



Case study on the Research-Create- Innovate initiative, Greece

Contribution to the OECD TIP Digital and
Open Innovation project

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Open Innovation project**

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Abstract

An initiative called “Research-Create-Innovate” was launched by Managing & Implementation Authority for Research, Technological Development and Innovation (MIA-RTDI) at national level in Greece in 2017 in order to increase the competitiveness of enterprises by promoting research activities in key selected domains and synergies with public research organizations. The economic activities (priorities) that could boost the country’s performance and the relevant technologies were identified mainly through a bottom-up approach with the relevant stakeholders of the quadruple-helix as well as data regarding the country’s position compared with EU and the world. Digital technologies play a key role in all the key selected domains of interest. The initiative is implemented through grants for RDI activities that are awarded through open calls with cut-off dates. The selection criteria of the projects are in line with the criteria used in EU’s research programme Horizon 2020. The first signs from the submitted proposals after the 1st cut-off date are very promising regarding the quantifiable targets set and the contribution of ICT-related technologies to enhance the competitiveness of the country’s key economic domains.

Executive summary

An initiative called “Research-Create-Innovate” was launched at national level in Greece in 2017 in order to increase the competitiveness of enterprises by promoting research activities and synergies with public research organizations. Digital technologies will be utilized in all the key domains of interest of the country. Specific quantifiable targets and relevant indicators have been set in order to assess the initiative’s effect.

The rationale for introducing such a call to promote among others the ICT domain was based on various studies which all of them resulted in the same fact; many of the country’s sectors need restructuring. ICT can play an essential role but Greece is lagging behind in most of key ICT indicators. On the other hand, the participation of Greek research teams in EU’s research programme FP7 on the ICT field for the period 2007-2013 was quite successful in relation to the other scientific fields. The successful track of the Greek research teams continues in EU’s research programme Horizon 2020 for the period 2014-2020. So it is evident that although Greece has strong research potential in ICT related technologies, very competent in EU research programmes, this knowledge is not diffused in the enterprises and the economy in general and maybe not related to the country’s economic areas of specialisation.

The initiative is implemented through grants for RDI activities that are awarded through open call to:

- Firms of any size
- Public research institutes
- Higher education institutes

The selection criteria, aligned with the criteria used for the EU Horizon 2020 research programme, are:

- Excellence
- Impact
- Quality and efficiency of the implementation
- Alignment with national priorities

The “Research-Create-Innovate” initiative introduced a new way of designing private-public collaborating initiatives on R&D in many aspects, mainly:

1. Emphasis was given to the promotion of technologies that could differentiate or modernize economic activities where Greece presents critical mass of enterprises and also excellent research potential.
2. The economic activities (priorities) that could boost the country’s performance were identified not only through statistical data and relevant studies, but mainly through a bottom-up approach where representatives of the quadruple-helix (private sector, research organisations, public authorities, society) convened repeatedly, expressed their views and reached consensus on the activities that would be supported (Innovation Platforms).
3. By the term “Innovation Platform” we refer to an open structure, created for each domain, coordinated by GSRT, where the main stakeholders (entrepreneurs, researchers, federations, public sector bodies, regional authorities, etc.)

participate in order to exchange information and opinions about relevant RIS3 priorities. The Innovation Platforms are at the core of the consultation process taking place at the national level.

The involvement of the quadruple-helix representatives was not constrained only in the design phase of the initiative but also to later phases. In particular, after the submission of proposals in the 1st cut-off date, the quadruple-helix representatives convened again in order to assess if the priorities included in the initial design of the initiative were supported by the interest of the applicants of the submitted proposals and possibly introduce new ones that emerged recently.

The initiative was announced with an initial budget of 280 M€ and provided for 3 cut-off dates but because of the great interest that was expressed (2,426 submitted proposals of which 498-20.53% in the ICT domain, not considering the interest for the ICT related priorities in other domains) after the first cut-off date in June 2017, additional funding was allocated to the initiative, reaching 410M€ in total.

Regarding cross-country collaborations, enterprises from other countries can participate in the initiative by collaborating with Greek enterprises in order to promote collaborations for innovation.

Since the initiative was announced in 2017, it is only possible to draw some first conclusions on its impact based on the data regarding the submitted and evaluated proposals. First of all, it seems that the importance of the areas of intervention in the ICT sector as it was predicted in the design phase of the initiative, was mostly confirmed by the interest of the applicants. Regarding the contribution of the ICT-related priorities in the other key domains (ICT as enabler), data show a clear interconnection between the domains of Culture-Tourism-Creative Industries and ICT as well as the domain of Transport & Logistics and ICT. These first indications are very promising since these are two with strong potential for Greece and their upgrade through ICT can contribute significantly to the boost of the economy. Another very promising conclusion is that the objective to mobilize the enterprises to participate in RTDI activities has been fulfilled, at least at the phase of submission of proposals. Even more encouraging is the fact that the highest participation came from very small enterprises that usually lack the economic and human resources to engage in such activities. In overall, the first signs from the submitted proposals after the first cut-off date are very promising regarding the quantifiable targets set and the contribution of ICT-related technologies to the upgrade of the country's key economic domains.

1. Main features of Research-Create-Innovate programme

1.1. What are the specific policy objectives of Research-Create-Innovate?

An initiative called “Research-Create-Innovate” was launched at national level in Greece in 2017 in order to increase the competitiveness of enterprises by promoting research activities and synergies with public research organizations. Digital technologies will be utilized in all the key domains of interest of the country, as it will be presented later on. The specific objectives of the initiative were:

- Promote research activities in enterprises
- Promote collaboration between enterprises and public research organizations
- Integrate mature research results into the production process
- Foster patenting of innovative products and services
- Create linkages with European and international partners
- Increase competitiveness, productivity and business extroversion towards international markets

Specific quantifiable targets and relevant indicators have been set in order to assess the initiative’s effect towards the promotion of the above-mentioned objectives. The indicators used in the initiative are part of the output indicators set of EUs European Regional Development Fund (ERDF). In Table 2, a complete list of targets set along with relevant expected values is presented.

1.2. What are the main factors and background conditions that motivated the design and implementation of the initiative?

The rationale for introducing such a call, to promote among others research in the ICT domain, was based on various studies that reached the same conclusion: many of the country’s sectors need restructuring. ICTs can play an essential role in such process but Greece is lagging behind in most of key ICT indicators. This is reflected in the following diagrams taken from OECD’s Science, Technology and Innovation indicators on the Digital Economy (data for 2015).

Figure 1 OECD Key ICT indicators - 7b. Broadband connectivity, percentage of all enterprises, 2010 and 2014

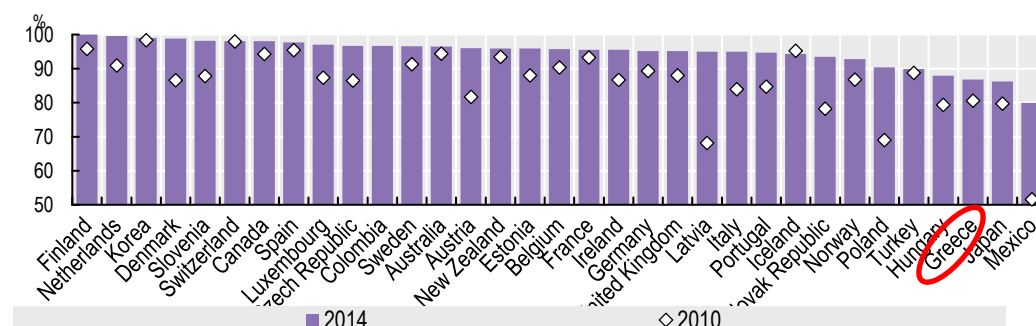


Figure 2 OECD Key ICT indicators-Value added of ICT sector and sub-sectors, 2013

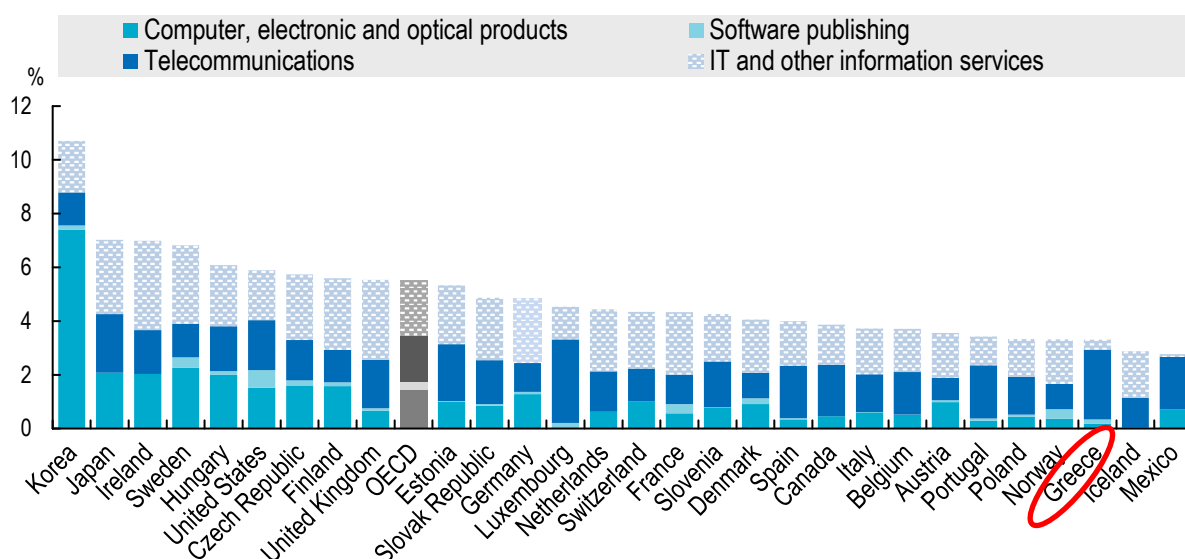
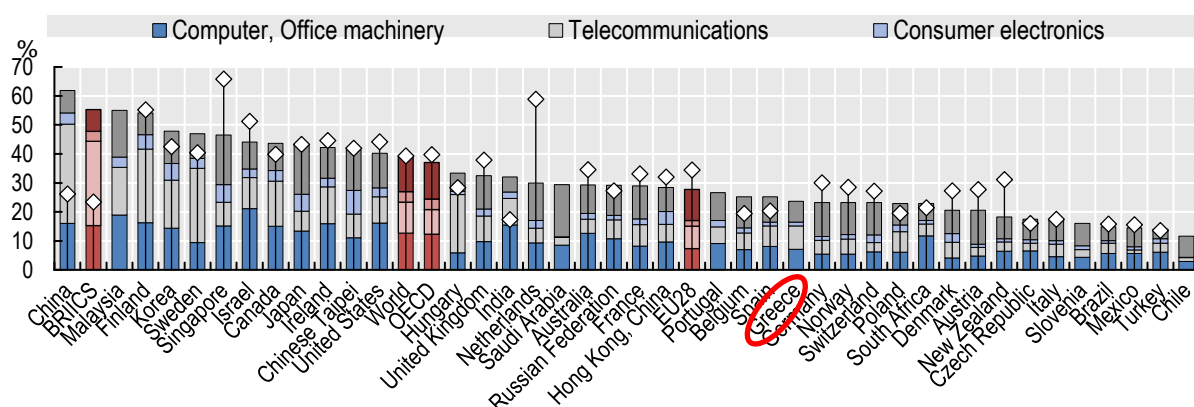
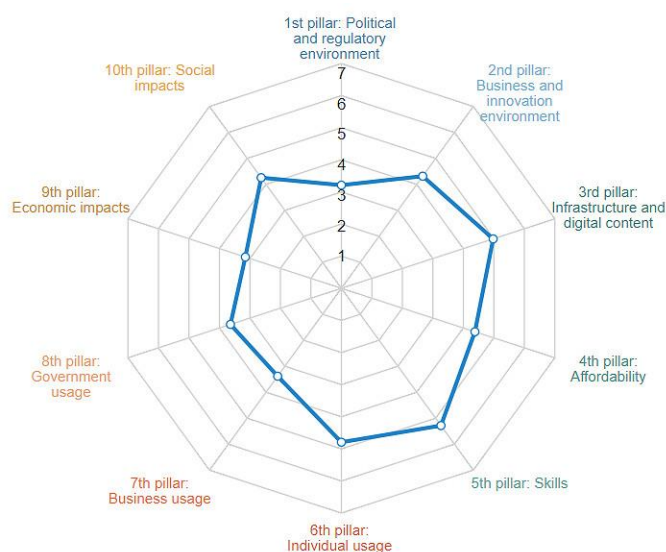


Figure 3 OECD Key ICT indicators - Specialisation in ICT-related patents, 2000-02 and 2010-12



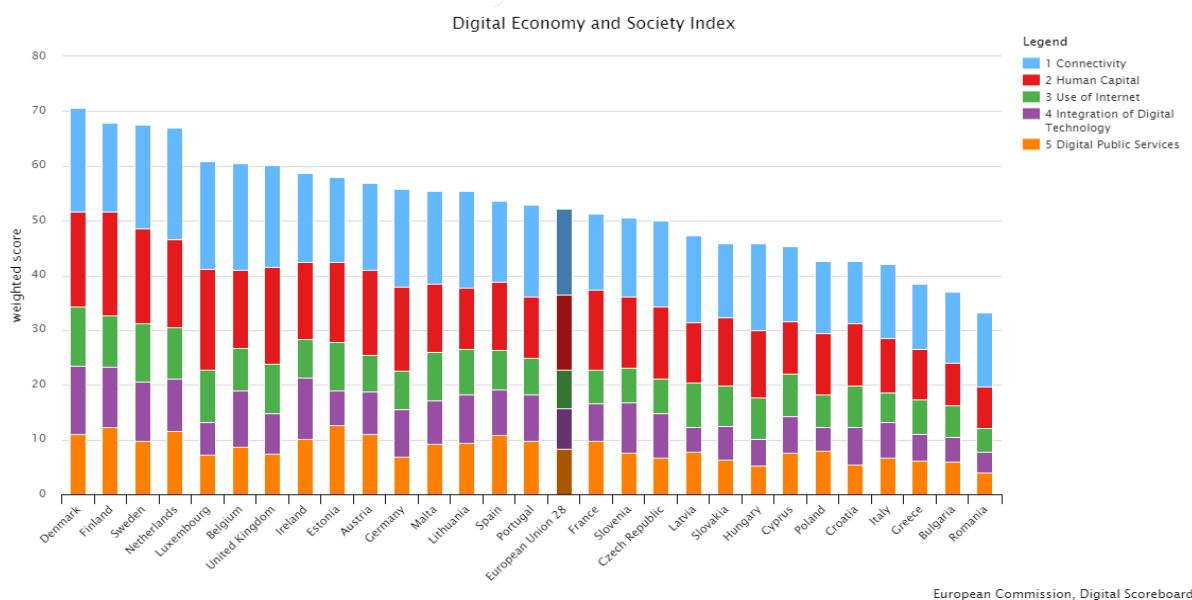
Moreover, according to the World Economic Forum Global Information Technology Report 2015, Greece was ranked low among the EU countries with a rank of 66. The report assesses the state of networked readiness of 143 economies using the Networked Readiness Index (NRI), which is comprised of 53 individual indicators that measure the capacity of countries to leverage ICTs for increased competitiveness and well-being. The overall performance of the country is summarised in Figure 4.

Figure 4 World Economic Forum - Global Information Technology Report 2015, Greece



A similar with the OECD's view of the countries performance on the digital aspect can be seen when examining the EC's Digital Economy and Society Index (DESI). DESI is a composite index that summarises some 30 relevant indicators on Europe's digital performance and tracks the evolution of EU Member States, across five main dimensions: Connectivity, Human Capital, Use of Internet, Integration of Digital Technology, and Digital Public Services. Greece has one of the lowest scores on the DESI index.

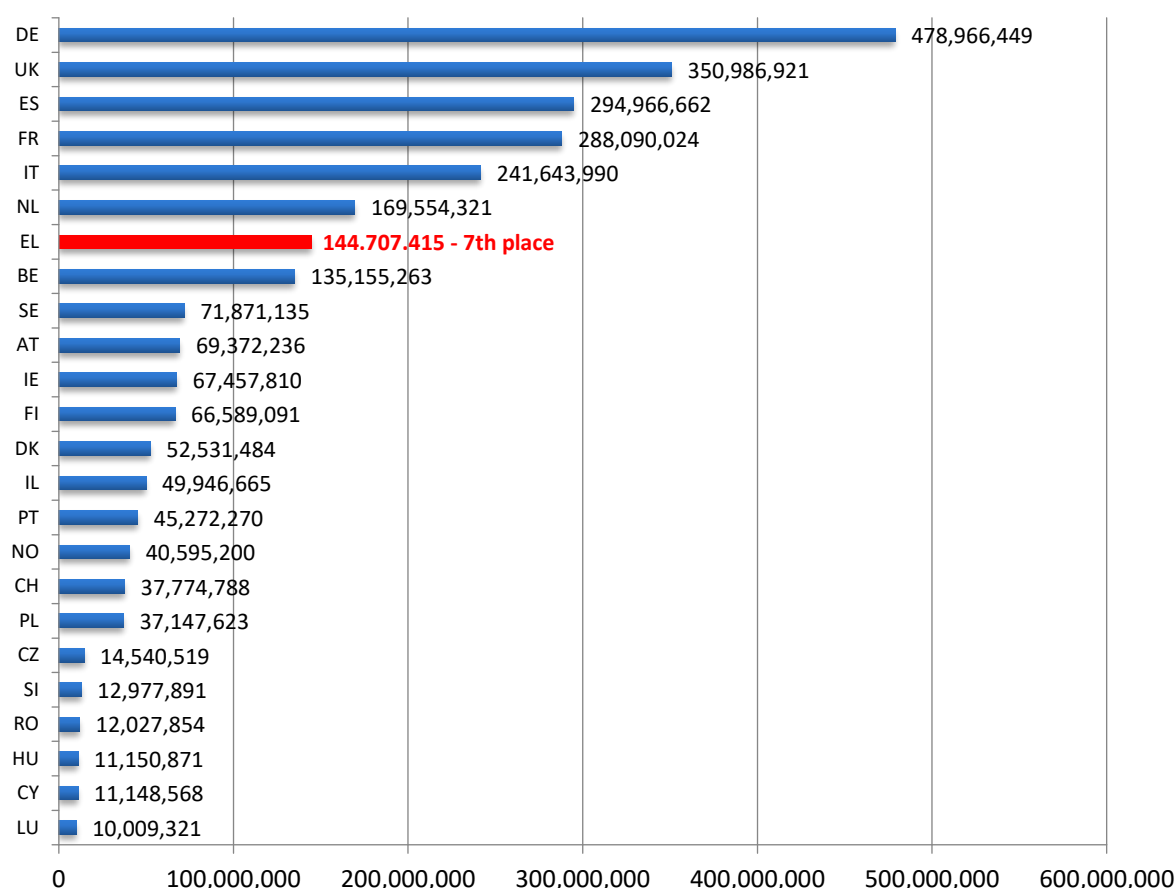
Figure 5 EC Digital Economy and Society Index (DESI) 2017



On the other hand, the participation of Greek research teams in EU's research programme FP7 on the ICT field for the period 2007-2013 was quite successful in relation to the other scientific fields, as 76% of funding is concentrated in this area, while the average of all EU countries is 66%. Overall, the Greek research participation in ICT reached the 8th position in FP7 among all participating countries.

The successful track of the Greek research teams continues in EU's research programme Horizon 2020 for the period 2014-2020. According to cumulative data for the period 2014-2017 regarding funded projects under the pillar "Leadership in Emerging and Industrial Technologies (LEIT), ICT topic", Greek participation has moved up to the 7th position, despite the brain-drain symptom as well as the increased competition from new Member States (Figure 6).

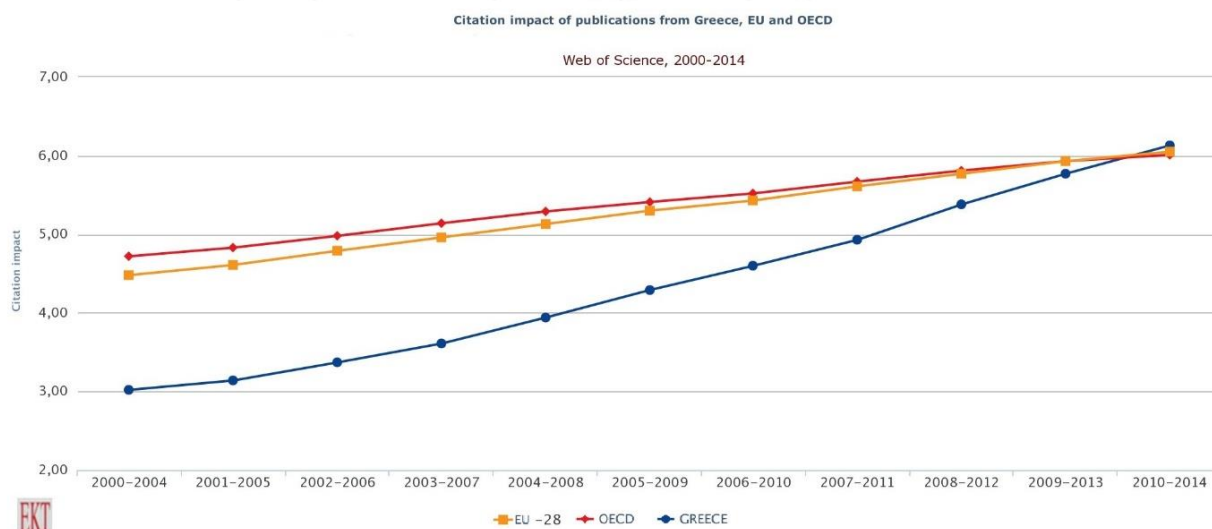
Figure 6 EU H2020 LEIT-ICT, EC Financial Contribution in Retained Proposals to Applicants from a Country



Note: Only countries with requested EU contribution > 10M€ are shown

Apart from being highly competitive, research performed by the Greek research ecosystem is also excellent regarding the citation impact of publications (Figure 7).

Figure 7 Citation impact of publications from Greece, EU and OECD for 2000-2014, National Documentation Center



According to the above graph, as well as various other studies and statistical data, it is evident that although Greece has strong research potential in ICT related technologies, as reflected in the high participation of Greek research teams in EU research programmes, this knowledge is not diffused across the economy, maybe due to the low relatedness to the country's economic areas of specialisation. Therefore, new instruments will be needed in order to:

- foster collaboration between enterprises and research organisations;
- address private sector needs; and
- stimulate demand for new, highly competitive products and services.

That was the rationale behind the design of the initiative called “Research-Create-Innovate”.

1.3. What are the characteristics of the policy instrument(s) used?

The initiative is implemented through grants for RDI activities that are awarded through open call to:

- Firms of any size
- Public research institutes
- Higher education institutes

The selection criteria are:

- **Excellence-Scientific and technical excellence of the proposed project.** The specific criterion involves the evaluation of the clarity and relevance of goals of the project, the soundness of scientific and technological principles, the reliability of the proposed research and technical approach, and seeks whether the proposed project is ambitious, adopts innovative principles and approaches and extends beyond the current technological trends

- **Impact-Results and Impact of the proposed project.** An important criterion under which the beneficiaries should justify the ability to create and maintain jobs, the contribution of the project to the competitiveness of the economy at national/European and international level, the enhancement of competitiveness of the enterprises, the ability of the beneficiaries to commercialize the results of the project and improve their products or processes and the effectiveness of the proposed exploitation and dissemination plans (including intellectual property issues)
- **Quality and efficiency of the implementation-Experience and credibility of the beneficiaries and quality and capacity of the project implementation.** This criterion involves the consistency and effectiveness of the work plan and suitability for disposal of resources, budget and job assignment, the ability and experience of the beneficiaries and the persons involved in the project team, the efficacy of the infrastructure of the participating institutions and suitability of the organizational structure and management of the project, including risk management and innovation management, as well as the complementarity of the partners in terms of ability and experience in the execution of research projects
- **Alignment with national priorities** (according to national RIS3) (on/ off criterion).

The selection criteria were aligned with the criteria used for the EU Horizon 2020 research programme, in order to facilitate the process of application of the Greek research community to EU and national funding opportunities, as proposals would not need to be significantly altered.

Proposals submitted should be in one of the following three areas:

1. Research and Development by Small and Medium Enterprises (beneficiaries are SMEs)
2. Business Partnerships with Research Organizations (beneficiaries are SMEs, PRI and HEI)
3. Incorporating mature research results into the production process (beneficiaries are SMEs and large enterprises)

1.4. What are innovative features of the policy design process?

The “Research-Create-Innovate” initiative introduced a new way of designing private-public collaborating initiatives on R&D in many aspects:

1. Firstly, emphasis was given to the promotion of technologies that could differentiate or modernize economic activities where Greece presents critical mass of enterprises and also excellent research potential.
2. The economic activities (priorities) that could boost the country’s performance were identified not only through statistical data and relevant studies, but mainly through a bottom-up approach where representatives of the quadruple-helix (private sector, research organisations, public authorities) convened repeatedly, expressed their views and reached consensus on the activities that would be supported. More details on the design of the initiative are presented in section 2.
3. To facilitate the interaction between all interested stakeholders of the quadruple-helix, GSRT formed steering groups, one for every key domain that was identified in national RIS3 strategy. The steering groups acted also as permanent advising bodies to GSRT.

4. The involvement of the quadruple-helix representatives was not constrained only to the design phase of the initiative but also to later phases. In particular, after the submission of proposals in the 1st cut-off date, the quadruple-helix representatives convened again in order to assess if the priorities included in the initial design of the initiative were supported by the interest of the applicants of the submitted proposals and possibly introduce new ones that emerged recently.
5. The evaluation criteria of the submitted proposals were aligned with the criteria used for the EU Horizon 2020 research programme. This would facilitate the Greek research community in exploiting more easily funding opportunities from EU or national funds without altering significantly the proposals.
6. Finally, vast publicity was given to the initiative before its launch through different channels like:
 - a. Info day events in 8 main cities of the country covering different regions
 - b. Extensive social media promotion
 - c. Posting of related to the initiative news on various public authorities' websites

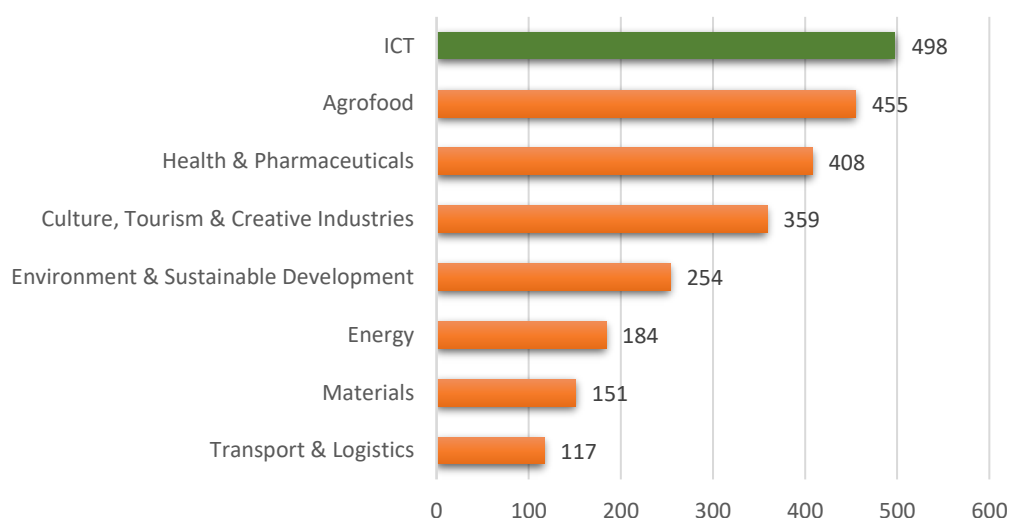
1.5. What is the annual budget allocated to the programme? What are the sources of funding? Please describe its funding model.

The funding of the initiative is provided by the European Structural and Investments Funds (ESIF) and mainly from the European Regional Development Fund (ERDF), and is channeled to beneficiaries in the form of grants.

The initiative was announced on March 2017 with an initial budget of EUR 280 million and it provides three cut-off dates for submission. The indicative initial budget for the ICT domain was EUR 52 million while for the ICT priorities related to the other key priority domains there was no constraint but the overall constraint for the domain (for example, in a theoretical case, all available funding for a domain could be allocated to an ICT-related priority).

Because of the great interest that was expressed for the initiative (2,426 submitted proposals of which 498 or 20.53% in the ICT domain, not considering the interest for the ICT related priorities in other domains) after the first cut-off date in June 2017, additional funding was allocated to the initiative, reaching EUR 410 million in total and EUR 77 million in particular for the ICT domain.

Figure 8 Research-Create-Innovate, Submitted proposals per domain (after 1st cut-off date)



The proposals that are positively evaluated after each cut-off date will be funded for a maximum of 36 months. An advance payment of up to 40% of public funding may be granted to the beneficiaries and intermediate installments are provisioned related to the deployment of the projects.

2. Design and implementation process

2.1. Context of the initiative

In the context of the national Research and Innovation Smart Specialisation Strategy (RIS3) of Greece and the underlying entrepreneurial discovery process (EDP), the programme aims to meet the needs of enterprises and enhance their competitiveness in the global market. A prerequisite for achieving the objectives of the programme is to focus resources and efforts on selected areas of economic activity and fields of intervention where potential for entrepreneurship and research excellence is identified in accordance with the national strategy for research and innovation for smart specialization (RIS3 strategy) at national and regional level, with the aim of modernizing, diversifying and exploiting new opportunities in the Greek economy.

The importance of ICT and related digital technologies have been acknowledged as a key factor to improve productivity and hence growth and jobs in the country. In particular ICT plays a fundamental dual role¹:

- **ICT as a domain:** ICT as a domain represents 5% of total GDP and 20% of overall productivity growth in Europe (for Greece the ICT domain represents 3.27% of total GDP for 2016). The digital economy is growing at seven times the rate of the rest of the economy. ICT can be the basis to promote clusters and local/regional eco-systems of ICT companies in specific fields (e.g. within the

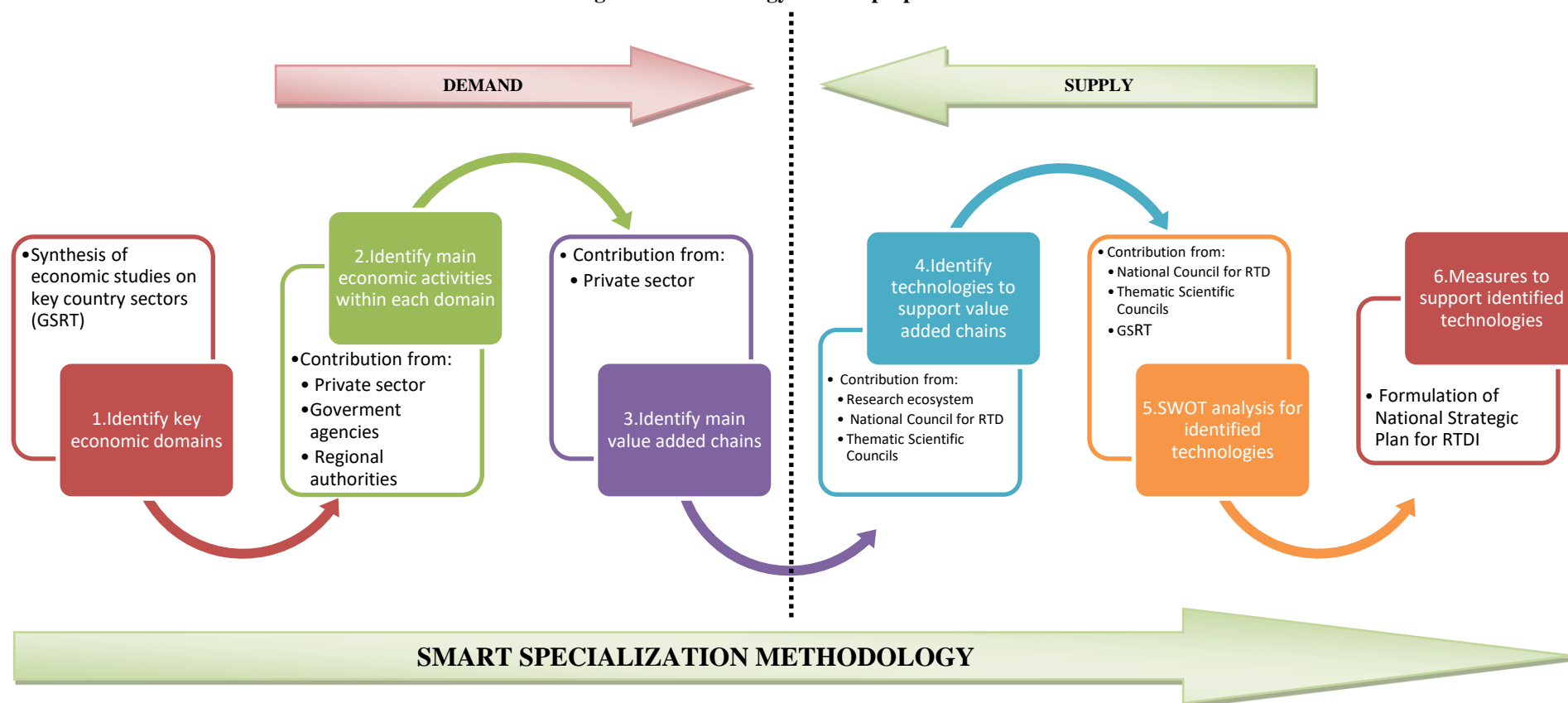
¹ [EC-The Digital Agenda Toolbox](#)

contexts of future networks, Internet of things, trustworthy ICT, etc.). ICT is a natural component of product and service development and delivery in areas such as creative media sectors with culture, music, movies and games.

- **ICT as enabler:** ICT technologies play a horizontal cross-cutting role in enabling innovation and the diffusion of new practices. In this respect, ICT are Key Enabling Technologies (KETs), like micro- or nano-electronics and photonics. The introduction of ICT-related processes can lead to productivity gains not only in high-tech sectors but across entire industries and value chains. ICTs can reduce barriers to entry, cut time to market, reduce transaction costs, extend global reach, sharpen market intelligence, blur industry boundaries and open doors for a new generation of entrepreneurs and innovators. ICTs speed-up and improve the way innovative products and services are conceived, developed, produced and accessed.

Due to the importance of ICT and related digital technologies, a genuine bottom-up approach was followed by GSRT in order to identify the exact technologies where emphasis should be given in relevance with the economic activities where the country presents strong potential. The complete methodology is presented in Figure 9 and summarized below.

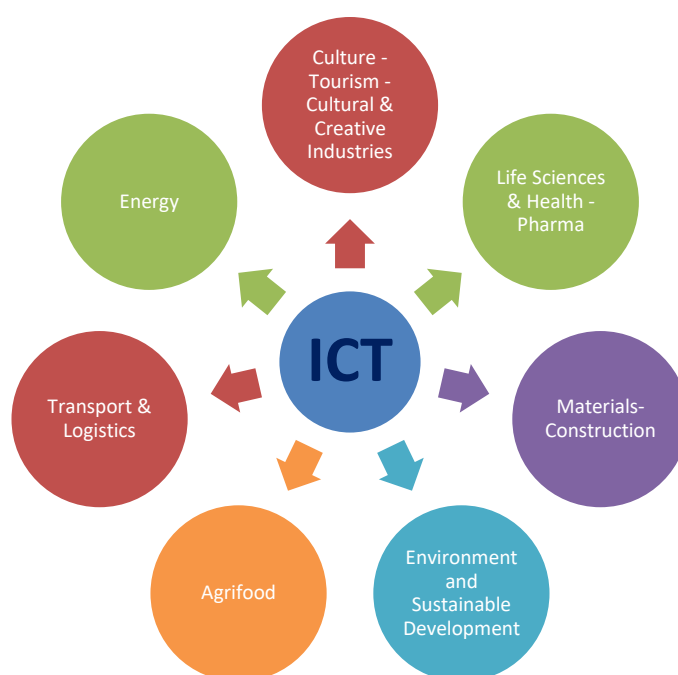
Figure 9. Methodology of RIS3 preparation



1. Step 1: Identification of key economic domains with potential:

After an initial assessment of numerous statistical data, the country has selected 8 key priority domains to focus resources and effort for the period 2014-2020 in order to overcome the economic crisis and boost the economy. The ICT domain, being one that influences all other domains, was naturally selected among them. The 8 key priority domains are depicted in the following diagram.

Figure 10 Key priority domains that will be supported in Greece in the period 2014-2020



2. Step 2: Identification of main economic activities within each domain

It consisted of a broad **consultation** conducted by GSRT with Ministries, Regions, Research Centers, the Federation of Greek Industries, and the National Council for Research and Technology (ESET) and studies carried out by companies and Greek research institutes in order to identify:

- Horizontal characteristics of the National Research and Innovation system and its comparative position in the EU setting
- The role of regions in the national research and innovation system and the existence of regional innovation systems
- The broader economic areas or domains which should be further examined

3. Step 3 and 4: Identification of main value-added chains and supporting technologies

During the previous phase, 8 initial priority domains were identified in accordance with the strategic domains where Greece is making its development effort for the next decade.

For each domain, an analysis of existing studies and strategic papers followed: **a [document](#) was prepared per domain mapping major characteristics and setting the broader scene.**

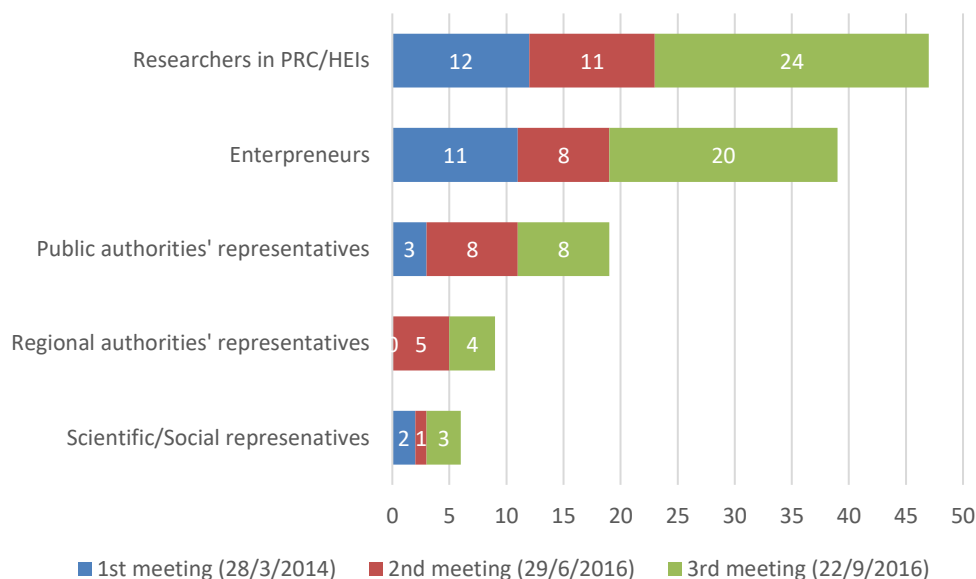
The next step involved the identification within each domain of the most promising “activities”, on the basis of the existence of both scientific excellence and entrepreneurial potential. To this end, a genuine bottom-up approach was used through a broad and structured consultation with all relevant stakeholders - giving emphasis on the representation of the enterprise community - in the framework of the Innovation Platforms, using a suitably designed questionnaire. For each Innovation Platform, a competent coordinator was appointed on behalf of GSRT.

By the term “**Innovation Platform**” we refer to an open structure, created for each domain, coordinated by GSRT, where the main stakeholders (entrepreneurs, researchers, federations, public sector bodies, regional authorities, etc.) participate in order to exchange information and opinions about relevant RIS3 priorities. The Innovation Platforms are at the core of the consultation process taking place at the national level.

The Innovation Platform that was formulated for the ICT domain proved to be very fruitful and useful for GSRT, and provided information, data, opinions and steering of the whole process of entrepreneurial discovery. The outcomes of the ICT Innovation Platform meetings were discussed by the coordinators of the other platforms in order to identify common needs between platforms regarding ICT and decide on the one hand the best approach to meet these needs and on the other hand to avoid overlaps.

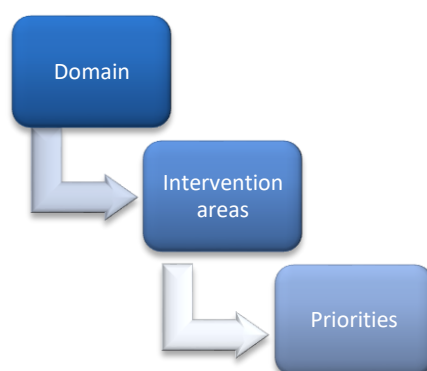
In the following diagram, the participants to the meetings of the ICT Innovation Platform are depicted for the time period 2014-2016. Participations are analyzed according to the origin of the participants in order to demonstrate the contribution of the representatives of the quadruple helix.

Figure 11 Participants in GSRT's ICT Innovation Platform meetings, per category, 2014-16



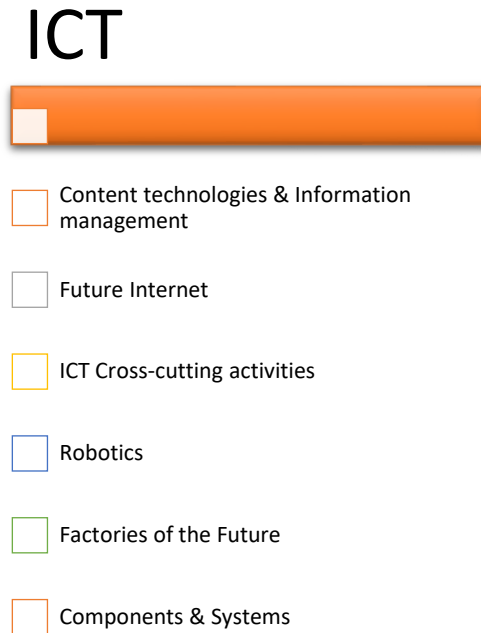
After the implementation of the previous mentioned steps, a 3-layer list was formulated for each of the above mentioned domains through an extensive consultation with the relevant stakeholders of the quadruple-helix.

Figure 12 3-layer prioritization of domains



The intervention areas that were identified for the ICT domain are presented in Figure 13.

Figure 13 Intervention areas identified in the Greek ICT domain



The complete list of intervention areas and priorities of **ICT as a domain** are presented in Appendix 1 (Table 3). The terminology used for the intervention areas as well as the priorities, is the same as the one used in the EC Horizon 2020 (H2020) program for Research & Innovation. That was agreed with all the involved stakeholders of the quadruple-helix in order to use a common vocabulary and to facilitate submission of proposals to national or H2020 calls. On the other hand, the priorities identified are those relevant to the country and specifically those that complied with the following criteria:

- Existence of critical mass of enterprises
- Existence of strong human research potential
- Anticipated significant economic and societal impact
- Possible technological upgrade of the domain
- Increase in exports

Although no specific thresholds were set for the above mentioned criteria, the quadruple-helix stakeholders were asked to support their proposed priorities with sufficient data from recognized sources. At the same time, ICT priorities were recognized as essential to be supported through the initiative in the other key priority domains (**ICT as enabler**) by the relevant Innovation Platforms. These ICT-related priorities that are demand-driven by the other key priority domains are presented Appendix 1.

4. Step 5: SWOT analysis for identified technologies

In parallel with Step 2 for the identification of main economic activities within each domain, a SWOT analysis was conducted that revealed:

- the strengths of the country related to the economic activities and the supporting technologies by the research ecosystem
- the opportunities that are given because of recent trends that could be exploited given the identified strengths
- the many weaknesses of the economy, the public sector, the digital infrastructures as well as the people's mindset
- the threats that might affect the strategy implementation which were identified mainly on the pure financial liquidity, the formation of global value chains and the strong competition from Asian countries

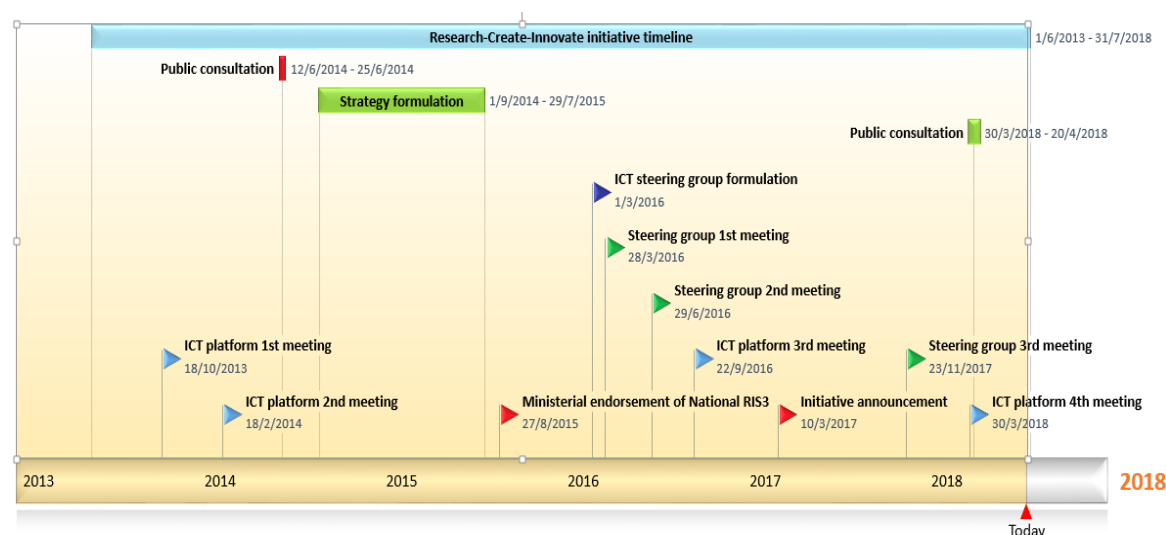
5. Step 6: Measures to support the identified technologies

The convergence of the demand and supply process depicted in Figure 9 resulted to a list of priorities that would be supported in the period 2014-2020 described in a concrete National Strategic Plan. The Plan also included a set of proposed measures to promote these priorities, one of which is the Research-Create-Innovate initiative.

In order to maximize the participation of the private and public sector in the formulation of the National Strategic Plan, the outcome of the previous phases was put on **open, electronic consultation** on the relevant website of the Greek government².

The timeline of ICT Innovation Platform meetings, the relevant steering group assemblies as well major milestone events related to the above described process are depicted in the following figure.

Figure 14 . Timeline of ICT Innovation Platform & Steering Group meetings



The methodology described previously could easily be adopted and effectively applied at national or regional level. The basic elements of the methodology, data-quadruple-helix stakeholders-coordinating authority, are usually present at all levels.

² <http://www.opengov.gr/ypepth/?p=2035>

2.2. What challenges have been faced during the design and/or implementation of the initiative (if any) and how have they been addressed?

One of the challenges faced by GSRT while communicating with the participants of the Innovation Platforms was for the coordinators of the platforms to prepare well-documented draft documents and questionnaires that would be discussed during the platform meetings, collect participants' proposals and comments and prepare a synthesis report that would hopefully be adopted by the platform. In order to address these issues and to further facilitate the interaction between GSRT and the representatives of the quadruple helix, steering groups were formulated, one for each of the eight key domains of interest to the country. The steering groups consisted of about 11 members (the number depending on the domain) where both the private and public sector of the research community were represented equally, along with representatives from relevant to the domain public authorities/ministries. The role of the steering groups was:

- To advice GSRT on the performance of enterprises to the priorities identified within each domain
- To indicate the technological advancements related to the priorities
- To propose new priorities and intervention areas (see Figure 12-3-layer prioritization of domains) that were not foreseen in previous consultation phases or that have emerged due to recent changes and technological breakthroughs
- To prepare well documented proposals for possible alteration of initial priorities to be discussed at the platform meetings.

2.3. What are the conditions for the programme to be effective?

Greece's major weaknesses appear to lie in administration, taxation as well as innovation and growth sustainability. The most important of the restrictive factors identified are linked to the access to finance, the regulatory environment and infrastructure and the adoption of new technologies or new forms of governance. In addition to that, state aid rules put more obstacles to the participation of enterprises to collaborative research initiatives.

A number of structural deficiencies of the production sector, deteriorating during the crisis time, lie at the basis of the competitiveness gap:

- Low contribution of activities of high added-value and ICT penetration, based mostly on "traditional" sectors (i.e. food and beverage, cement and concrete etc.), de-industrialization and re-location of activities abroad were accelerated.
- Small size of enterprises and lack of large firms with international exposure and market penetration. In general, the value chains are short and close to the final consumer.
- Companies rely mostly on imports of machinery and equipment (embedded technology) as the main form of technological upgrade and productivity improvement.
- Institutional and cultural barriers to entrepreneurship, limited use of economies of scale, (lack of B2B services, vertical links and complementarities between

companies), restricted personnel mobility, high energy costs, bureaucracy and red tape.

- Limited use of Venture Capital, Business Angels, crowdfunding or other similar financial instruments.

2.4. Are initiatives in other policy areas in line with the objectives of Research-Create-Innovate? In what ways they reinforce each other?

Apart from the National Research and Innovation Smart Specialisation Strategy (RIS3) of Greece, which was developed by the General Secretariat for Research and Technology, the National Digital Strategy 2014-2021 was developed by the relevant Ministry of Greece.

The two strategies are interconnected and aligned in the following areas:

- Open Data
- Interoperability
- Smart applications and services
- Access
- Digital skills

3. International dimension

3.1. Does this initiative have an international dimension?

The International/European dimension is secured in the “Research-Create-Innovate” initiative in two ways:

1. During the design phase, an analysis of various studies regarding the ICT domain and related technologies was made on a global as well at European level (see Step 3 and 4 on page 18). Disruptive technologies identified by various studies along with European Union’s Strategy for the ICT sector, as expressed through the Horizon 2020 Work Programme, were taken into account in order to align the national strategy with the new trends worldwide. In this way it is ensured that funding will not be allocated to obsolete technologies that will not lead to the envisaged economic transformation of the country.
2. According to the provisions of the call, enterprises from other countries can participate in the initiative, either on their own means, or by collaborating with Greek enterprises in common research projects, thus promoting collaborations for innovation. In order to receive funding from the “Research-Create-Innovate” initiative, these enterprises have to establish a branch in Greece, otherwise they can participate as subcontractors to beneficiary firms. More details regarding the number of enterprises that participated in the first cut-off date of the initiative are presented in Section 4.

3.2. In what ways have experiences from other countries informed the development of the policy initiative?

During the preparatory phase of the initiative and in order to exchange ideas and knowledge on where to put emphasis in the ICT domain as well as to identify best practices among other countries, GSRT has participated in numerous cross-border collaboration and knowledge sharing events organized by various EC bodies like the:

- EU Smart Specialisation Platform (S3 platform),
- EU Member States Board on Digital Entrepreneurship
- EU Communication Networks, Content and Technology Directorate-General (DG CNECT) Workshops on Strategies for a Data-Driven Economy
- EU DG CNECT Grand Coalition initiative
- EU Europeana

Also, knowledge sharing has been achieved through the collaboration between GSRT and the relevant authorities of other countries for the design of bilateral research calls (like Greece-Germany, Greece-Israel and Greece-China), as well as through the participation in EU ERANets, Joint Undertakings and Art. 185 initiatives.

At the same time GSRT has collaborated with regional authorities and managing authorities of regional operational programmes, in order to support regional initiatives on RDI collaborative projects, since never before 2014 have regional authorities designed and implemented such initiatives.

4. Impact

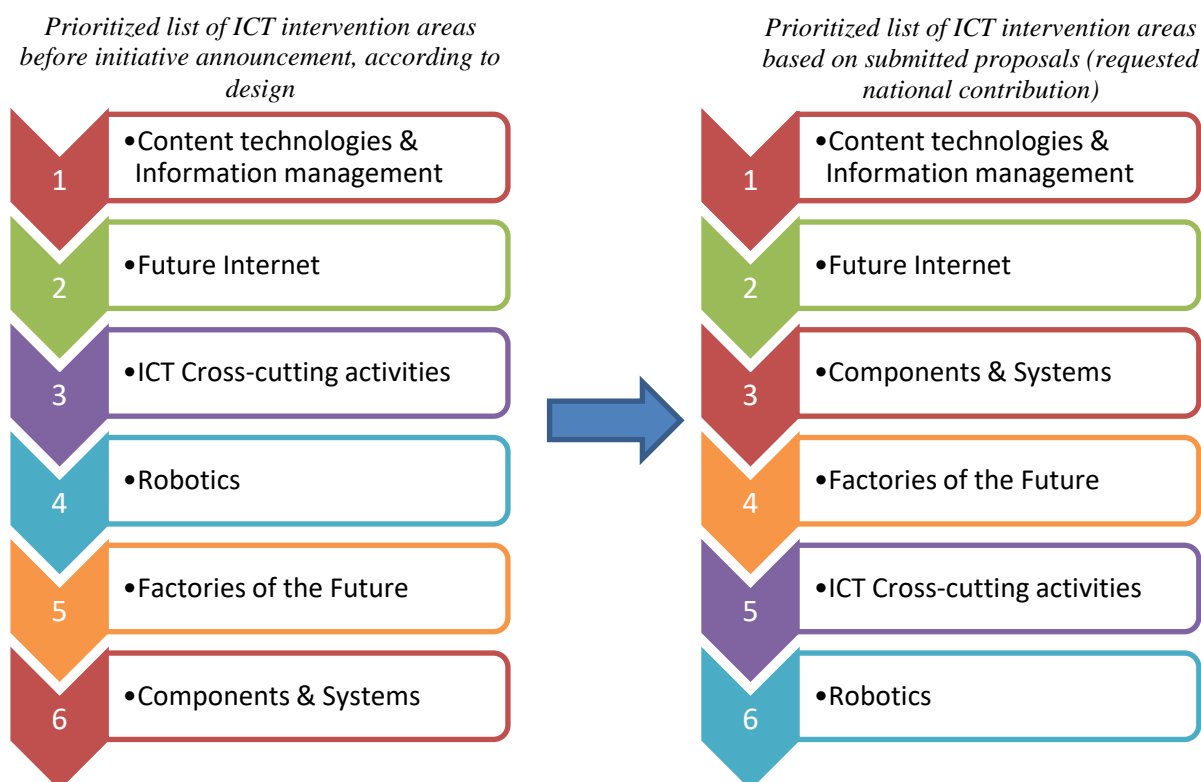
4.1. Has the policy initiative's impact already been evaluated? If not, how and when are impacts planned to be evaluated?

The initiative was announced in 2017, the evaluation procedure for the first cut-off date was concluded in late 2017 and therefore it is not possible to assess the impact of the initiative yet. It is only possible to draw some first conclusions based on the data regarding the submitted and evaluated proposals.

First of all, it seems that the importance of the first 2 areas of intervention in the ICT sector, namely “*Content technologies & Information management*” and “*Future Internet*”, was confirmed by the interest of the applicants, as expressed through the requested national contribution. It should be noted that in the design phase of the initiative, following the methodology presented in section “

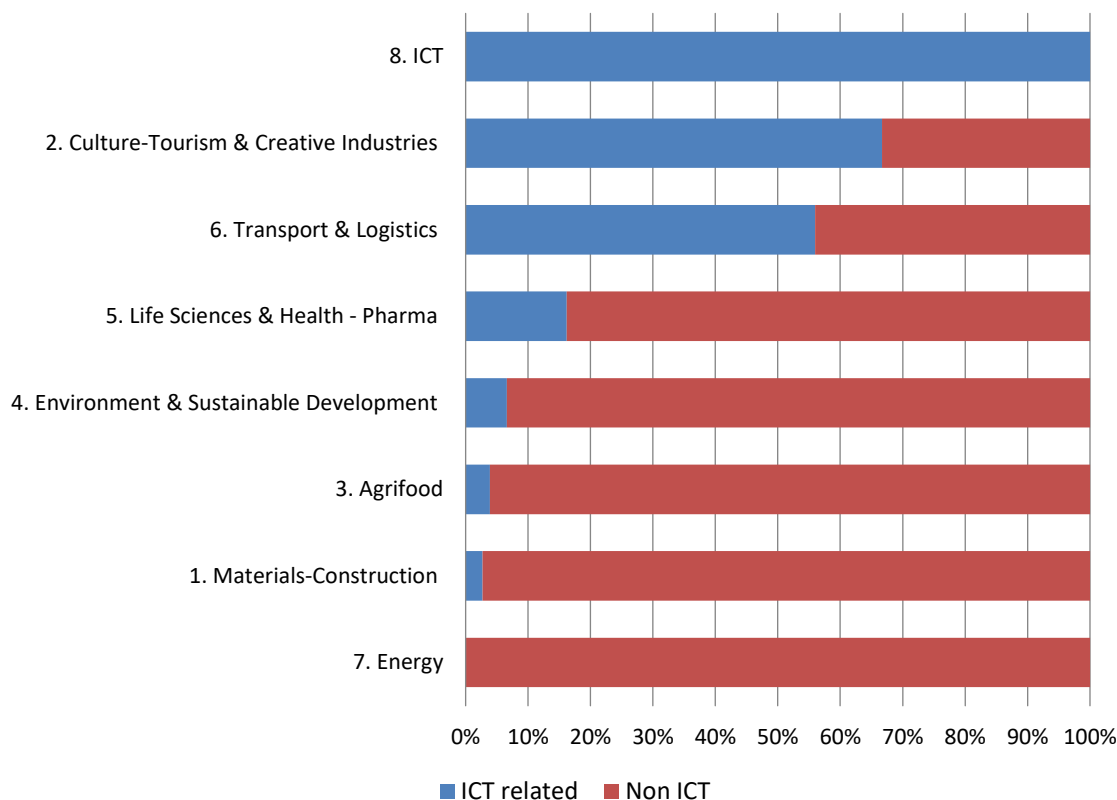
Design and implementation process”, the intervention areas in the ICT sector were prioritized. In Figure 15, the shifting of importance of the intervention areas before and after the announcement of the initiative is depicted.

Figure 15. Change of priority in ICT intervention areas before and after submission of proposals



Regarding the contribution of the ICT-related priorities in the other key domains (ICT as enabler), data from the retained proposals after the 1st cut-off date of the initiative show a clear interconnection between the domains of Culture-Tourism-Creative Industries and ICT as well as the domain of Transport & Logistics and ICT (more than 50% of public expenditure in these 2 domains will be allocated to ICT-related proposals). These first indications are very promising since the domains of Culture-Tourism-Creative Industries and Transport & Logistics are two domains with strong potential for Greece and their upgrade through ICT can contribute significantly to the boost of the economy.

Figure 16 Research-Create-Innovate initiative: Contribution of ICT related technologies to other domains

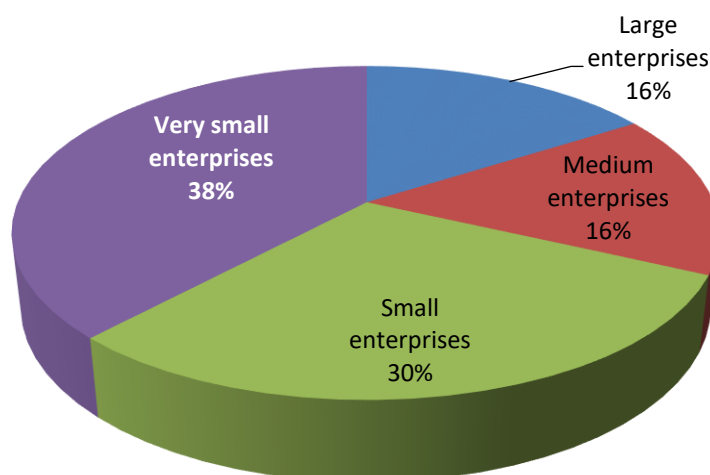


Source: Data provided by MIA-RTDI

Another very promising conclusion that can be derived from the retained proposals after the first cut-off date of the initiative is that the objective to mobilize the enterprises to participate in RTDI activities has been fulfilled, at least at the phase of submission of proposals. In a participant satisfaction survey that was conducted after the first cut-off date of the initiative, almost half of the responders (49%) were from the private sector and indicated among others that the initiative meets their needs (Totally: 18.3%, Very much: 51.7%).

Even more encouraging is the fact that the highest participation came from very small enterprises that usually lack the economic and human resources to engage in such activities. Although not yet based on relevant studies, there is a widespread belief that the recent economic crisis has triggered a shift in entrepreneurial mentality, especially among young entrepreneurs, which now gives more emphasis on innovation.

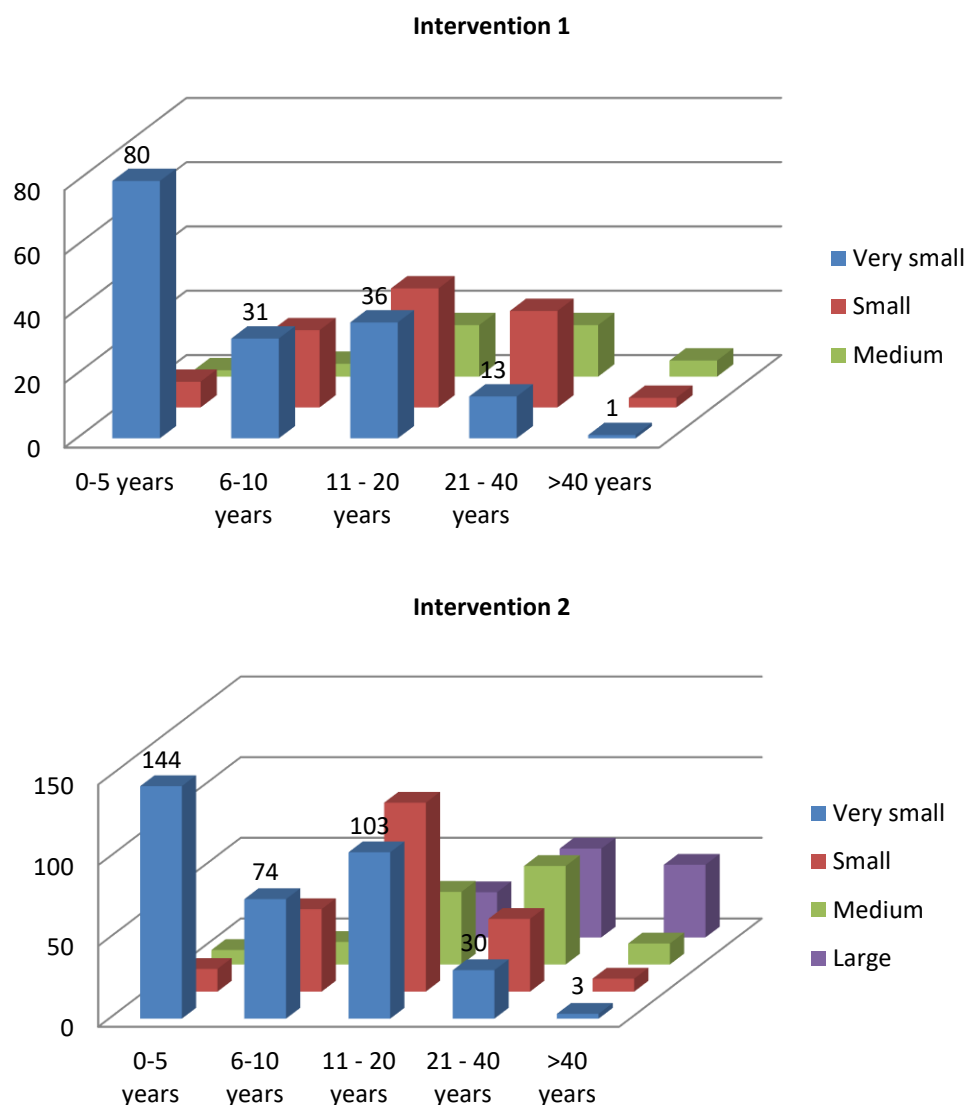
Figure 17 Research-Create-Innovate initiative: Participation of enterprises to retained proposals according to size



Source: Data provided by MIA-RTDI

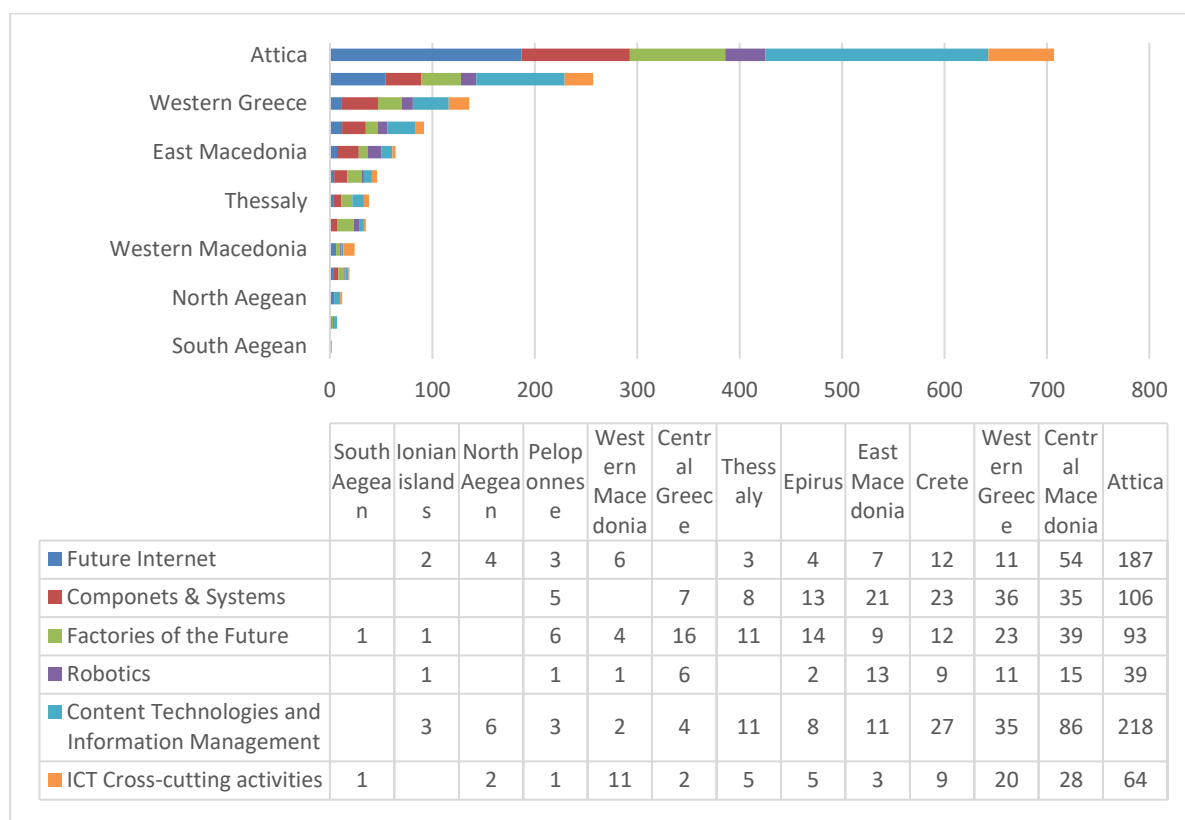
If we examine the submissions data further, we reach even more encouraging conclusions. As it was presented in section 1.3, the initiative provided for three interventions. Only enterprises could submit proposals in intervention I and III, while intervention II was aiming collaborative projects between enterprises and research organisations (HEI and PRCs). If we examine the participation of enterprises in interventions I and II (that drew the major interest) according to their age as well as their size, we find that newly created enterprises (0-5 years old) seem to be very active in the initiative and also successful in getting funded, which might be an indication of mindset change in young entrepreneurs.

Figure 18 Research-Create-Innovate initiative: Participation of enterprises to retained proposals according to age and size in interventions 1 and 2



Source: Data provided by MIA-RTDI

The regional dimension of the interest of the applicants is depicted in Figure 19. The centralized structure of the economy is expressed through this diagram with the Attica region being the most active since most of the enterprises and research organisations are located in that region.

Figure 19 Research-Create-Innovate, Submissions per region and ICT intervention areas

Source: Data provided by MIA-RTDI

Regarding cross-country collaborations, the initiative has attracted interested applicants from various countries, mainly from UK. In Table 1, participations by enterprises of EU Member States to the various intervention areas of the ICT domain is presented.

Table 1. Interest to the initiative by other countries

Domain	ICT									
No of proposals	Country									
	CYP	DEU	EST	FRA	GBR	GRC	IRL	NLD		Total
Content technologies & Information management	1	1			2	408		2		414
Future Internet					4	288	1			293
Components & Systems				1		253				254
Factories of the Future				1	2	226				229
ICT Cross-cutting activities						151				151
Robotics						98				98
Total	1	1	1	1	8	1.424	1	2		1.439

Source: Data provided by MIA-RTDI

For the overall monitoring of the initiative, certain indicators have been set in compliance with the output indicators of EUs European Regional Development Fund (ERDF). The expected outcomes from the programme support to the funded proposals after the first cut-off date are presented in the following table. For each indicator the expected value is compared with the target that had been set before the announcement of the initiative.

Table 2 Indicator values of the Research-Create-Innovate initiative

Indicator	Value based on proposals	Target value	Difference (%)
CO01-Number of enterprises receiving support	1.209	958	26,20%
CO02-Number of enterprises receiving grants	1.209	958	26,20%
CO05-Number of new enterprises supported	255	139	83,45%
CO026-Number of enterprises cooperating with research entities	895	488	83,40%
CO24-Number of new researchers in supported entities	4.390	5.850	-24,96%
05801 Scientific publications in international journals with evaluation or in peer-reviewed international conferences	3.536	1.611	119,49%
05802 Patent applications at National level under the initiative	333	74	350,00%
05803 Patent applications at European level under the initiative	242	103	134,95%
05804 PCT patent applications under the initiative	154	45	242,22%

Source: Data provided by MIA-RTDI

Although it is too early to draw conclusions since the implementation of the projects is about to start, it is evident from the above mentioned table that only by the projects selected from the first cut-off date, in almost all of the indicators the target values will be surpassed and two more cut-off dates are ahead. The only indicator that is still lagging is “CO24-Number of new researchers in supported entities”, which is expected considering the restraints in the recruitment of new researchers in PRIs and HEIs.

5. Appendix 1 – ICT related priorities in key economic domains

In the following table the priorities identified in the ICT acting as domain, are presented.

Table 3. Research-Create-Innovate initiative, ICT domain, areas of intervention and respected priorities

Areas of intervention	ICT as a domain - Priorities
1. Content technologies and information management	1.1 Open data, big data
	1.2 Advanced technologies for 3D modelling, preservation and restoration of tangible and intangible assets of particular interest, by use of semantic web technologies
	1.3 Machine translation to/from Greek
	1.4 Tools for creative content, media and knowledge industries
	1.5 Multimodal and Natural Computer Interaction, verbal and non-verbal
2. Future Internet	2.1 Smart networks and novel architectures
	2.2 Smart technologies for optical and wireless networks
	2.3 Advanced cloud infrastructures and services
	2.4 Tools and methods for software development
	2.5 Collective Awareness platforms
	2.6 Advanced 5G network and service infrastructure
	2.7 Satellite Internet and IoT
3. ICT Cross-cutting activities	3.1 Internet of things - Platforms for connected devices, objects, smart environments, services and people
4. Robotics	4.1 Next generation robots and support technologies for manufacturing and services
	4.2 Operation in dynamic, real world environments, with increased capabilities for autonomy, adaptability and safe human interaction
	4.3 “Smart manufacturing” robotic systems
5. Factories of the Future	5.1 Process optimization of manufacturing assets
	5.2 ICT-enabled modelling, simulation, analytics and forecasting technologies
	5.3 3D Printing
	5.4 Smart technologies and strategies to prolong the operational life of production systems
	5.5 Zero Defect Manufacturing
	5.6 Reconfigurable Manufacturing Systems/ Industry 4.0
6. Components & Systems	6.1 Micro and nano-electronics and embedded systems
	6.2 Microelectromechanical-MEMS sensors
	6.3 Digital electronics
	6.4 Electronics and embedded systems for sound, image and video management
	6.5 Systems and tools for electronic security
	6.6 Systems and components for «smart wearables»
	6.7 Microwave devices
	6.8 Optical devices
	6.9 Microelectronics design and simulation tools
	6.10 Microelectronics and electronics manufacturing processes
	6.11 Low power electronics

In the following table the ICT-related priorities that will be supported in the key economic domains of Greece for the upgrade of the domains, are presented (ICT as enabler).

Table 4 Research-Create-Innovate initiative, ICT as enabler, Areas of intervention and respected ICT-related priorities in key priority domains except ICT

Priority domain	Areas of intervention	ICT-related priority
1. Materials- Construction	1.3 Biomaterials/ Biomediments	1.1.2 Implantable Micro / Nano systems, devices, micro-chips for: (i) Controlled drug delivery for more effective and targeted personalized treatment. (ii) Dynamic cell culture micro-flow platforms (iii) In vivo micro / nano-tissue diagnosis and regeneration systems
	1.3 Materials for integrated electronics and photon technologies / applications in micro-nano electronics	1.3.2 Materials for power electronics (e.g. GaN, SiC) for terrestrial and satellite telecommunications applications, defense and security, and high voltage and current converters.
2. Culture - Tourism - Cultural & Creative Industries	2.1 Development of innovative products and services, including audiovisual, with the emphasis on strengthening and supporting businesses, professionals and organizations active in the areas of Culture, Tourism and Creative Industries.	2.1.6 Development and exploitation of ICT applications for analysis, documentation, modeling and management of cultural assets, as well as areas of environmental and tourist interest, aiming at the upgrading of tourism resources and their products
		2.1.7 Development of innovative platforms for collecting tourist and cultural content and making it available to developers of applications and services. It also includes the use and exploitation of open data, social networks and crowd sourcing.
		2.1.8 Development of new technologies-techniques-digitization methods and scientific documentation of cultural heritage (movable, immovable and immaterial) with emphasis on improving digitization quality and reducing time and cost
		2.1.9 Development of marketing promotional applications and, more generally, decision-support support to stimulate the competitiveness of the Culture-Tourism-Creative Industries domains by exploiting big-data techniques
		2.1.10 Development of innovative tools or platforms, such as Media Asset Management platforms offered as a product or cloud service (SaaS), for the integrated management and processing of audiovisual content, e.g. platform for digital preservation, editing and projection of Greek cinematographic and other audiovisual works, including amateur material
		2.1.11 Development of innovative digital content protection applications (existing audiovisual content, new producers, amateur films, promotional material, etc.), e.g. applications for exploitation, liquidation, copyright management-Digital Rights Management, watermarking
		2.1.12 Development of innovative platforms and methods for distribution of audiovisual content and / or digital applications
		2.1.13 Development of platforms and ICT toolkits to support the design of spatial environments and spatial interactive applications (e.g. in the areas of architecture, decoration, scenography, directing, lighting design, sculpture, etc.), incorporating advanced technologies (e.g. design in a mixed reality immersion environment,

	user interfaces in hybrid environments, generating design, simulation, visual programming, etc.)
2.2 Development of innovative products and services, including audiovisual, with a focus on enhancing the end-user experience and aiming at the promotion of cultural heritage, modern culture and the tourist product	<p>2.2.1 Developing innovative applications for (a) touring natural and / or virtual cultural environments (e.g. museums, virtual museums, archaeological sites, festivals, exhibitions, collections, cultural events and tours, as well as other cultural activities and events), (b) to promote areas of tourist and environmental interest (e.g. areas of natural beauty, traditional settlements, geoparks, shipwreck, underwater attractions, aquariums), (c) to promote specific forms of tourism (experiential, educational, alternative, medical, etc.)</p> <p>2.2.2 Development of innovative applications for the revival, representation and promotion of intangible cultural heritage and cultural evidence (e.g. folk tradition, Greek mythology, cultural events, customs, artistic events, activities, etc.) and contemporary culture / visual arts through technologies / technical speech, audio, image, augmented reality, etc.</p> <p>2.2.3 Design of techniques and "story telling" systems for the innovative / interactive presentation of exhibits / events in places of cultural and tourist interest</p> <p>2.2.4 Developing advanced applications for advertising and marketing the cultural and tourist product of the country (e.g. interactive applications, immersion environments, etc.)</p> <p>2.2.5 Development of digital games and gamification techniques for computers, mobile devices and gaming consoles, utilizing cultural and tourist content (arts, history, science, etc.) for entertainment, education, development of design thinking, promotion of culture and tourism</p> <p>2.2.6 Enhance and enhance the capabilities of traditional content presentation tools (e.g., e-books of augmented reality)</p> <p>2.2.7 Development of digital interactive learning applications and educational material suitable for support of educational tourism activities and, more generally, for increasing the tourist interest in the country (e.g. promotion of specific periods and events of Greek history, culture and sciences, with international interest)</p> <p>2.2.8 Development of advanced applications to enhance the access of the foreign-language audience to Greek cultural and tourist content</p> <p>2.2.9 Development of digital products and accessibility services for specific population groups (children, single parent families, elderly, disabled, chronically ill, etc.) with cultural and tourist content (e.g. video, text, sound, etc.) end user</p>
2.3 Development of ICT tools and applications that promote the synergy of the Culture, Tourism and Creative Industries sectors with other thematic areas to create new value chains	<p>2.3.1 Developing applications to improve, predict and manage the energy and environmental footprint of tourist infrastructure</p> <p>2.3.2 Develop platforms and applications to provide advanced security and protection services to tourists</p> <p>2.3.3 Development of platforms and applications for forecasting, detection and risk management (e.g. fire, climate change, extreme weather events, earthquakes, etc.) in areas of cultural and tourist interest</p> <p>2.3.4 Developing digital games and generally innovative ICT applications that harness creative content to promote well-being, physical fitness and health</p> <p>2.3.5 Development of technological applications for the promotion of Greek gastronomy, sports activities and events for the benefit of tourism</p> <p>2.3.6 Development of innovative Design, through the creation of value chains, for the development of products, applications, systems and services designed to support and strengthen the primary and</p>

		secondary production sector, including craft and handicrafts, e.g. incorporation of cutting-edge technologies, design innovation, production process innovation, identity assurance and authentication, etc.)
		2.3.7 Utilization of design methods for the development of innovative products, systems and applications to optimize user experience when using transport means, e.g. when moving to and from places of tourist and cultural interest or recreation
	2.4 Design and development of innovative products, applications, methodologies and services from the Creative Industry in order to create value chains in the fields of Culture, Tourism, Creative Industry	<p>2.4.1 Exploitation and development of technologies for the collection, analysis and visualization of Big Data using visual communication techniques to improve information transmission and understanding and / or market analysis in the areas of design, communication, journalism, publishing, etc.</p> <p>2.4.2 Exploitation and development of innovative design methods and technologies (e.g. customization, optimization, mass customization, etc.), digital production tools and tools (e.g. CAM, 3D printing, CNC, robotics, innovative tools, etc.) for prototyping and production in the apparel / fashion, jewelery, visual communication, industrial design, product design, etc.</p> <p>2.4.4 Develop applications for enriched and interactive presentation of movies, exhibitions, performances</p>
3. Agrifood	3.8 Exploitation and application of new technologies in all systems of agricultural products and food production	3.8.2 Development and exploitation of new remote sensing technologies and Geographic Information Systems in the agrifood sector as well as for the evaluation and management of pastures
4. Environment and Sustainable Development	4.7 Pollution / Decontamination. Rehabilitation of coastal and groundwater soils	4.7.1 Development of water quality and soil quality observatories, Systematic monitoring and recording of surface and groundwater quality and soil pollution using Integrated Information System aiming at environmental protection, enhancing environmentally friendly agricultural practices, tourism development and risk assessment for ecosystems and the health of residents (including pilot applications using chemical / biological sensors and ICT).
	4.8 Air pollution	4.8.4 Recording of transport / industry emissions and development of applications and technologies to reduce them. Monitor and improve atmospheric quality. Sensor development and integrated atmospheric quality recording system.
	4.11 Creation of Model Centers / Measurements, Ecosystem Approach to Sustainable Development - Environmental Indicators / Studies	4.11.1 Collection, Analysis, Processing and Dissemination of Terrestrial and Marine Environment related data and natural disasters, as well as data from terrestrial sensors networks related to the quality of life in the urban environment (such as pollutants, noise) and the environmental protection of areas of particular of interest (such as monitoring of anthropogenic activity, monitoring of biodiversity)
5. Life Sciences & Health - Pharma	5.5 E-Health: Services and Systems for Patients / Citizens and Health Professionals	<p>5.5.4 Decision Support Systems for Detecting, Preventing and / or Monitoring Adverse Drug Actions in the Clinical Environment</p> <p>5.5.5 Advanced decision support systems and e-prescription</p> <p>5.5.7 Telemedicine systems and interconnected health services</p>
	5.7 Promote and confirm new therapies, targets and biomarkers to develop personalized therapeutic	<p>5.7.6 Digitization of medical data in easy-to-use and secure databases.</p> <p>5.7.7 Large volume biomedical management tools / methods and optic analytical techniques to solve open problems in large volume bio-data</p>

	approaches and new targeted therapies		
6. Transport & Logistics	6.1 Strengthening the freight transport system in order to increase added value and competitiveness	6.1.3	Facilitate intermodal transport by developing appropriate infrastructures and systems such as deployment of RFID systems for goods and / or baggage, automatic warehouse management systems (WMS) and electronic load and process monitoring (e-freight, e-documents, etc.).
		6.1.7	Development and use of new systems and technologies to optimize the management of fleets (road, sea, air) and available resources, and optimal routing and optimal timetabling of the freight services offered.
	6.2 Development of intelligent infrastructure and transport systems	6.2.1	Use of new technologies to increase road safety (applications of new embedded systems in road construction such as markings and markings aimed at communicating with drivers, development of other safety features, etc.).
		6.2.2	Driver support systems (e.g. eCall, driver vigilance, active safety, etc.).
		6.2.4	Use of new technologies to improve transport and interoperability (such as automation, electrification, cloud services, IoT, traffic and data management systems, etc.).
		6.2.5	Transport Interconnection Applications with Distribution and Storage Centers (e.g. Ports, Airports, Warehouses).
		6.2.6	Design of smart port infrastructures and use of Port Community Information Systems (PCSs) to effectively inform and communicate port operators to complete procedures from an access point (maritime single window).
		6.2.7	Augmented Reality and Artificial Intelligence Technologies (Systems and Tools) to Improve Supply Chain
	6.3 Sustainability in transport	6.3.4	Applications of innovative interoperable solutions for unhindered access to multiple transport services (one stop shop for seamless intermodality).
		6.3.5	Development of real-time information systems, parking management systems, integrated ticketing systems, Mobility-as-a-Service and cooperative mobility systems.
		6.3.6	Development and application of big data analytics for mobility, transport and logistics.
		6.3.7	Develop and implement sensors for low cost and high efficiency mobility management.
		6.3.8	Developing simulation models and studying the structure and operation of urban networks for the implementation of intelligent mobility systems and infrastructures.
		6.3.9	
	6.4 Enhancing intermodality and autonomy in urban passenger and freight transport	6.4.4	Automatic Driving in Greek Cities: Prospective Assessment and Pilot Actions for Passenger and Freight Transport.

**7.
Transport
& Logistics****7.6 Intelligent Network
Technologies**

7.6.2 New methodologies and tools for the development and design of the transmission network. Developing algorithms for real-time big-data mining, scatter production optimization, cost-benefit assessment for network expansion options, confirmation of the impact on network design for coordinated architecture design, flow control devices, location optimization, etc. Tools that can recognize climate and operational conditions, component lifetime, material failure prediction and detection, forecasts of production from renewable sources taking into account weather forecasts, historical data, and real-time measurements.