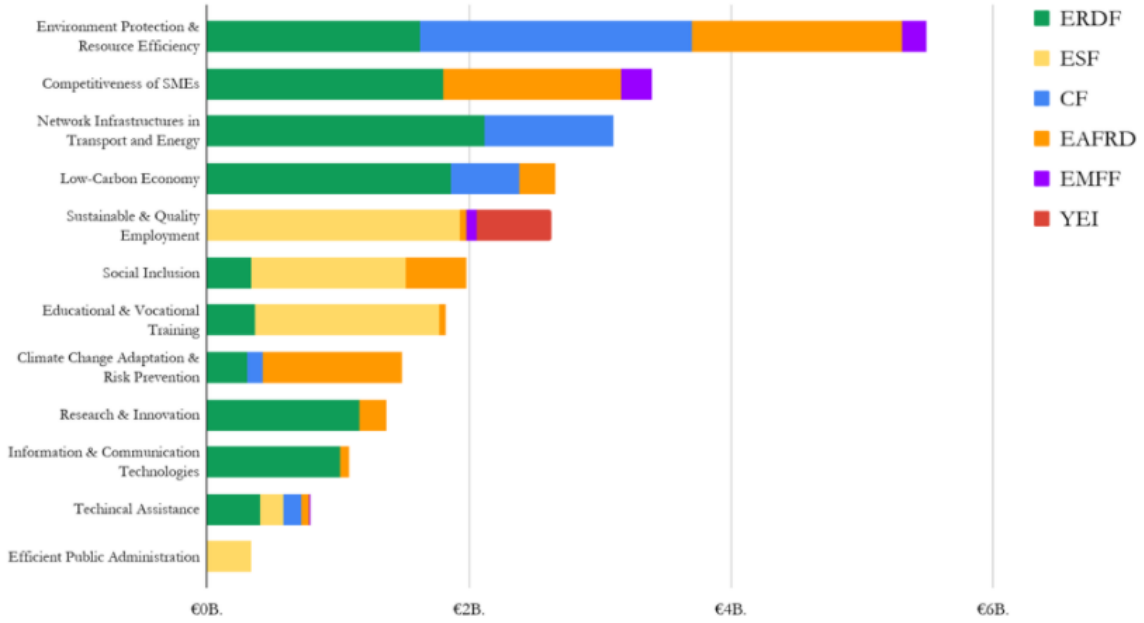

Figure 3-2: Total Budget coming from the Structural and Investment Funds by theme

The main investment area of the Greek government are the protection of the environment and the enhancement of resource efficiency, however attention is also paid in, lesser extent, for the improvement of the competitiveness of small and medium enterprises (SMEs) and overall initiatives that will boost the country's transition to a digital age.

Table 3-3[17] summarises the most prevalent initiatives funded by EU structural funds, regarding the digitisation uptake in different industrial sectors of the country's economy.

Table 3-3: Overview of funded initiatives

Initiatives	Year started	Sectors targeted	Digital technologies targeted	Funding
Digital Step	2018	All	Social Media, Mobile Services, Cloud, IoT, Cyber Security	EUR 50 million. Co-financed by ERDF and by national funds.
Digital Jump	2018	All	Social Media, Mobile Services,	EUR 50 million. Co-financed by

[17] EU, VVA & Wik-Consult, (2019). '*MONITORING PROGRESS IN NATIONAL INITIATIVES ON DIGITISING INDUSTRY: Country Report Greece*'

			Cloud, IoT, Cyber Security	ERDF and by national funds.
Digital transformation of Greek agriculture	2018	Agriculture	Mobile Services, Cloud, IoT, Big Data and Data Analytics, AI	EUR 33.5 million. Co-financed by ERDF and by national funds
Research-Create-Innovate	2017	Research & innovation support	ICT, Agriculture, Health, Energy, Transport, Culture-tourism, Environment, Materials	EUR 75.5 million (during 2018) – 729 firms funded. Co-financed by ERDF and by national funds
Upgrading digital skills of private sector employees	2018	Horizontal		EUR 24,000,000 – 15,000 beneficiaries. Co-financed by ERDF and by national funds
STEM	2019 (announced 2018)	Horizontal		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)	Agriculture		EUR 9,585,572 – 10,000 beneficiaries. Co-financed by ERDF and by national funds
Digital Skills for All initiative	2018	Horizontal		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	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.		EUR 70,387,748.44. Co-financed by ERDF and by national funds

3.3.1. Broadband infrastructure

99% of Greek households enjoyed basic fixed-line broadband in 2016. Despite its challenging geography, Greece managed to increase its coverage of rural areas by one percentage point to 97%, which was above the EU average (93%). Its coverage of households with next-generation access (NGA) networks increased by 8 percentage points to 44%, but was still very low compared to the EU average (76%). Only 1 % of households in rural areas had access to NGA networks (EU average 40%). This further emphasises the importance of 4G deployment, where Greece fared well with 80% coverage of households, which was very close to the EU average of 84%. Lack of NGA coverage only partly explained the low NGA take-up, which was the second lowest in the EU. Only 7% of current subscriptions were between 30 Mbps and 100 Mbps. The lowest fixed-line broadband price (12-30 Mbps or higher) was €21.69 compared to €21.33 across the EU.[18]

Table 3-4: Greece's Broadband coverage. Data as of October 2015 - October 2016[19]

Coverage		Greece 2015	Greece 2016	EU 2016
Fixed Broadband coverage (total)		99%	99%	98%
Fixed Broadband coverage (rural)		96%	97%	93%
Fixed NGA coverage (total)		36%	44%	76%

[18] Europe's Digital Progress Report-2017

[19] Broadband Coverage Study (IHS and Point Topic).

Fixed NGA coverage (rural)		0%	1%	40%
4G coverage (avg over all operators)		No data	80%	84%

Greece restructured its administration in 2016, bringing all digital policy departments under one ministry (Ministry of Digital Policy, Telecommunications and Information). The broadband strategy is based on the assumption that the private sector will fund most such investments, with public intervention focusing mostly on areas plagued by market failure (required funding is expected to be between €1.36 billion and €4.53 billion). Greece is allotting EUR 304 million of ESI Funds to the deployment of broadband infrastructure, specifically to high-speed networks (access/local loop >/= 30 Mbps). At present, only 8.6% of these funds have been used. There are currently no plans for other financial instruments to be used in broadband deployment. The strategy reaffirms Greece's intention to focus on two projects: the rural extension project (an extension of the rural broadband project), necessary for the country to achieve the target of 30 Mbps coverage; and superfast broadband, which aims to boost the take-up of ultra-fast broadband. This will help Greece hit the 100 Mbps target.

3.3.2. Digital Public Services

Greece has made progress in simplifying its administrative systems and processes for the citizens, the public sector shows signs of improvement, however, it still ranks second to last among the EU member-states. The open data maturity indicator shows that Greece in 2020 ranks at the EU average with 66 per cent. Regarding the provision of online public services, Greece continued to progress in 2019, with 25/100 pre-filled forms compared with 23/100 in 2018, though this remains well below the

EU average. The number of internet users that are active users of e-government services at 39 per cent with a 3 per cent increase in 2019.Finally, it is important also to note that the availability of digital public services for businesses increased to 63 per cent[20].

Citizen Service Centres (KEP) through the use of their online platform (eKep), play the role of a one-stop shops where citizens can have access to public service information and over 1,000 standardised administrative procedures. The Citizen Service Centres are linked together by an IP network and use the eKep platform to file and manage citizens' requests, create a relevant eDirectory, register KEP mail and monitor requests' progress all the way through settlement. Moreover, the eKep platform supports the use of certified digital signatures, enabling real-time online transactions between public administrations. The Citizen Service Centre Internet Portal receives over 9 million visits each month, with more than 60,000 citizens visit the Citizen Service Centres every day for their transactions with the government, while since March 2007 Greek enterprises have also been able to make transactions

[20] Digital Transformation in Greece 2020-2021

through the 59 National Chambers more quickly and easily using the Citizen Service Centres. The average service time usually does not exceed seven days[21].

When it comes to e-health, Greece has signed a Memorandum of understanding between the Civil Registry, the Ministry of Interior, the Ministry of Administrative Reform and Electronic Governance of Social Security, the Aristotle University of Thessaloniki, and the states of Germany and Portugal. This action aims at the development, testing and delivering to the European Commission a reference implementation of an eID connector, linking the National Contact Point for eHealth to the EU Member State's technical specification network[22].

In parallel, ebanking which has been introduced in Greece only in 1998, has witnessed a significant increase of active users during the Covid pandemic. The active users of Ebanking services have increased from 3.3 million in the end 2019 to 3.7 million in 2021[23].

In March 2020 Greece established the single digital public administration portal, 'gov.gr', which aims to gather all digital public services under one single domain. The aim of this national scale portal is to progressively host all digital services of Ministries, agencies, organisations and independent public authorities which are already provided through the Internet. Through this overarching portal, users have the ability to search all available services by Ministry, agency, organisation or independent public authority while additionally, the Portal provides, from a central point, complete information to citizens and enterprises with regard to all transactions with the public administration.

The Portal has already contributed to the reduction of bureaucracy and the facilitation of transactions with the state in the midst of the Covid-19 pandemic and hosts the official information website for the measures taken by the Greek government in the context of the above-mentioned pandemic. In addition, the Portal now offers the option of issuing intangible prescriptions, authorisations and a statement of electronic registration in the national Greek online tax and customs services portal (TAXISnet).

Gov.gr functions as an 'umbrella' project that hosts over 500 digital services already provided by 14 ministries, 32 organisations and 3 independent authorities. In short summary, the existing digital services that are available for public use concern the following domains:

- Agriculture and livestock (procedures, subsidies and allowances for agricultural, livestock or fishing activity)
- Justice (judicial services, issue of documents)
- Education (Procedures for enrolment and attendance at all levels of education)
- Entrepreneurial activity (services to start and grow a business)
- Work and insurance (tools and services for your job search, insurance and retirement)

[21] Digital Public Administration Factsheets Greece (2020). Available at: https://joinup.ec.europa.eu/sites/default/files/inline-files/Digital_Public_Administration_Factsheets_Greece_vFINAL.pdf

[22] https://www.moh.gov.gr/articles/ehealth/9300-enhmerwtiko-deltio-gia-thn-proodo-ergasiwn-symmetoxhs-ths-elladas-stis-hlektronikes-diasynoriakes-yphresies-ypodomhs-pshfiakwn-yphresiwn-hlektronikhs-ygeias-ehdsi-septembrios-2021

[23] https://www.kathimerini.gr/economy/561271042/3-4-ekat-christes-toy-mobile-banking-stin-ellada/

- Family (procedures and issue of documents about life events)
- Property and taxation (instructions and services about property and taxation management)
- Citizens' everyday life (services concerning solemn declarations, authorisations, fees payments as well as services addressed to third-country nationals)
- Culture, sport and tourism (e-libraries, scientific databases etc)
- Military service (conscription issues, military academies etc)
- Health and welfare (Public health and food safety procedures, e-prescription and hospital services)

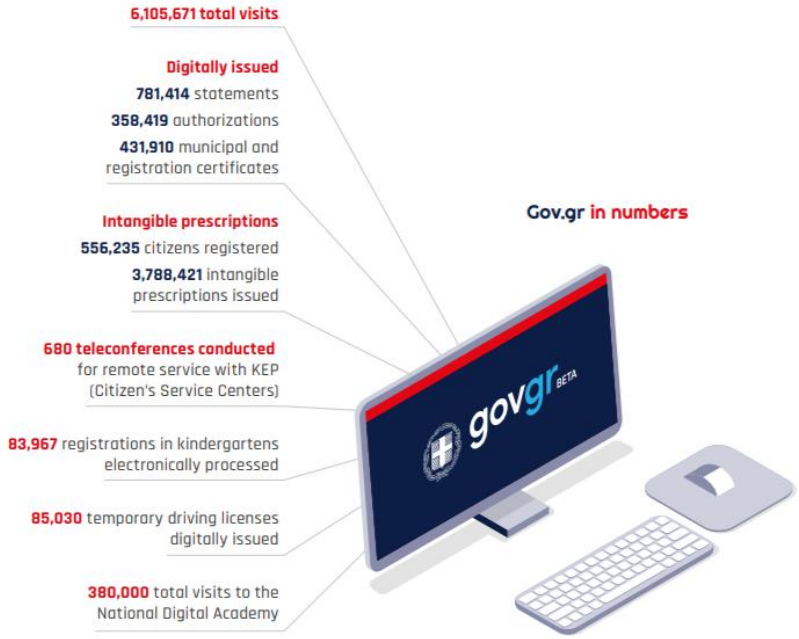

Figure 3-3: Gov.gr performance as per Sep.2020

Finally, due to the COVID-19 outbreak, effective actions were needed in respect with the public's administration digitalisation development. Therefore, the Ministry of Digital Governance undertook the supervision of the "e-Presence.gov.gr'' teleconference infrastructure (provided by the National Infrastructures for Research and Technology-GRNET), and the advanced network, cloud and IT e-Infrastructure and services provider for the Greek Educational, Academic and Research community. In similar fashion, DigitalSolidarityGR, is developed as another initiative from the Ministry of Digital Governance that currently hosts over 130 services, launched with the purpose of helping citizens find access to the necessary digital tools provided for free or at low cost from private or public institutions.

When it comes to public digital services focused in rural and agricultural areas, Greece finds itself in a transition period after the recent completion of the landmark ENRD project of Broadband Network Development in Rural 'White Areas'. As a result, the recent broadband penetration in the rural regions showcases still a low uptake on internet usage. However, Greece through Gov.gr portal has launched

the ''Greek Farms'' platform that allows retailers and wholesalers to get in touch with Greek farmers. This newly launched digital service facilitates the development of new trade relations and helps farming communities expand and meet the needs of the national and international markets[24].

As a follow up of the CAP 2021-2027 programming period, the Greek Ministry of Rural Development and Food has planned a series of initiatives that will take place inside the broader scope of National Digital Transformation Plan 2020-2025 [25]. These initiatives aim to the development of numerus public digital services focused mainly on the rural regions. Namely some of the most prominent future initiatives are the following:

- Remote Training Platform (e-learning) for the Agri-Food Sector
- Platform for Digital Transformation of the Agricultural Sector
- Online Smart Agriculture Advisory Tool for Producers
- Support services for smart agriculture in the Cyclades Islands
- Pilot platform for Track & Trace Greek Food products across the supply chain
- e-Fisheries, a platform that will provide digital services to the fishery supply chain, both in the production sector and in the marketing of products in the retail market.

At this point it should be mentioned that the grading of the e-services showcased in the table below are rather based on observation and desk research.

Table 3-5: Digital Public Services usage

		Extremely common	Very common	Fairly common	Not common for most of the population	It is not a possibility nowadays
e-Administration procedures	In general in the country		X			
	In rural areas		X			
e-Health	In general in the country		X			
	In rural areas			X		
e-Education	In general in the country	X				
	In rural areas	X				
Digital identity	In general, in the country					X

[24] https://greekfarms.gov.gr/greekfarms/index.html

[25] http://www.opengov.gr/digitalandbrief/?p=2108

	In rural areas					X
Digital signature	In general in the country				X	
	In rural areas				X	
On-line banking (account management, payments)	In general in the country	X				
	In rural areas		X			
Bills (council taxes, water, electricity)	In general in the country	X				
	In rural areas		X			

3.3.3. Research and Innovation Strategies for Smart Specialisation (RIS3)

Greece has a hybrid RIS3 with a centrally-administered national strategy, and 13 regional strategies that are overseen by regional authorities and coordinated by the Ministry of Development. The total amount of funds allocated from ERDF towards funding the thematic area of 'Strengthening research, technological development and innovation' is EUR 935m, of which 87% is attributed to national Operational Programmes (OPs) and the rest to all 13 Regional Operational Programmes (ROPs). The national RIS3 Strategy identifies eight priorities: 1. Agri Food; 2. Health-Biosciences; 3. ICT; 4. Energy; 5. Environment & Sustainable Development; 6. Transport & Logistics; 7. Materials & Construction; 8. Tourism, Culture & Creative Industries.

The budget of RIS3 action plan is provided by the Operational Programme "Competitiveness - Entrepreneurship – Innovation" (EPANEK-Restart) from 2014 to 2020, the Rural Development Programme (RDP) 2014-2020, the Operational Programme Human Resources and Lifelong Learning and HORIZON 2020. In this way, RIS3 creates Synergies and links between the various thematic priorities and funds.

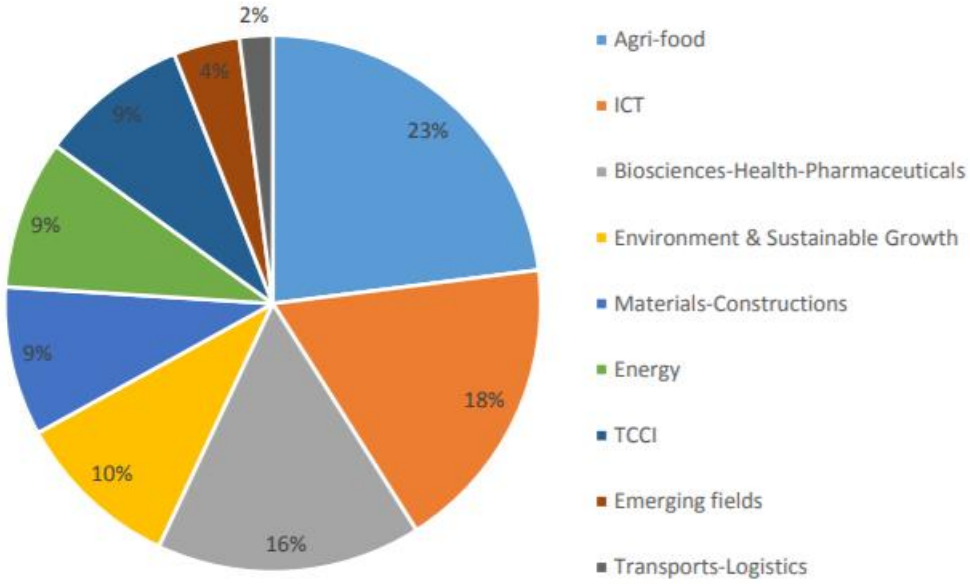

Figure 3-4 Public funds per specialisation field[26]

Greece has made strides in putting in place the governance framework required for RIS3 but that major challenges remain. Regional administrations do not have the required capabilities or innovation policy experience. Co-ordination between national and regional RIS3 has not been adequate resulting to overlaps of national vs regional policy priorities and measures and lack of diffusion of know-how to the regions. There is no common governance model across regions and staff shortages have led to delays in the implementation of RIS3. Indicatively, as of December 2018 only 3 regions had established a RIS3 Technical Office and only one was operating. In most cases regional S3s have been de facto handed to Managing Authorities which tend to treat them as just another OP, preventing accumulation of innovation-specific policy capabilities within the regional administration. As a result of initial delays and continuing gaps in the governance of RIS3, activation across regions is uneven and slow.[27]

However, having acquired experience with the first round of RIS3 and all stages of its lifecycle, national and regional authorities are well-positioned for a more effective strategic planning in the forthcoming Programming Period. The shift of executing more effectively is apparent if we examine KPIs before and after 2015-2018. They have acknowledged the increased significance of solid governance schemes and the difference between planning a ROP and a smart specialisation strategy.[28]

[26] General Secretariat for Research and Technology (GSRT). (2015), ''National Research and Innovation Strategy For Smart Specialization 2014-2020''

[27] Metaxas M., (2019), "Summary Report on RIS3 implementation status in Greece. 2019 Edition"

[28] EC (2019), ''Smart Specialization Platform : Greece''

3.3.4. Digital Innovation Hubs (DIH)

In Greece there is a growing number of Digital Innovation Centres (DIH), settled across the national territory. According to EC's Smart Specialisation platform in Greece hosts 9 fully operational Digital Innovation Hubs while 5 more hubs are in preparation status expected to commence their operation in the near future. Additionally, across the country are based several institutes that take part in European projects that create an interconnected ecosystem with other EU stakeholders that work together in the different phases of agricultural-rural and forestry innovation actions.

Greece's wider goal, as described In the Digital Transformation 'Bible' 2020-2025, is to create an organised, reliable, sustainable and coordinated network of digital innovation hubs at national level, in line with European strategy. The development and operation of the network will be carried out with the cooperation of the main stakeholders from both the public and the private sector (competent ministries, chambers, social partners, collective bodies, research and academic institutions, large companies) and will cover issues of utilisation of new technologies and issues of adoption of Information and Communication Technologies in the organisation and operation of companies, being the main lever of their digital transformation.

Attica Hub for the Economy of Data and Devices- ahedd, is another important actor that provides core technologies for achieving significant advancements to agricultural practices and the businesses depending on agricultural production. It brings high expertise and experience on technologies like in-field sensing and monitoring, agricultural data analytics, process optimisation and robot navigation, which can be readily applied in the sector. Ahedd takes also part in the biggest EU Research and Development project in IoT for Agrifood (IoF2020) in which the company will provide on farm services and a digital ecosystem for post farm activities that will reach the final consumer.

ATHENA Research and Innovation Center- ARC, is another Greek digital innovation hub with strong regional role at national level. ARC is supported by public funding and is closely cooperating with regional authorities and implements its research and innovation strategy, positioning itself as an important partner in the regional plans. ARC has a dedicated Sustainable Development Unit that focuses on interdisciplinary systems research and the delivery of innovative solutions for the transition to a green, digital, sustainable future and an Environmental and Networking Technologies and Applications Unit, dedicated to promoting fundamental and applied research in all aspects of the contemporary environmental and networking problems, such as climate change and space networking.

Institute of Entrepreneurship Development (iED), is the only 'in preparation' Digital Innovation Hub based in central Greece. IED takes part in LIVERUR H2020 project aiming to expand the Living Labs model among rural regions facilitating the strategic development and establishing an association of sustainable stakeholders; users, policy makers, businesses and researchers that will enable agreements on the basis of which they can participate in a longer-term collaborations.

For the northern region of Greece, Central Macedonia Digital Innovation Hub on Agrofood is a DIH that prioritises the smart specialisation of northern Greece exploring the added value of digital technologies towards efficiency, efficacy, cost reduction and environmental policy.

Finally, Embedded System Design & Application Laboratory DIH (ESDALAB DIH) is another decentralised institution that supports smart farm systems as a part of the ecosystem of the Internet of Things, cloud computing and digital economy. Aiming also in the exploitation of collective data and knowledge to improve agricultural decision making, knowledge acquisition and capacity building.

Finally, Greece participates in one of the 28 experiments taking place under the SmartAgriHubs project, with the flagship innovation experiment "Digitising Open Field Vegetables". In this experiment, Agricultural University of Athens, Neuropublic and Marathon Bio-products through the gaiasense smart farming system , take part as partners aiming to develop complete models for the optimisation of fertilisation, irrigation and pest control, as well as, create a maturity estimation algorithm and use artificial intelligence for an early weed detection system.

3.4. CAP National Strategic Plans

During the last CAP programming period 2014-2020, Greece planned approximately 5% of its rural development funding for knowledge exchange and information dissemination actions consulting services, farm management services to boost exploitation and co-operation, numbers above the EU average of 3.63%. However, the level of expenditure by the second quarter of 2020 was merely 20% for knowledge exchange and dissemination actions and 0% for the rest of the thematic areas which indicates significant delays that led to severe under-utilisation of the planned budget. In terms of innovation cooperation, no operational teams have been formally submitted from the managing authority of Greece to the European Commission, as the measure was only recently activated based on the Greek Rural Development Program (RDP). The implementation of the RDP measure for consulting services, services for farm management and on-farm consulting services are still lagging behind even more, since it has not been activated yet. Indicatively in 2016, the number of agricultural managers holdings with basic or complete training was 7% (for managers under 35 years the share was 24%), a percentage below the EU average. The implementation progress of the RDP shows that, by 2019, the number of participants trained was 10,456, which signifies that only 15.49% of the 2023 target has been achieved. In addition, this percentage seems to remain still since 2017 (already 10 350 participants then)[29].

The Greek Agricultural Network[30] has organised a number of activities involving research organisations that operate inside the Horizon 2020 scope with a number of universities and SME's as well as with farmer communities, consultant service providers and agricultural enterprises. This line of action will continue to be the basis for the future CAP to intensify these actions and play a key role in promoting synergies between Greek CAP policies and the European Research Area.

Moreover, it should be noted that Greece has not yet deployed the use digital-satellite based ICTs for monitoring the implementation of the CAP, though governmental institutions that are involved in EU programs have prioritised the adoption of new technologies for the modernisation of CAP

[29] https://ec.europa.eu/info/sites/default/files/food-farming-fisheries/key_policies/documents/rdp-factsheet-greece_el.pdf

[30] https://ead.gr/

administrations, CAP monitoring and more effective interactions with the farmer communities. Finally, it is observed a lower-than-expected performance of the Greek Agricultural Knowledge and Innovation System (AKIS), that comes as a result of the low levels of agricultural training in national scale, combined with the limited cooperation among consultant service providers, researchers and agricultural organisations, a fact which in turn affects the achievement of the goals set in the national CAP priorities[31].

According to the recent (June 2021) agreement about the new Common Agricultural Policy 2023 – 2027, each country will develop for the CAP implementation a national CAP strategic plan. Economic, environmental and social sustainability are key objectives of the new CAP and are achieved through the specific priorities related to Pillar I (direct payments) and Pillar II (investments). Among the focusses of pillar II is the strengthening of the market orientation and the increasing competitiveness, with a greater emphasis on research, technology and digitalisation. For Greece a total budget of 19,3 billion Euros is foreseen. While the budget for Pillar I will be decreased by roughly 3%, the Pillar II budget will be increased by 4,7%[32]. This is a clear indication of the direction the new national CAP strategic plan will take, to support rural transformation and innovation.

3.4.1. CAP Integrated Administration and Control System (IACS)

The new Greek CAP aims to dynamically introduce ICTs in the agricultural sector, reduce the administrative burden from stakeholders as well as boost the overall sustainability and competitiveness of the agricultural sector. A milestone in this direction is the operation of the Copernicus satellite program and the provision of free satellite imagery Sentinel 1 & 2. Administrative agencies from 9 EU countries among them Greece also represented by OPEKEPE (Greek Payment Authority of Common Agricultural Policy Aid Schemes), are cooperating to establish an Integrated Administration and Control System that would serve as a central tool for CAP monitoring. This initiative is taking place in the context of a H2020 programme titled 'A New IACS Vision in Action' (NIVA). The end goal of this collaboration programme is to create an innovative environment that will enable the EU member states to utilise ICTs towards demonstrating to farmers and stakeholders ways to improve agricultural activities and methods that contribute to the sustainability and competitiveness of the agricultural sector. An indicative EU promoted tool that OPEKEPE has adopted through its involvement in NIVA is the new process of remote control and monitoring of plantation declarations through satellite images also known as MONITORING. Through this new process of remote monitoring and administration, the control system of OPEKEPE transforms from a system form a non-compliance penalty system into a system of assistance of eligible funding applications. The new monitoring system uses the free satellite images SENTINEL 1 and 2 to guide the producers and OPEKEPE in the successful completion of funding applications before their final submissions to secure the payments and to avoid reductions or penalties. The automatic evaluation of the funding application through CAP funding schemes and the possibility to the producer to confirm his statement through geo-referenced images and Farm Management Software (FMIS) as well as a Decision Support System (DSS) are some additional features under development. Moreover, another IAC System In

[31] https://ec.europa.eu/info/sites/default/files/food-farming-fisheries/key_policies/documents/el-swd2020_372-other-swp_el.pdf

[32] https://m.naftemporiki.gr/story/1695279/stin-teliki-eutheia-gia-ti-xaraksi-mias-prasinis-koinis-agrotikis-politikis

development features the interconnection of land fields with linked data, collected by remote on field sensors, that will be sent directly to the responsible control authority in order to approve CAP payments.

OPEKEPE, as the national public authority responsible for CAP aid schemes, from 2006 and on has formed strong partnerships with private sector ICT developing companies that lead to the adoption and utilisation of a series of systems and services that satisfy the proper application of the CAP requirements and support a number of interventions concerning mainly Pillar I (Direct Payments to farmers) and Pillar II (Rural Development Policy).

Information systems in use by OPEKEPE:

- Rural Development Integrated Information System (R.D.I.I.S.)[33]
- Farmer Single Payment Application
- Agro-environmental Aids System

3.5. Data management

The importance of Open Data and Open-Source solutions is thoroughly emphasised in the Greek "Bible" for Digital Transformation. Furthermore, a multitude of data, that apply within the scope of Law 4305/2014 are available to the Ministry of Rural Development and Food (MRDF) as well as its supervised entities are gradually becoming available for public use. Greece Action Plan 2019-2022 encompasses the commitment titled as 'Open Access to data of the Ministry of Rural Development and Food'[34] enabling the adaptation of national legislation to the provisions of EU directive 2013/37/EU. Moreover, this commitment aims to the enhance the quality of published data and provide additional guides on personal data and protection rules as well as procedures for published data updates. MRDF has identified 180 data sets held in-house and approximately 150 data sets supervised by entities related to agriculture, fishery and food, veterinarians, and other relevant actors. The selection of datasets that befall under the 'restructure' and publication that this national commitment prescribes, is made based on the potential number of public sector stakeholders each individual dataset could benefit.

Below we focus on other existing data management policies implemented in national provisions.

- **Open Data**

Directive (EU) 2019/1024 on open data and the re-use of public sector information is incorporated into Greek law, the provisions of which extend the principles of open availability and re-usability of documents, information and data that are either in the possession of public bodies or funded by public resources. For the first time, explicit reference is made and special provisions are introduced in categories of data, the utilisation of which has a particularly significant benefit for the economic and

[33] https://www.neuropublic.gr/en/case-studies/rural-development-integrated-information-system-r-d-i-i-s/

[34] 4th national action plan on open Government. Available at: https://www.opengovpartnership.org/wp-content/uploads/2019/05/Greece_Action-Plan_2019-2021_EN.pdf

social life of the country, such as the dynamic data (e.g. environmental data, traffic data, satellite data, meteorological data, sensor data), research data and high value data (i.e. documents, the re-use of which is associated with significant benefits for society, environment and economy), while the obligation to allow the re-use of documents is extended. The re-use of documents includes now documents that are issued by public undertakings established for the specific purpose of meeting needs in the general interest and operating in specific sectors, critical to the national economy.

Greece tends to perform poorly in capturing the effects of implementing open data use. The indicator to measure Greece's performance is broken down into the three components i) Political impact mapping, ii) Social impact mapping and iii) Impact on economic level. Although high scoring is achieved in the first index, low scoring appears in the next two, as the effects and benefits of open data policy at social and economic level are not clearly visible. As it was found in the last annual report on 2016, despite the adequacy of the relevant institutional framework, this is due to the fact that the dissemination, use and exploitation of open data is still limited, not only to public bodies but also to the business world[35].

- **Cybersecurity and data safety[36]**

The Greek National Cybersecurity Strategy sets out the strategic objectives, the priorities, and the appropriate policy and regulatory measures to ensure a high level of protection of IT systems at national level. The National Cybersecurity Strategy is implemented centrally through the establishment of a specialised Directorate within the Ministry of Digital Governance. The Directorate aims at filling the organisation and coordination gap among agencies operating in Greece in the field of cybersecurity, within both the public and private sector. In addition, the National Cybersecurity Strategy is evaluated, reviewed and updated, if necessary and no later than every three years, by the National Cybersecurity Authority.

To further support the National Cybersecurity strategy, a ministerial decision is issued regarding the safety of operators of essential services (OES) and digital service providers (DSP), aiming at establishing a unique framework for organisational and technical measures, compliance with basic safety requirements, communication with competent authorities and the methodology for determining service providers, in accordance with the provisions of Directive 2016/1148/EU of the European Parliament and of the Council of 6 July 2016 (OJ L 194). Moreover, three additional Greek laws are ratified, relevant with the national cybersecurity aspects:

Law of High Common Level of Security and Network Information Systems 4577/2018

This Law is a transposition of the EU 2016/1148 directive concerning measures on a high common level of security of network and information systems across the European Union.

The Law on the Protection of Individuals with regard to the Processing of Personal Data 4624/2019

Law 4624/2019 establishes additional measures for the implementation of the General Data Protection Regulation (GDPR) and incorporates Directive (EU) 2016/680. The Law must be complied

[35] Angelopoulos M., Pollalis Y. (2020), ''Use of Open Data as a Tool for Successful Lean Management in Public Services: Evidence from Greece''

[36] EU (2019), ''Digital Public Administration Factsheet 2020 :Greece''

with by all public and private sector bodies/organisations that process personal data in the context of their activities. The GDPR imposes new obligations on editors, which derive from basic principles and in particular the enhanced principle of transparency in the way data is collected, processed and stored, and the new accountability principle, according to which the data controller is responsible to demonstrate compliance with all principles governing the processing of personal data. Also, new rights are introduced such as 'the right to be forgotten' and the right to data portability.

Law on the Protection of Personal Data and Private Life with regard to Electronic Telecommunications (Initial Law 3471/2006 was adopted on 28 June 2006, revising Law 2472/1997, later amended by Law 3917/2011 and Law 4070/2012)

This law aims in establishing safe measures for privacy in the context of personal data processing, and security and privacy of electronic communications.

- **Interoperability**[37]

eGovernment Interoperability Framework

The implementation of the Greek eGovernment Interoperability Framework (Greek eGIF), institutionalised by State Law 3882/2010, begun on 28 October 2006. The project was carried out within the framework of the Operational Programme of the Information Society (OPIS) and aimed at defining standards, specifications and rules for the development and deployment of web-based front- and back-office systems for the Greek public administration at national and local level.

Interoperability and Electronic Services Provisioning Framework

The Interoperability and Electronic Services Provisioning Framework defines the basic principles and the general strategy to be followed by public agencies when developing eGovernment information systems. It also provides organisational and semantic interoperability guidelines, as well as technical specifications and communication standards.

Based on Article 13 of Law 4623/2019 (Government Gazette 134/A/9-8-2019), the Department of Electronic Governance and Interoperability of the Ministry of Digital Government is responsible for policy, organisational and legal issues regarding interoperability. Differently, the Interoperability Centre has now exclusive competence regarding the implementation of the overall framework for interoperability between actors of the Greek public administration, sectors and the individual registers of public administration bodies.

Digital Authentication Framework

The Digital Authentication Framework aims at effectively supporting eGovernment at central, regional and local level, and contributes to achieving interoperability at information system, procedure and data level. More specifically, the Framework sets the standards, procedures and technologies required for the registration, identification and authentication of eGovernment services users, including citizens, businesses, public authorities and civil servants. It also aims at creating an integrated and coherent set of policies regarding digital certificates and public key infrastructures.

[37] ibid

Certification Framework for Public Administration Sites and Portals

The Certification Framework for Public Administration Sites and Portals specifies the directions and standards to be followed by public agencies at central or local level when designing, developing and deploying the eGovernment portals of the public administration, and supporting eGovernment services.

4. Challenges and Opportunities

4.1. Barriers to digitalisation

Greece is one of the 28 EU countries, which up to the beginning of 2020 were significantly lagging in various areas of digital performance, such as internet accessibility, Internet services usage, digital skills. As a result, the digital gap and inequalities were created both between Greece and other European countries, as well as inside the country. The performance in digital public services remains low and in conjunction with the low digital skill level hamstrings the further development of digital economy. Furthermore, Greek economy is characterised by a weak export base where the vast number of SME's are focused on traditional non export oriented sectors and show a significant lag to change while tend to import already mature technology from abroad instead of investing in in-house R&D or collaborate with Greek R&D institutions. Another important factor that needs to be highlighted is a wide mismatch of skills between demand and supply and the inappropriate response of the education system to the market needs that leads each year thousands of scientists and young ICT graduates to seek employment abroad. Finally, the heavy bureaucratic processes imbued in the public sector impede a fast-paced implementation of digital transformation policies and initiatives.

COVID-19, has acted as a catalyst for a long-overdue technological upgrade in Greece, prompting a rush to adopt more digital solutions. Greece has achieved improvements in the digital maturity of the public sector, as the governmental portal gov.gr provides more than 500 e-services and the Ministry of Digital Governance helps the provision of critical public services. However, at the same time this recent pandemic has highlighted the country's long-standing problems in digital connectivity, digital skills and digital literacy and the country's persistent difficulties to respond to international developments in the digital economy in recent years, which primarily result from its productivity model. Greece has the need to accelerate digital transformation as a mean to tackle future uncertainty and proceed to deep-cut restructure and redesign in the public and private sector[38].

Table 4-1: Barriers to digitalisation

Barriers to digitalisation		Influence of COVID-19
Technical	Lower, than EU average, transition to fast broadband connections	Heavy pressure on network due to the sudden and vast amount of teleworking of the private sector and

[38] https://blogs.lse.ac.uk/greeceatlse/2020/11/17/greeces-digital-challenges-what-is-to-be-done/

		synchronous public education programmes. Covid-19 highlighting the e importance and need of upgraded broadband network-coverage and technical equipment
Legal	Lack in a concrete national Open Data regulatory framework	
Training / Education	Intense digital divide and inequalities among individuals, generations, geographical regions	Triggered cooperation between public and private sector to support the public education system to equip a vast number of younger individuals with technological equipment. Digital skill divide of the individuals working at the Greek educational system coupled with the lacklustre broadband infrastructure, hindered the educational curriculum.
Economic	lagging in internet penetration and the use of e-services. low diversity of online activities weak demand for internet services	Greek businesses, despite their digital deficit, attempted to adopt techniques to confront the pandemic. increase of electronic transactions by € 3 billion in October 2020 compared to 2019[39] Greek economy shrunk at a lower pace compared to the stronger economies of the Eurozone (8.5% versus 9.2%)[40]
Others	Delays in implementation of digital action due to heavy bureaucracy characterising the public sector. Idiosyncratic cultural factors that impede digital infusion in the SME's.	Created the need to simplify as many government processes as possible trying to increase the rate of Greece's digital transformation.

4.2. Actions to boost sustainable digitalisation

Table 4-2: Actions to boost sustainable digitalisation

Key rural development domains			
Human capital	**Innovation**	**Investments**	**Governance**

[39] PWC, (2020). 'The Response of the Greek companies to the '

[40] Ibid

Creating the basic conditions for digitalisation	Systematic, coordinated and targeted intervention policies for the comprehensive development of the digital skills of its human capital	Support founding and refinement of innovative ideas, create mechanisms to foster the liaison of suitable partners and funding tools.	Digital Upgrade of Public Services.	Greece to acquire "digital by default", by 2023. Revision of the national digital strategy and implementation of the actions described in the Greek 'Digital Bible'
Anchoring digitalisation to sustainable development	Enhancing digital skills, not just for employment purposes, but also to ensure more active participation in societal aspects, and reinforce social cohesion.			DESI 2021 to be considered in conjunction with the very intense pressure, due to covid-19, exerted on digital infrastructure and digital services. Special attention must be paid in the DESI indicators that are important for a stronger and more durable digital transformation and economic recovery.
Adapting digitalisation to different context	Increase and support more state-based educational programmes to encourage the beneficiaries to acquire experience in digital related fields and acquire skills valuable to cover the market needs.			Establishing a clear and favourable national regulatory framework for the use of open data.
Favouring digital inclusion				Offering more focused programmes to supplement the horizontal ones, based on age or other characteristics, to tackle the large disparity in skills and the needs of certain demographic and other social groups.

Developing digital ecosystems		Introduction and promotion of innovation support services to connect innovation bodies (SMEs, researchers, NGOs, etc.).	Increase national funding for the launch of horizontal pogrammes that will focus on the digital transformation of Greek SMEs	Connect under the National Coalition of digital skills the private-public sector, education providers and NGOs that have made pledges to reduce digital skills gaps by providing measures such as training courses, certification and awareness raising.
Developing adaptative governance models	Reconfigure the educational training programmes closer to the needs of the economy, expand on the job training programmes and provide incentives to the private sector to increase training of their employees			
Designing policy tools for sustainable digitalisation	Policy recommendations to take into account both the place and role of individuals stakeholders and societal actors in their social context and how their respective role is affecting the planning of future actions regarding sustainable digitisation.			

5. Conclusions

Greece needs to achieve significant progress in several fronts to approach the average of the European Union countries in terms of digital transformation as in levels of a wider national digital preparedness as in specific rural digitalisation transition actions. Some of the initiatives included in the 2021-2025 Digital Transformation 'Bible' have already been implemented in other EU countries, and if aiming to approaching the level of those countries Greece must alleviate its structural weaknesses related to a narrow productive base, lack of quality and scale effects, missing value chains and limited innovative activity that affect the competitiveness of their economy. During the programming period 2014-2020, Greece planned almost 5% of its rural development funding for knowledge dissemination and information actions (M1), consulting services, farm management services and replacement services in exploitation (M2) and co-operation (NSP), well above the EU average of 3.63%. However, the expenditure by the second quarter of 2020 was only 20% for M1, 0% for M2 and 0% for the M16, which indicates significant delays that are likely to lead to severe under-absorption of the planned amounts of available funding[41].

Measures like Digital Step and Digital Jump supported by the Cohesion Structural Fund boosted the support of SME's and DIH institutions that operate in the country while initiatives like 'Digital transformation of the agricultural sector', Research-Create-Innovate, and the pan-Hellenic educational and information activities in Digital (Intelligent) Agriculture contributed to step-up the countries week performance in terms of digital skill level. However, the recent implementation of these initiatives deems their impact assessment impossible for the time being. At the same time Greece takes part in various landmark European initiatives, such as the European Blockchain Partnership (EBP), Digital Skills and Jobs Coalition, the 5G cross boarder corridor initiative, and the Southern European Countries Ministerial Declaration on Distributed Ledger Technologies. These initiatives are expected to advance the broader adoption of ICT tools to monitor the implementation of national policies, like CAP, and monitor the public-private institutions progress involved in EU programs ultimately aiming to the modernisation of monitoring-administrations systems, and interaction mechanisms with rural societies and farmers.

Concluding, rural digitalisation policy in Greece's context is suffering from the absence of closer focus to the challenges the individual regions face and the opportunities they present, furtherly Greece lacks feedback mechanisms that would gather and capitalise on local experience and knowledge and channel them into the policy making process and priority setting when it comes to policies, initiatives and actions. The decentralisation of responsibilities and decision making will enable a more place-based policy approach, more closely related in building local and regional capacity and strengthening their resilience to respond in the future challenges. As a closing remark, it should be also highlighted the need to access data that would contribute to the acceleration of a smart, green and digital transition of agriculture in Greece, as well as the need of public organisations / institutions to liaise

[41] EU report (2020): 'Evaluation support study on the CAP's impact on knowledge exchange and advisory activities' Available: https://ead.gr/wp-content/uploads/2021/03/Study-on-CAP-impact-on-Advisory-Services.pdf

with digitally acknowledged consultants that would facilitate in bridging the gap between research and practice.

6. Annex

6.1. Annex A

Table A.1: Policies influencing digitalisation in your country

Areas being addressed / supported by the policies	Policy	Brief Description	Objectives	Area of impact	Period of implementation	Budget (if any)	Public / Private	Address rural areas (Y/N) Specify how	Link
Rural access to technologies	Digital transformation of Greek agriculture	Digital transformation of Greek agriculture is the first national digital agriculture infrastructure in Europe and is developed by the Ministry of Digital Policy, Telecommunications and Media, in collaboration with the Ministry of Agriculture, based on precision farming technologies. This initiative was designed to cover, initially, half of the arable land in Greece, about 15 million acres and 20 of the country's most exported crops, including cotton, grain, rice, cotton, olive, vines and citrus.	Development of a platform that will gather data from existing meteorological stations of the National Meteorological Service, the Earth observation satellite systems of the Copernicus program subsequently classify them into a data warehouse in cloud infrastructures where they are processed in order to provide tailored services to meet the needs of each producer.	National	2018-	EUR 33.5 million. Co-financed by ERDF and by national funds	Public-Private	Yes	https://www.ktpae.gr/diagwnismoi/%CF%88%CE%B7%CF%86%CE%B9%CE%B1%CE%BA%CF%8C%CF%82-%CE%BC%CE%B5%CF%84%CE%B1%CF%83%CF%87%CE%B7%CE%BC%CE%B1%CF%84%CE%B9%CF%83%CE%BC%CF%8C%CF%82-%CF%84%CE%BF%CF%85-%CE%B3%CE%B5%CF%89%CF%81%CE%B3%CE%B9/
Broadband, connectivity, affordability	Broadband Network Development in white rural areas of Greece	This programme intends to close the 'broadband gap' between remote, disadvantageous, traditionally "white rural areas" (remote and dispersed residential departments of Greece, mostly mountainous or insular), and the rest of the country where broadband services are already being offered. The project provides broadband high-capacity coverage, which occupies almost 45% of the Greek territory, as well as affordable and reliable connectivity services to approximately 525.000 citizens of 5.077 residential departments of rural and border areas of Greece deprived of a connection to the digital world.	Development of a network that offers its users in remote areas internet access at a bandwidth up to 30 Mbps with an ability of a gradual advancement of service speed up to 50 Mbps.	White Rural Areas	2014-2019	The total project's implementation cost amounts to EUR 199 715 754.00 (EUR 161 061 091.94 is eligible for co-financing by EU Structural and Investment funds and National funds) while the project is implemented in two programming periods.	Public	Yes	http://nga.gov.gr/index.php/development-of-broadband-networks-in-white-rural-areas-rural-broadband/?lang=en
Creation of digital innovation ecosystems in or with influence in rural areas	Smart Rural areas -Smart Villages	Development of standards and examinations of living conditions of rural areas, further examination of economic	Promote sustainable development and quality of life in rural Greece. Increase efficiency in achieving national and European policy	National	2020-2025	Budget information is not available	Public	Yes	https://digitalstrategy.gov.gr/project/exipne

		conditions, and particular environmental challenges, of remote geographical locations, as well as rural development models.	objectives using cutting-edge technologies.						s_agrotikes_perioxes_xoria
New digital business models in rural areas, agriculture, and forestry	Research-Create-Innovate	The measure aims to support research and innovation, technological development and demonstration at operating enterprises for the development of new or improved products, the development of synergies among enterprises, research and development centres and higher education sector as well as to support the patentability of research results and industrial property.	In that context, the main objectives of the measure are: Economic development based on knowledge and sustainable specialisation; Integration of new knowledge and innovation to existing and new products, services, production systems and value chains; Connection of academic research with market needs and economy.	National	2017-2020	EUR 75.5 million (during 2018) – 729 firms funded. Co-financed by ERDF and by national funds	Public	No	https://www.greeknewsagenda.gr/topics/business-r-d/6363-research-create-innovate-programme-connecting-r-d-with-enterprises
Funding of digitalisation (access to technologies, digital education, broadband access, etc.) in rural areas, agriculture, and forestry.	Greek CAP Priority 1: FOSTERING KNOWLEDGE, INNOVATION AND DIGITALISATION IN AGRICULTURE	CAP aim in advancing research, knowledge-sharing, and innovation as essential elements for securing a smart and sustainable agricultural sector. Furthermore, aims at incorporating stronger agricultural knowledge and innovation systems (AKIS) to boost the development of innovation projects, disseminate their results, and encourage their use as widely as possible	Support cooperation projects, including the framework of the European Innovation Partnership, as well as by stimulate the development of supply chain partnerships in the agri-food sector as well as enhance knowledge transfer in the fields of environmental awareness, innovative technologies, and research to encourage practical implementation on farms and in forests.	National	2014-2020	Under the programming period 2014-2020, Greece programmed 5.7% of their total rural development envelope (EAFRD + national contribution) under M01: knowledge transfer and information actions, M02: advisory services, farm management and farm relief services and M16: Co-operation-EIP. This is above the EU-28 average of 3.63%.	Public	Yes	https://ec.europa.eu/info/sites/default/files/food-farming-fisheries/key_policies/documents/rdp-factsheet-greece_en.pdf
National rural development networks' initiatives	Greek National Rural Network	Greek National Rural Network, established during the RDP 2014-2020 programming period, continues to support the effective implementation of the Rural Development Programme. e Network Support Unit (Unit of Networking and Publicity), within the Managing Authority of RDP 2014-2020, is responsible for the networking and the operation of the NRN, acting as the coordinating link for both rural networking	NETWORKING OBJECTIVES Networking through the National Rural Network aims to: - improve the quality of RDP implementation; -increase the involvement of stakeholders in the implementation of rural development;	National	2014-	Budget information is not available	Public	Yes	https://ead.gr/home-en/gnrn-en/

		issues and innovation promotion in rural development.	-inform the broader public and potential beneficiaries on rural development policy and funding opportunities; -foster innovation in agriculture, food production, forestry and rural areas; -facilitate the exchange of knowledge and relevant practices on rural development issues.						
Digital Literacy and Digital Divide	Digital Skills and Jobs Coalition	Facilitation in European level of the cooperation of member states and public-private actors for the alleviation of digital skills gap inside the EU.	Digital competence framework, Digital tools adoption, upskilling & reskilling	EU	2018	Budget information is not available	Public	No	https://digitalstrategy.gov.gr/project/anaptyxi_ethnikou_plaisioy_dexiotiton_kai_pistopoiisi
Open data, standardisation of data, data access, etc…	Law 4635/2019 on Geospatial Data	Public sector bodies will be obliged to provide the competent authorities with electronic access to all geospatial data they hold within their competence in digital form. Public agencies are required to ensure accurate and up-to-date information on geographic data and arrange for the conversion of all their geospatial data into digital form.	Collect and centralise geospatial data, such as land use and building planning.	National	2019	Budget information is not available	Public	No	https://www.kklawfirm.com/wp-content/uploads/Newsletter-N.-4635.2019-05.12.19_NEW.pdf
Cybersecurity	Integrated Information System for managing requests of citizens, businesses, public services and other bodies through the Website of the Personal Data Protection Authority (APDP)	This information system will essentially aim to harmonise the data administration with the new institutional framework of Regulation (EU) 2016/679 of the European Parliament, so as to be able to provide data subjects and controllers with appropriate electronic services.	More specifically, it will include the following: 1. A tool to assist processors in managing personal data breach incidents and a tool to assist APDPH in managing personal data breach notifications. 2. Self-assessment tool on security and protection of personal data (oriented mainly to small and medium enterprises and organisations). 3. Tool to assist in the planning-execution of administrative controls of APDPH. 4. Assistance to citizens in submitting a complaint to the APDPH. 5. Assisting citizens in exercising their rights to controllers. 6. Creation of content (web and mobile apps) information and awareness especially for children. 7. Management Tool / Information System (M.I.S). 8. Virtual workstations.	National	2020-	Budget information is not available	Public	No	https://digitalstrategy.gov.gr/project/APDPX