

# Comparative Analysis between Greece and Cyprus of the Impact of Digital Transformation on the Development of Quality of Life

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## Abstract

Today, in the “digital age” and the “knowledge society”, the modernization of the public sector at the international level and the addressing of its inherent, structural weaknesses in the way of organization, establishment and operation, are unthinkable without the generalized use and exploitation of Information and Communication Technology (ICT). E-Government today is expanding rapidly in all developed countries and is intertwined with growth and progress. The current COVID-19 pandemic has demonstrated the importance of digital resources in our economies and societies and has been a driving force for the rapid promotion of the digital transformation of states and the establishment of integrated, interoperable and extrovert information systems. The purpose of this paper is to examine the level of digital transformation achieved in Greece and Cyprus, in accordance with the countries’ political and institutional commitments towards the European Union, as well as e-government as a reform tool for modernizing and addressing the inherent problems of the Greek and Cypriot public administration. In particular, the Digital Economy and Society Index (DESI, 2022) on Cyprus and Greece data are presented and a comparative analysis of the existing situation regarding E-Government in Greece and Cyprus is made, while at the same time, the average of E-Government of the Member States of the European Union is being compared. This comparative analysis covers at European level and includes digital skills, broadband connectivity, internet use, cybersecurity and the Information and Communication Technologies sector of the Member States.

## Keywords

DESI, Digital Transformation, E-Government, ICT, Quality of Life (QoL)

## 1. Introduction

Governments use DGPs as the foundation of their digital transformation practices. Users of these platforms can be citizens, businesses, public servants, other local or governmental bodies, and non-profit organizations (Dimitrelou & Fouskas, 2023). The Digital Economy and Society Index (DESI, 2022) is a tool developed by the European Union to measure the digital performance of member states. The index is composed of five categories, including connectivity, human capital, use of the internet, integration of digital technology, and digital public services. DESI is an important metric for understanding how countries are adapting to the digital economy, as it provides insights into the strengths and weaknesses of their digital infrastructure and policy frameworks. This research paper will provide an in-depth analysis of DESI, including its methodology, key findings, and implications for policy and practice.

Digital transformation has had a significant impact on the development of quality of life in many ways. Here are a few examples.

### 1.1. Increased Access to Information

Digital technology has made it easier for people to access information on a wide range of topics, from health and wellness to education and job opportunities. This has empowered people to make more informed decisions and take greater control of their lives, leading to improved quality of life.

### 1.2. Improved Healthcare

Digital technology has transformed the healthcare industry, enabling patients to receive better and more efficient care. Telemedicine and remote monitoring allow patients to receive medical attention from the comfort of their own homes, while electronic health records ensure that doctors have access to a patient's full medical history, leading to more accurate diagnoses and better treatment outcomes.

### 1.3. More Efficient and Convenient Public Services

Digital transformation has also made it easier for people to access public services. Online portals and mobile apps allow people to pay bills, apply for permits, and access government services from anywhere at any time, saving time and reducing the hassle of navigating bureaucracy.

### 1.4. Enhanced Social Connections

Digital technology has brought people closer together, enabling people to connect with each other across vast distances. Social media and other online platforms allow people to maintain relationships with family and friends, even when they are far apart. This can lead to increased social support, reduced loneliness, and improved mental health.

However, it's important to note that there are also some potential downsides

to the impact of digital transformation on the development of quality of life. For example, some people may become overly reliant on digital technology, leading to social isolation and reduced face-to-face interactions. Additionally, concerns around privacy and cybersecurity may erode trust in digital technologies and reduce their potential impact on quality of life.

Overall, the impact of digital transformation on the development of quality of life is complex and multifaceted. While digital technologies have the potential to significantly improve people's lives in many ways, it's important to carefully consider the potential risks and downsides as well (Dermatis et al., 2019a; Deramtis et al., 2019b).

## 2. Theoretical Background

In the year 2022, taking into account the rapid pace of technology development and the greatest possible ease of life for citizens, the European Commission is invited to monitor the digital progress of Member States. Since 2015 this monitoring has been done through the Digital Economy and Society Index (DESI, 2022) reports, as shown in the following Figure 1.

The European Commission established the Digital Economy and Society Index (DESI, 2022) in 2015. DESI is a compound index used as an analytical tool to measure the progress and "readiness" of the EU Member states with regard to their society and their digital economy (Sklenar et al, 2018). DESI is the official index of the EU for measuring the level of digitalization in EU-27 countries.

It is revealing that there is an ongoing discussion about how the innovation and competitiveness of countries are developed in the digital age (Laitsou et al., 2020).

In summary, the five (5) components relate to the following parameters, namely (Official Website of the European Commission, 2021):

- **Connectivity:** which measures the deployment of broadband infrastructure and its quality.

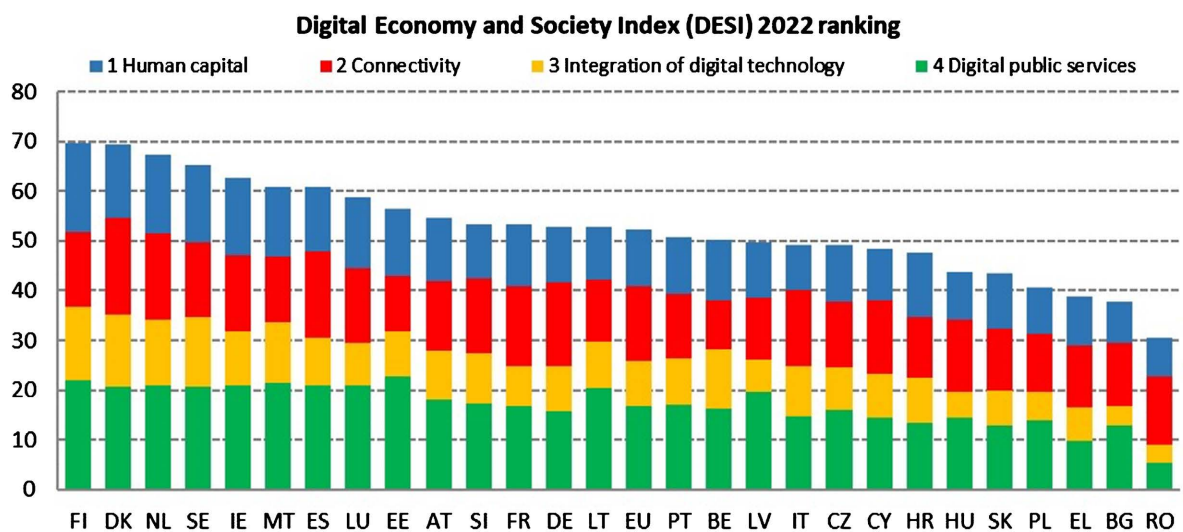


Figure 1. DESI ranking of EU member states in 2022.

- **Human capital:** which measures the skills needed to take advantage of the digital society.
- **Using online services:** It deals with the use of their content (the Internet services) by citizens.
- **Integrating digital technology:** It deals with digitization of business and electronic commerce.
- **Digital public services:** which measures the digitalization of public services. Digitalization refers to the adoption or increase in use of digital or computer technology by an organization, industry, country, etc. (Katsikas et al., 2017)

### 3. Methodology

The DESI is composed of five main components: Connectivity, Human Capital, Use of Internet, Integration of Digital Technology, and Digital Public Services. Each component is measured using a set of indicators, which are aggregated into a composite index. The methodology for calculating the DESI is based on a combination of official statistical data and expert evaluations. The indicators used in the DESI are grouped into three categories: structural, process, and outcome indicators. Structural indicators measure the underlying conditions that facilitate digital transformation, such as the availability of infrastructure and the legal and regulatory framework. Process indicators measure the use of digital technology by individuals, businesses, and public authorities, while outcome indicators measure the impact of digital transformation on economic growth, social inclusion, and public services.

The methodology to be followed in this paper is firstly to present and at the same time to compare the aggregated scores of Cyprus and Greece for each component mentioned above and to compare both countries with the European average. Then, the comparison of the percentages between the two countries in various parameters, as presented in the report, and in some parameters will be further compared with the average EU rate.

#### 3.1. Conceptual Approach to Key Concepts of Work

*E-government* is characterized by the use of Information and Communication Technologies (ICT) in the Public Administration. E-government is one area of digitization that has been underway for several years in European countries (Krejnus et al., 2023). In particular, the emphasis is placed on the electronic way of producing and distributing services, such as e-education, e-commerce, e-government services. It is an attempt to exploit modern technology, avoiding bureaucracy and saving valuable time, so that the citizen can fulfill his obligations to all Public Services using the Internet. Clearly, e-government provides greater security in making transactions and procedures more transparent because all actions can be controlled. By extension, the corruption that existed before e-government can be combated to a large extent and democratic participation is strengthened in many areas.

The DESI Digital Economy and Society Index, records the progress made by all Member States of the European Union in digitizing them and, by extension, the measures taken to implement the term “e-Government” by 2022. Therefore, an analysis at European level of broadband connectivity, digital skills, Internet use, business digitization, digital public services, emerging technologies, cyber-security and the ICT sector is included (Liargovas et al., 2019).

### 3.2. Current State of Digital Infrastructure in Both Countries

In recent years, digital infrastructure has become an increasingly important factor in the development of economies, and Greece is no exception. All the necessary elements for digital development, such as the Archaeological Service overseeing archaeological data produced by other entities and policies governing physical and digital documentation archives<sup>1</sup>, are in place. However, the digital infrastructure in Greece is still lagging behind the European Union average. In terms of cloud computing, for example, the national scores indicate that only 11% of Greek SMEs sell online, compared to the European average of 17%<sup>2</sup>. Fixed broadband take-up is also progressing slowly, with Greece reaching only 74% compared to the rest of the EU member states<sup>3</sup>. On the other hand, electronic information sharing, social media and big data are all indicators where Greece is near or above the EU-28 average, and the country has a wide fixed broadband coverage, reaching 96% of the population with fixed broadband compared to the 97% EU-28 average. The results coming from proposed forecasts indicate that convergence will occur by 2035, though Greece currently faces significant challenges due to the low state of digitization, both from the demand side (consumer of internet services) and the offer side (institutional and governmental constraints). It is clear that Greece has achieved less than the rest of the EU-28 member states in terms of digital infrastructure, and thus further digitalization is necessary in order to ensure the country’s economic recovery.

The digital infrastructure of Cyprus has undergone vast improvements in recent years, as the nation seeks to modernize and adapt to the times. The switch-over to austerity measures has opened the door for digital solutions to become the norm, transforming the television landscape of the nation<sup>3</sup>. The introduction of digital solutions has been a boon for the nation, as evidenced by the high percentage of households with access to a personal computer, at 74.8%, and the 98% of enterprises (with 10 or more employees) making use of personal computers<sup>4</sup>. This is further backed up by the fact that 85% of Cypriots regularly use the Internet, 72% make use of social media, and 50% interact with e-government services. Additionally, broadband connections in households and enterprises in Cyprus rank above the EU-28 average at 90% and 93%, respectively. The nation has also implemented an electronic justice system, iJustice, to address the need

<sup>1</sup><https://intarch.ac.uk/journal/issue58/8/>

<sup>2</sup><https://www.mdpi.com/857668>

<sup>3</sup>[https://intellectdiscover.com/content/journals/10.1386/jdtv.5.3.207\\_1](https://intellectdiscover.com/content/journals/10.1386/jdtv.5.3.207_1)

<sup>4</sup><https://www.mdpi.com/807300>

to further enhance the lifelong training of judges and the continuing professional development of legal professionals<sup>5</sup>. Moreover, the COVID-19 pandemic has given a significant boost to online teaching in the law curriculum, a delivery mode that was nearly absent previously. Finally, the Digital Ecosystem Utilization—Cyprus Slovenian Pilots (CYSLOP) project, part of the IoF2020 initiative, has been launched to demonstrate IoT solutions in vegetable farms in Cyprus and Slovenia. In conclusion, the current state of digital infrastructure in Cyprus is one of progress and development, with the nation's digital landscape continually evolving to meet the needs of the times.

### 3.3. Ranking of Countries Greece, Cyprus and EU-27

The DESI index measures the performance of each country in these dimensions on a scale of 0 to 100, with 100 indicating the highest level of digital development. Based on 2022 DESI data, Cyprus is 20th in the overall ranking of 27 countries. Although its score (48.4%) is lower than Europe's average score (52.3%), it is still making good progress with hopeful signs of alignment with the European average (European Commission, 2022).

The COVID-19 pandemic also operated in Cyprus as an accelerator of the overall effort because due to the immediate needs of the two-way interaction of the public service and the citizen-businesses, the processes ran at a greater pace both in infrastructure and in software use learning. Cyprus has improved its score in almost all dimensions of the index, directly linked to Europe's strategic objectives for the Digital Decade 2030 (DESI, 2022) (Figure 2).

A further understanding of the evaluation can be made through the study of the two sub-categories of the human capital parameter:

#### 1) Internet skills

The sub-category takes into account the percentage of the country's population, which possesses either basic digital skills, or beyond basic, or content-creation skills. Cyprus is given a score in all three categories well below the average, demonstrating the need for the state to provide further education opportunities, familiarize citizens with the basic digital skills. In particular, indicators show that only 50% of the population possesses basic digital skills. In addition, only 21% of the population were found to possess skills beyond basic ones and 60% to possess sufficient skills in creating digital content.

#### 2) Advanced skills and development

This sub-category evaluates the degree of citizens in the country having more advanced digital skills. More advanced digital citizens, defined as the Information and Communication Technology (ICT) experts. According to the indicators, ICT specialists make up 3.9% of the employees in Cyprus, just below the EU average (4.5%). The proportion of ICT graduates in Cyprus (2.7%) is also lower than the EU average (4.5%). Encouraging are the messages regarding businesses in Cyprus that provide ICT training, since with a rating of 25%,

<sup>5</sup>[https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=4133542](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4133542)



**Figure 2.** Overall imprint of greece & cyprus for all DESI components.

Cyprus is well above the majority of other member states (EU average = 20%).

The above analysis demonstrates the need to further improve the digital skills of the average Cypriot citizen, especially as regards basic digital skills, but also the most advanced ones, through the implementation of appropriate policies to encourage youth engagement with the ICT sector. The evaluation of Cyprus's human capital indicators, while noting some improvement over the past five years (from 20.6% to 22.3% in the basic and from 18.5% to 19.5% in the advanced digital skills), is however generally considered unsatisfactory, taking into account the actions taken by the state for this purpose.

According to the DESI index's 2022 figures, Greece is 25<sup>th</sup>, receiving a score of 38.9%, while the 27-nation EU average is 52.3%. However, overall, our country has made good progress in recent years compared to other EU Member States, which means that it is catching up.

The individual parameters considered are connectivity, human capital, digitization of public services and the integration of digital technology. (Table 1)

The human factor is one of the key parameters that the DESI Index measures for the development of the Digital Economy and Society in the European Union. The human capital dimension of DESI focuses specifically on skills, employment and labor market trends and education. It provides comparative data on how Europe uses the Internet and digital devices (basic digital skills) and activities involving more advanced ICT skills. Greece is 22<sup>nd</sup> with a score of 40.1 (EU index 45.7) among the 27 countries in the Union for 2022. Basic knowledge holds 52% and more specialized only 22%. Greece, however, proved its potential and developed a strategy for its digital transformation until 2030. One of its objectives is the basic knowledge of citizens (now 22%) to reach 80% of Greek society.

Greece is 22<sup>nd</sup> on “integrating digital technology”, with a score of 26.6. Significantly lower rates than the European average have been: digital SME intensity of 39% (EU 55% index), cloud computing of 17% (EU 34% index) and artificial intelligence of 4% (EU 8% index).

With regard to digital public services, Greece ranks 26<sup>th</sup>. Citizens' use of online services reached 69%, exceeding the EU average (65%). In fact, this indicator is larger than the EU average. Low levels of digital public services for citizens (52% for the EU is 75%) and businesses (48% for the EU is 82%) are also low.

Greece's level of digital skills is 22<sup>nd</sup> among the 27 EU countries and of course below the EU average. As 1 out of 2 people (aged 16 - 74) have at least basic digital skills, Greece is very close to the EU average (54 %). However, when the age group of 16 - 24 is found in the microscope, Greece is among the pioneers, since 88 % of young people have at least basic digital skills, much higher than the European average (71%). Regarding specific information and communication technologies (ICT), Greece has seen a slight increase but remains low compared to the EU average. It is worth mentioning that the proportion of women who are ICT-specific is marginally above average (21% - 19%) and that 1 in 8 companies offered their staff the specific type of training at the time when in the EU the corresponding percentage was 1 in 5.

**Table 1.** Mapping of Greece-cyprus DESI parameters.

	Greece/rating	Cyprus/rating	E.U./rating
Connectivity	49.6 (22 <sup>nd</sup> )	58.8 (12 <sup>th</sup> )	59.9
Human capital	40.1 (22 <sup>nd</sup> )	41.8 (21 <sup>st</sup> )	45.7
Integration of digital technology	26.6 (22 <sup>nd</sup> )	35.3 (17 <sup>th</sup> )	36.1
Digital public services	39.4 (26 <sup>nd</sup> )	57.5 (20 <sup>th</sup> )	67.3



The total penetration of fixed broadband communications is 82% while in the EU it is 78%. Progress has also been made in the coverage of high-speed broadband communications (NGA) to 92%, which is two points higher than in the EU. However, only a small proportion (20%) of coverage of fixed high-capacity networks (VHCN) and the penetration rate of fixed-speed broadband communications less than 100 Mbps (9% in Greece and 41% in the EU) remain. As regards mobile networks, broadband penetration is 76%. Excellent is the indicator of the “5G spectrum” for Greece. The country reached 99%, while the EU figure is 56%, as shown in the following **Figure 3**.

#### 4. The Importance of Exploiting GIS Geo-Information Systems in Mapping the DESI Index in EU Countries

Geo-information systems, also known as GIS, can play an important role in mapping the DESI index in EU countries by providing a powerful tool for visualizing and analyzing spatial data related to each of these dimensions.

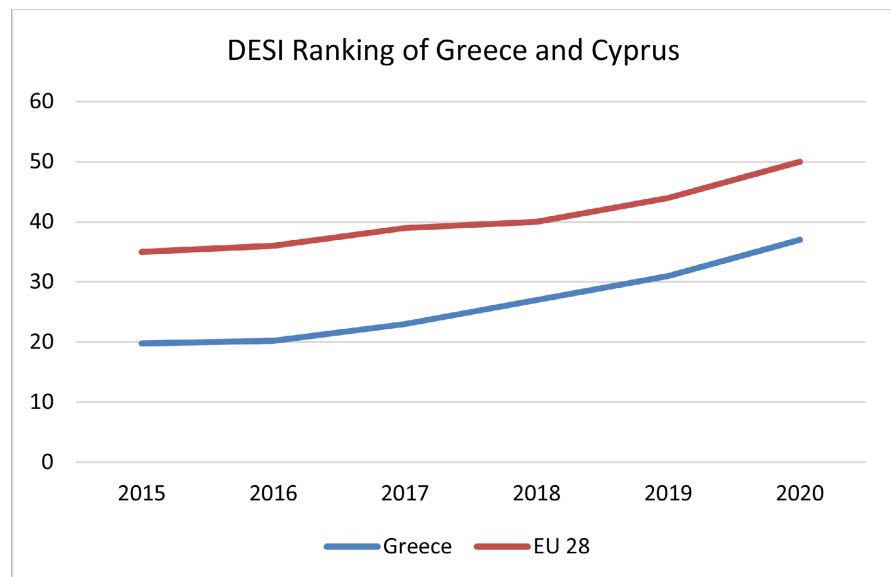
Here are some of the key benefits of exploiting GIS in mapping the DESI index.

##### 4.1. Spatial Analysis

GIS allows for the integration of various data sources, such as population density, internet penetration rates, and infrastructure availability, to provide spatial insights into the level of digitalization across different regions in a country. This can help policymakers and stakeholders identify areas of need and allocate resources more effectively.

##### 4.2. Visualization

GIS provides a visual representation of data through maps, which can be a powerful



**Figure 3.** DESI ranking of Greece and Cyprus during the period 2015-2022.

tool for communicating complex information to stakeholders. By mapping the DESI index scores for each dimension, decision-makers can quickly identify areas of strength and weakness in a country's digitalization efforts.

### 4.3. Planning and Policy Development

GIS can be used to create predictive models that can help policymakers anticipate future trends and plan for digitalization initiatives. For example, GIS can be used to model the impact of new infrastructure development on internet connectivity or to identify areas where the integration of digital technology would have the greatest impact on economic growth.

### 4.4. Cross-Country Comparisons

By mapping the DESI index scores across multiple EU countries, policymakers can identify best practices and learn from successful initiatives in other countries. This can help to foster collaboration and information sharing across borders.

Overall, exploiting GIS geo-information systems in mapping the DESI index in EU countries as shown in the following **Figure 4**, can provide a valuable tool for decision-makers to identify areas of need, allocate resources effectively, and develop effective digitalization policies.

## 5. Key Findings

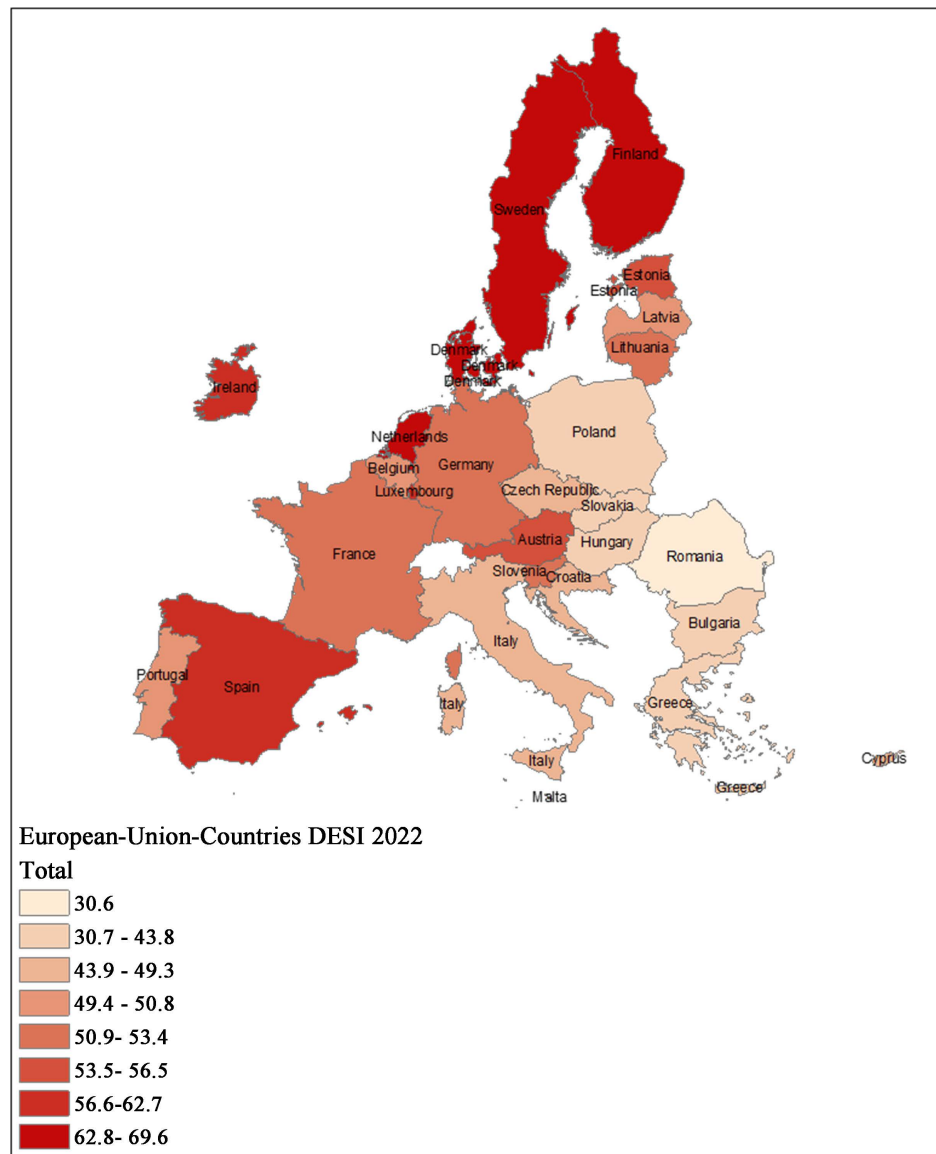
According to the most recent DESI report as shown in **Figure 5**, DESI (DESI, 2022), the EU has made significant progress in its digital transformation, with all Member States improving their scores since the first DESI report in 2015. However, there are still significant variations in the performance of Member States, with some countries performing much better than others. For example, the Nordic countries (Sweden, Denmark, and Finland) consistently rank among the top performers, while the Mediterranean countries (Greece, Italy, and Spain) lag behind. The key findings of the DESI report can be summarized as follows:

**1) Connectivity:** The availability of high-speed broadband has improved across the EU, with all Member States reaching the coverage target of at least 30 Mbps. However, there are still significant differences in coverage and quality of broadband across Member States.

**2) Human Capital:** The level of digital skills among individuals has improved, but there is still a significant digital skills gap, particularly among older adults and low-skilled workers.

**3) Use of Internet:** The use of internet by individuals and businesses has increased, but there is still a significant digital divide between rural and urban areas and between high-income and low-income groups.

**4) Integration of Digital Technology:** The integration of digital technology by businesses has improved, but there is still a significant gap between large and small businesses.



**Figure 4.** The overall DESI index in the EU countries.

**5) Digital Public Services:** The availability and quality of digital public services have improved, but there is still a significant gap between Member States in terms of e-government services and use of digital tools by public authorities.

## 6. Connectivity

As regards connectivity, Cyprus with a score of 58.8 is ranked 12<sup>th</sup> and Greece is ranked 22<sup>nd</sup> with a score of 49.6 against 59.9 which is the EU average, as shown in the following **Figure 6**.

The two countries, in the overall penetration of fixed broadband communications and in the coverage of high-speed broadband communications (NGA), are performing very well, with Cyprus, in the coverage of high-speed broadband communications (NGA), being ranked at the top with 100% compared to the EU

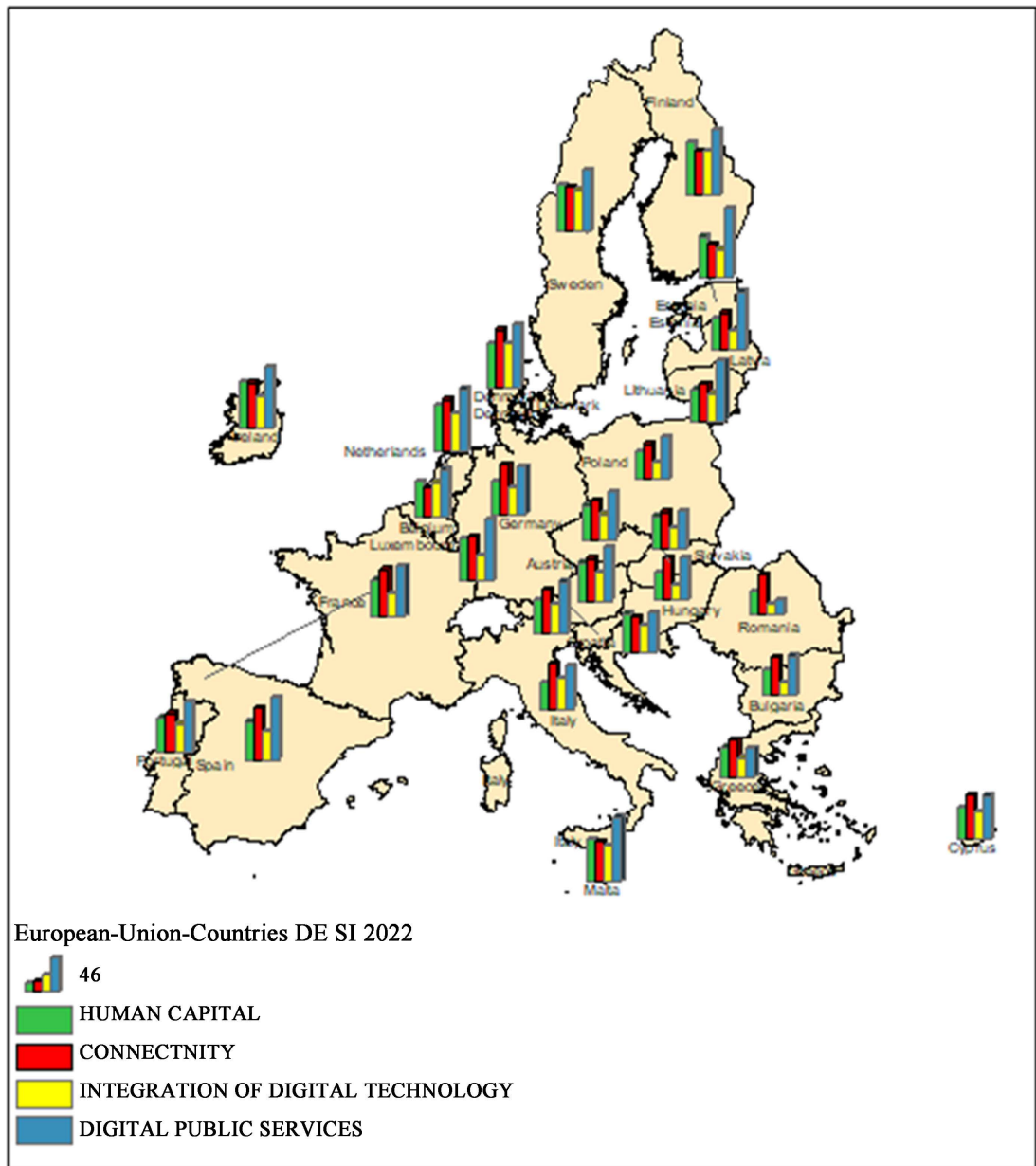


Figure 5. The DESI index for each component in the EU countries.

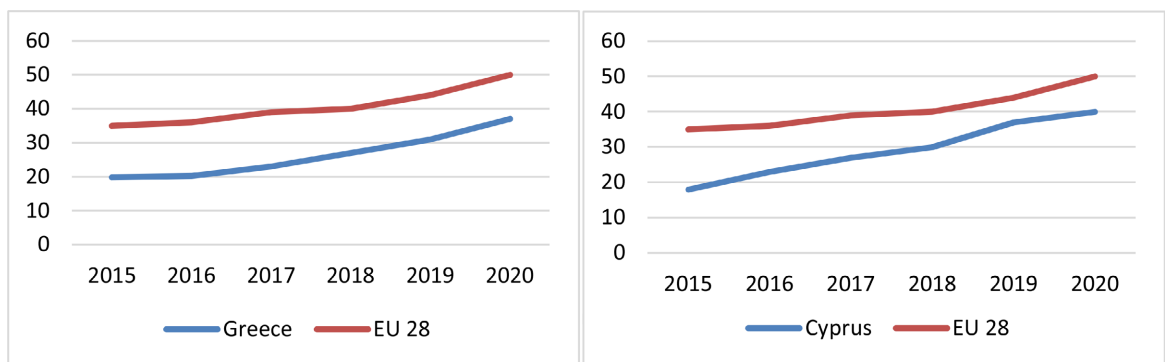


Figure 6. Connectivity in Greece and Cyprus compared to the EU average.

average, which is 86%. For Cyprus the same applies to the penetration of mobile broadband communications with 117 subscriptions per 100 people, compared to the EU average, which is 100, while for Greece in this area, the current figure is 86 per 100 people.

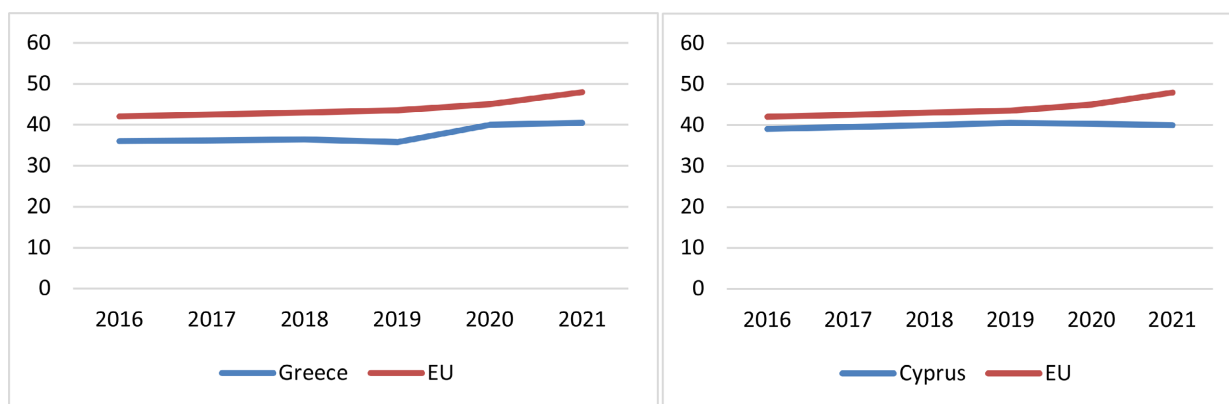
On the contrary, it appears that both countries are lagging far behind in the penetration of fixed broadband communications at a speed of at least 100 Mbps and in the coverage of very high capacity networks (VHCN). Cyprus is at the bottom of the rankings in the penetration of fixed broadband communications at a speed of at least 100 Mbps on prices, due to is among the most expensive countries in almost all price baskets above 100 Mbps.

Regarding the 4G coverage the performance of the two countries is very good, as Cyprus covered 98%<sup>6</sup> and Greece 97%, considering that the EU average, it's 96%.

## 7. Human Capital

The human capital component shows that the ratings of Cyprus and Greece are very close. Cyprus has a score of 41.8 (21<sup>st</sup> place) Greece 40.1 (22<sup>nd</sup> place). The two countries in this parameter are making progress, but their scores are lower than the EU average of 45.7, as shown in the following **Figure 7**.

In particular, in the digital skills parameter, apart from the basic ones, it seems that Greece is moving on similar levels to Cyprus, with Cyprus (25% of people) exceeding by 2% the percentage of Greece that is in 23% of people. The lack of digital skills, both at a basic and a higher level, remains a major obstacle for both countries in the context of the digital transformation of society and the economy. The aim is to equip citizens with digital skills so that they can make the most of and benefit from the provision of electronic services from both the private and public sectors. At the same time, it is important to train workers in the field of digital skills so that they can meet the modern requirements of the labor market. In order to improve the performance of the two countries, a new action plan is needed for digital education at primary and secondary level and for teacher training in the use of digital technologies in classrooms.



**Figure 7.** Human capital in Greece and Cyprus compared to the EU average.

<sup>6</sup>% of households (average operators).

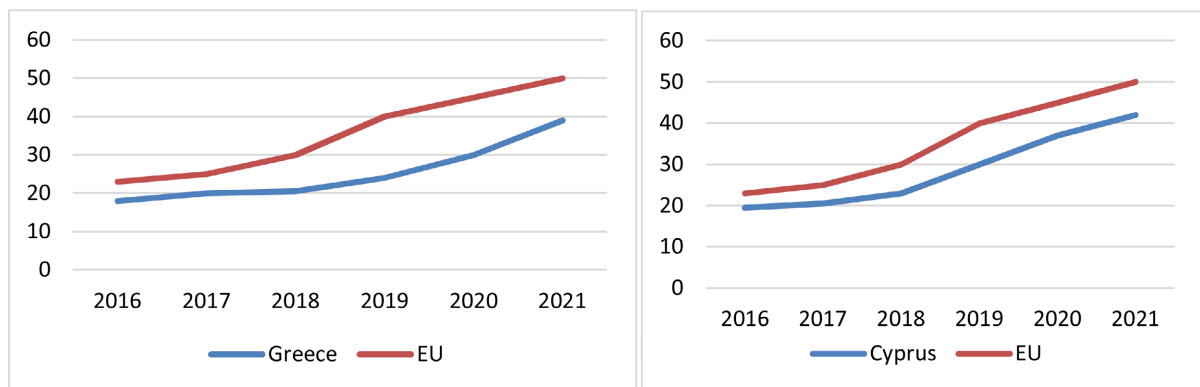
As regards the parameters: Graduates of Information and Communication Technologies (ICT) and ICT specialists, in the two countries there is not much growth. However, in Greece there appears to be a certain decrease of 0.3% of all workers, in the parameter ICT specialists. However, Greece seems to surpass Cyprus in the parameters “at least basic software skills” and “at least basic digital skills” by 10% and 6% of people respectively. Finally, regarding the parameter “Women ICT specialists” presents slightly higher percentage of working women Cyprus from Greece, but it seems that both countries in this parameter need improvement.

## 8. Using Online Services

In this component, it appears that Cyprus ranks in 16<sup>th</sup> position with a score of 54.5 and has a higher score than Greece (46.1) which ranks in 15<sup>th</sup> position. However, both countries appear to fall far short of the EU average score (58.0), as shown in **Figure 8**.

From the results, it appears that in Greece there are more people who have never used the internet than in Cyprus. Also, it seems that internet users in Cyprus rank in the same score (85% of people) as the average EU rate in this category, compared to Greece, which is 74% of people. In addition, the most popular online activities by Cypriot citizens are news, music, videos and games (87% of internet users), where this index is higher than Greeks (79% of internet users), but also video calls where Cyprus far exceeds the European Union average (60% of internet users), 84% of Internet users and 67% of Greek users, the same applies to the use of social networks where Cyprus, with 83% of internet users, is above Greece with 75%. However, both countries far exceed the EU average. (65% of internet users).

Cyprus and Greece are in the same ranking (7%) as regards internet users who attend courses using the internet, but also in sales over the internet, where Cyprus has 4% and Greece 3%. In these components - sub-indicators appear that the two countries are far behind, compared to the European Union average, 66% and 23% respectively. In this case, an oxymoron is emerging, because Cypriots



**Figure 8.** Use of internet services in Greece and Cyprus compared to the EU average.

are internet users but they do not use it to benefit.

Finally, in 2019, there was an increase in the category of Internet purchases by users in both countries (Cyprus: 45%, Greece: 51%). It would be advisable to carry out information campaigns for citizens to conduct banking and online purchases safely, and also to offer assistance and support services for citizens who find it difficult to respond to new technologies, such as the elderly, for example.

## 9. Integrating Digital Technology

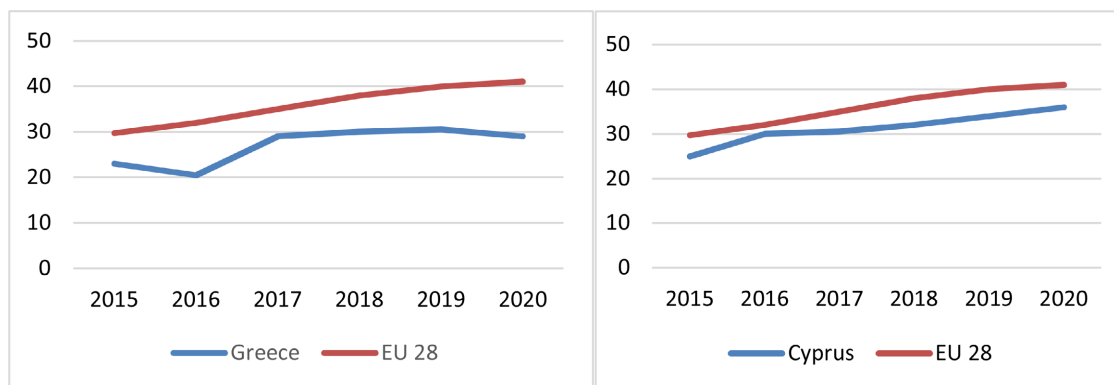
Regarding this component it appears that Cyprus ranks in 17<sup>th</sup> position, with a much higher score (35.3) than Greece (26.6) which ranks in 22<sup>nd</sup> position. However, both countries appear to be far behind the EU average (36.1), as illustrated in the following **Figure 9**.

Regarding Greece, it seems that its percentage in the electronic exchange of business information and in the analysis of massive data for the purposes of business activities of Greeks (38% and 13% respectively), is quite higher than that of Cyprus (33% and 5% respectively). It seems, however, that businesses in Cyprus use social media (38%) much more than businesses in Greece (19%). Also, Cypriot businesses (14%), in order to digitize further their business activities, made purchases of cloud computing services, while only 7% of Greek businesses made this innovative move.

The development of a strategy to further promote the digital transformation of Greek and Cypriot industry and enhance the integration of digital technology in small and medium-sized enterprises is a priority of the government agenda of both countries and requires the exploitation of both national and European sources of funding (Dermatis et al., 2020). In this way, businesses will be able to take advantage of the full benefits of the adoption of digital technologies, to become more competitive and to become a development pillar for the national economy of both Greece and Cyprus.

## 10. Digital Public Services

The latest component in the DESI Index report is digital public services, where



**Figure 9.** Integration of digital technology in Greece and Cyprus compared to the EU average.

Cyprus, ranked in 20<sup>th</sup> place, scored 57.5 and Greece, ranked in 26<sup>th</sup> place, scored 39.4. Cyprus, it seems, is very close to the EU average with a score of 67.3.

It appears that the number of active users of e-government services in Cyprus is 51% compared to Greece at 39%. According to the maturity index of open data, Cyprus (80%) and Greece (66%) made progress in 2019, with Cyprus overtaking Greece and enjoying a satisfactory level of maturity.

As regards pre-filled forms and online service integration, the two countries have seen an increase since 2018 (Figure 10). But the difference is that in the pre-filled forms, Cyprus with a score of 60, outperforms Greece with a score of 25. On the contrary, Greece (score: 84) overtakes Cyprus (rating: 79) online service integration.

Finally, as regards digital public services for businesses, Cyprus with a score of 91 appears to exceed the EU average. (score: 88) and Greece (rating: 63) to a very large extent.

Therefore, the DESI 2022 indicator shows that both Greece and Cyprus should intensify their efforts to improve the coverage of very high capacity networks, enable the marketing of 5G services, improve citizens' digital skills and further digitize businesses and the public sector.

## 11. Conclusions

The digital and technological adaptation of the economy and society of the Member States to the challenges of the 4<sup>th</sup> Industrial Revolution is one of the main objectives of the EU. Based on the measurements of the DESI 2022 Index, the tool used by the EU to monitor the countries' digital performance, Greece and Cyprus rank very low among the 27 member states. Cyprus, however, is showing more digital progress than Greece, due to the country's better performance in individual dimensions-components of the DESI 2022 index and in particular the coverage of high-speed broadband communications, the integration of digital technology by businesses and digital public services.

From reading the European Commission's Reports on the two countries, it is

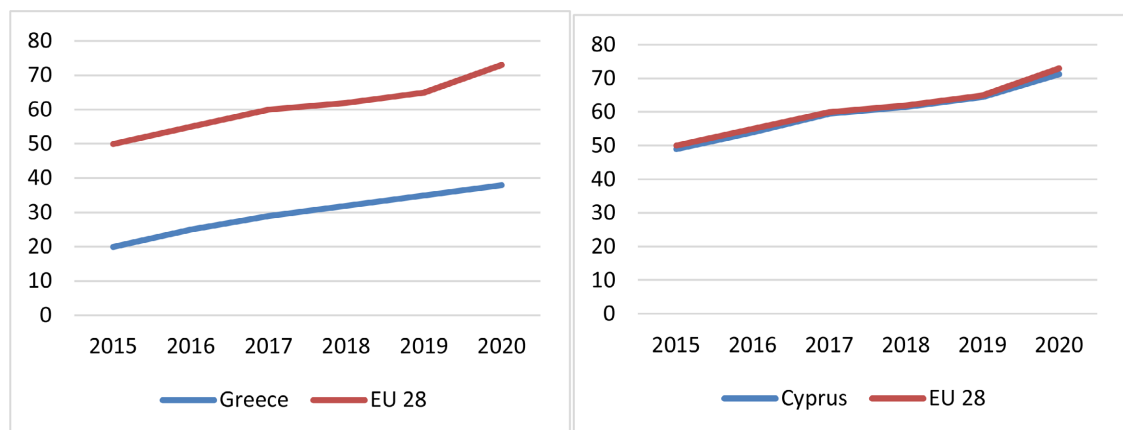


Figure 10. Digital public services in Greece and Cyprus compared to the EU average.



very clear that they must prioritize the exploitation of the potential of ICTs as a tool of modern governance and a lever of development. In fact, the fact that digital technologies and related service creation models are evolving at speeds that exceed the capabilities of states to adapt, does not allow the two countries to implement gradual and “evolutionary” digital strategies, as the countries of Norway, Finland, etc., which began their digital transformation much earlier, as the pace of technological developments was low.

Technological advances, with the main focus on technical interoperability at different levels of the manufacturing ecosystem and mass customization, offer a unique opportunity for the Greek economy to return to sustainable path of growth, income and wealth generation (Albani et al., 2019).

In Greece, despite the positive steps that have been made in recent years to utilize e-government, the Public Administration continues to be characterized by costly, time-consuming and inhospitable services, complex procedures, bureaucracy and opacity (Komninou et al., 2020). The practices applied in various states and those applied in our country, show that e-Government is the only way for a transparent, competitive and productive state. This is because undoubtedly e-Government contributes to the modernization of the state, the provision of services of increased quality and value, the more efficient use of available resources and human resources and the reduction of the costs and the time required to complete the relevant demands. At the same time, it contributes to tackling issues of corruption and mismanagement, to increase transparency and trust in public services and to promote the active participation of citizens.

An unprecedented global health crisis, known as the COVID-19 pandemic, has triggered some major changes in the functioning of the Public Administration through the use of Information and Technology Technologies. The wish of all is the digital initiatives that have been taken and the various actions that are planned to take place directly on the basis of the Digital Transformation Bible 2020-2025 in conjunction with the legislative initiatives (v. 4622/2019 on the State of Staff, Law. 4727/2020 for Digital Governance and Electronic Services) to lead to the digital and administrative modernization of the state and of course this progress is also reflected in the digital performance measurement indicators of the coming years.

### Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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