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Digital Transformation and COVID-19: The Case of Greece

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Abstract

The impact of the COVID-19 pandemic has caused significant problems to different public sector functions worldwide. This extends further than just public health. To protect citizens and keep services functional, the digital transformation of the public sector was selected by many countries as the most reliable solution (a policy with the goal of servicing citizens on-time and efficiently). Greece lagged significantly behind the European average in terms of digital governance. A different policy aiming at the development of digital governance applications was adopted in mid-2019. The scope of this paper is to examine how the pandemic (since the first months of 2020) has contributed to the impressive acceleration of the digital transformation processes of the central administration. This paper presents in detail the innovative applications implemented by Greece in the context of combating and limiting the effects of the COVID-19 pandemic as supported by statistics that reflect the spread of these applications. In summary, we see that through digital governance applications, the implementation of the lockdown was controlled, and, at the same time, many procedures were made digital. As a result, there would be no need for physical presence in public services for their processing. Examples of that include electronic prescribing, continuous monitoring of COVID cases, and vaccination appointment scheduling for the defense against COVID-19. This, therefore, became possible because of this digitalization approach. The success of this approach is evident in the National Theater's performances, as well as many of the country's museums contents, which were converted and transmitted in digital format. Volunteerism was

also promoted to strengthen hospitals and other units. Such state measures to deal with the COVID-19 pandemic and its consequences demonstrated the importance of leveraging the digital resources of public administration (networks, connectivity and interaction of digital skills) and how effectively Greece grasped the opportunity to accelerate the implementation of a lot of digital transformations towards digital governance.

Keywords: Digital Transformation, COVID-19, Greece, Innovation

1. Introduction

Digital transformation has emerged as a term in the last decade. It aims to redesign public and private sector services from the ground up to improve the daily work of workers and civil servants, while also meeting the needs of citizens effectively. The outbreak of the COVID-19 pandemic worsened and created several functional problems of the public sector worldwide. Consequently, these problems were not necessarily related only to public health services. Greece, lagging behind in this area compared to many other advanced countries, had to take huge steps towards the digitalization of many of its services with the aim of protecting citizens from the pandemic and providing services more efficiently and in a timely manner. This health crisis reinforced the tendency of all countries, let alone Greece, to focus and invest more in new technologies as well as to promote policies aimed at the modernization of the public sector (Karamalis & Vasilopoulos, 2020).

2. Methodology

In recent years, all states are moving towards the digital transformation of their services at a slower or faster pace. Greece was one of the countries in which the digital transformation was developing very slowly. Among measures taken by the Greek Government to limit the spread of COVID-19, measures related to digital transformation were also included. The scope of this paper is to present all the innovative applications related to the digital transformation implemented by Greece with the goal of continuing the orderly function of society and delivering increasingly faster and easier services to citizens during lockdown. This further highlights their importance in the overall program-agenda of the digital transformation of Greece.

The study used resources and material from the internet and from government agencies. More specifically, studies were found using the Google Scholar platform and have been published in international journals and publications of international organizations, e.g., OECD. For the presentation of the innovations implemented by the Greek Government, the material regarding their use and operation was found from the press releases of the

Ministry of Digital Governance. The applications' usage statistics created by the Greek Government were extracted from IDIKA's (Social Security Electronic Governance) official memos as well as from the official memos of the Ministry of Digital Governance. Finally, statistics on the course of vaccination in the country were extracted from the electronic database known as "Our World in Data".

3. Background

Greece proceeded very rapidly in the implementation of measures to limit the spread and effects of COVID-19 from the very beginning of the pandemic. The day after the first confirmed cases at the end of February 2020, all major events were canceled across the country despite the low number of cases. Within the first month of the pandemic, the government instituted a full lockdown which included the closure of educational facilities, retail stores, restaurants, cultural and entertainment venues, as well as the suspension of religious ceremonies and imposed strict restrictions on domestic travel. To facilitate compliance with stay-at-home orders, a digital permit was issued (with the exception of travel) via text message. The relaxation of lockdown measures in Greece was gradual, targeted, and based on epidemiological assessments. Between the beginning of May and the end of June 2020, all businesses and public organizations reopened with rules regarding the mandatory use of masks and physical distancing. In October 2020, the government launched a new risk assessment plan. Each week regional units were assigned a level of risk based on the number of new daily cases per 100,000 inhabitants. However, as the number of cases surged, a second month-long national lockdown in November was imposed. This is followed by another set of stringent containment measures during a third lockdown in February 2021. In May 2021, many of the restrictions were lifted and Greece opened its borders to tourists for the summer holiday season. At this point in time, nationwide rules still continue to apply such as wearing a mask in closed public spaces and crowded outdoors, while areas with a higher prevalence of COVID-19 are subject to local rules and stricter restrictions such as lockdowns (OECD/European Observatory on Health Systems and Policies, 2021).

4. Transition to Digital Transformation

The burden of the pandemic forced the Greek State to coordinate its actions to limit its consequences. The action plan was:

- 1) Keeping citizens informed
- 2) Ensure quarantine protocols were followed
- 3) Achieve highest potential vaccination rates among citizens

To implement this action plan, the government and the Ministry of

Digital Governance followed the “change of data approach”, which is the approach of transforming the public sector from the previous relatively inactive state to a modern, flexible, and active state that would be capable of making appropriate choices and decisions to implement projects effectively and on time. To do that, it would focus on overcoming legal constraints and taking advantage of the new market technologies. Recognizing these multifaceted challenges, the government launched a digital transformation policy for the public sector as a whole, and with health services as the key area of targeted investment (OECD/European Observatory on Health Systems and Policies, 2021).

5. Applications

In March 2020, the e-government portal "Gov.gr" was launched as a central platform for public administration information and services with the aim of unifying all government services online. It was implemented in less than seven months and became operational two months earlier than originally planned to serve citizens during the first lockdown. Gov.gr started with 503 fully integrated digital government services. It also managed to digitalize a significant number of basic public administration certificates and services, thereby making more digital public services available to citizens and thus contributing to the decongestion of public structures with the ultimate goal of reducing the spread of COVID-19 and supplying faster and more efficient service to citizens. The spread of COVID-19 provided the opportunity to further strengthen Gov.gr at the level of bestowing upon citizens better public services. For example, important life events that required complex bureaucratic processes such as birth certificates were simplified and digitalized.

In addition, Gov.gr ensured the registers' interoperability with the aim of:

- a) creating a single social security body (e-EFKA),
- b) digitalizing tax information for public contracts, and
- c) establishing a single national electronic toll system for highways.

Currently, Gov.gr hosts more than 1370 inter-terminal digital public administration services (compared to the initial 501 services in March 2020). As a result of these and other public administration digitalization measures, user uptake has increased significantly. It is worth noting that in 2018, all digital transactions (connections and interactions) with the Greek public administration amounted to 8.8 million, while in 2020 they increased eleven-fold reaching 94 million (European Commission, 2021).

Gov.gr Mobile App

The Gov.gr application was launched in December 2020, for iOS and Android smart phones, for connecting Gov.gr to citizens' mobile phones and offering a range of products and services. Through the mobile app, Greece expanded the concept of the digital portal with services such as Citizens Inbox, sharing of certificates, verification of documents, etc.

Paperless Prescriptions: The paperless prescription service was launched in March 2020 and quickly became one of the most popular digital government services in Greece. As the name suggests, the service fully digitalizes the process of writing and executing prescriptions for doctors, patients, and pharmacists. By signing up to this service via their email and/or phone number, citizens can receive their prescriptions via email or text message and they only need to provide the referral code to get them filled in at a pharmacy. It is a fairly simple, user friendly, and dynamic service that has been the backbone of the first digital vaccination program for COVID-19.

National COVID-19 Patient Registry: The National COVID-19 Patient Registry was launched to assist in the response to COVID-19. By law, all infections and cases of COVID-19 in Greece must be recorded in it. In this way, substantial assistance is provided to the work of the Epidemiological Group Committee, and at the same time the state reviews the epidemiological situation of COVID-19 in the country (Journal of the Government of the Greek Republic, 2020).

13033 Text Service: With the 13033 service, Greece accelerated its digital transformation by empowering citizens during a global pandemic with easy-to-use and privacy-friendly services. Rated by the OECD as a global best practice in digital responses to COVID-19, the 13033 messaging service allowed citizens to declare an "emergency travel permit" during the lockdown. Citizens would send one of the numbers of pre-defined eligible reasons for movement during the lockdown, their name and address, and immediately received a response from the system. In the event of an audit, this response could be provided to verify the eligibility of their travel permit. More than 100 million text messages for emergency travel movement were processed through the telephone number 13033. This is a service designed by the General Secretariat of Telecommunications and Posts (GTT) of the Ministry of Digital Governance in collaboration with telecommunication providers. On average, 13033 served 1,818 messages per minute, while at peak hours, 7,500 messages were handled per minute. According to data that came to the attention of the GTT, in the 42 days of operation of 13033, 110 million text messages were processed. The average daily success rate, i.e., the percentage of messages that had the correct structure to declare emergency travel movement, was 94.2%, while there were many days where the percentage exceeded 99% (Press Release of the Ministry of Digital Governance, 2020).

Digital Vaccination Platform: Greece has developed a digital multi-channel vaccination platform which supports its overall vaccination strategy. The Ministry of Digital Governance has been tasked with co-leading and designing the national vaccination initiative. Despite being entirely digital, the simple structure and user-friendly interface allows citizens, especially senior citizens who lack extensive digital skills, to operate it successfully. The vaccination platform automatically schedules appointments for citizens of each demographic group who are only asked to confirm said appointment or not.

Additional Services

- Registry of Vaccinations against COVID-19
- Vaccination certificates for vulnerable groups
- Change of vaccine of the 2nd vaccination dose
- Home vaccination certificates
- Issuance of a National Certificate of Vaccination
- Issuance of a National Certificate of recovery/ test from COVID-19
- Issuance of a European Certificate of Vaccination

COVID-19 Certificates Wallet: This is an application (Covid Free GR Wallet) through which citizens can safely and easily store their European and National certificates (vaccination, test, recovery).

MyHealth App: From August 2021, those who are registered in the paperless prescription service have the option to use the My Health app. The Ministry launched the MyHealth app which houses all healthcare-related digital services and data from and for the citizens. For the first time since the start of the electronic prescription system in Greece (which is mandatory for all doctor's prescriptions nationwide), patients have access to their personal history. Therefore, by using this application, citizens can be instantly and immediately notified of new drug prescriptions or medical examination referrals. In particular, all medical prescriptions and referrals that have been issued since the date that the institution in which the citizen is insured, joined the electronic prescription system, are now available. This date can reach up to 2012 when the operation of the Electronic Prescription System began. Medical certificates are now also issued digitally. Medical certificates are official certificates issue by a doctor that a citizen can participate in sports activities safely for both himself and his fellow citizens. In addition, it is possible for the certificate to be issued for any other legal use. The medical certificate is issued automatically and is available to the citizen from the MyHealth app in the "Medical Certificates" section. Once the citizen has activated the paperless prescription service, the barcode number of the medical certificate is sent via SMS and the complete medical certificate via e-mail in

pdf format (depending on what the citizen has chosen as the information channel for the paperless prescription service) (Press Release of the Ministry of Digital Governance, 2021).

Monoclonal Drug Delivery Platform: It was implemented to manage the administration of monoclonal drugs to patients with COVID-19.

Antiviral Drug Delivery Platform: It was implemented to manage the administration of antiviral drugs to patients with COVID-19.

Diagnostic Self-Test Disposition System: It was implemented to manage the free availability of self-diagnostic controls (self-test) to the citizens of the country.

Video Conferences Platforms (MyAADELive, MyKEPLive, MyConsulLive, MyOAEDLive): The digital platform (myDeskLive.gov.gr) played an important role in the management of the pandemic, as digital appointments contributed to limiting the spread of the coronavirus. More specifically, this platform promoted the creation of digital service channels to eliminate travel to and from the physical points of provision of services to citizens, saving time and avoiding overcrowding, an imperative task, due to the special conditions of the pandemic. The agencies to which the “myDeskLive” platform has been made available and working productively are as follows (Press Release of the Ministry of Digital Governance, 2022):

- MyAADELive: This is where the Ministry has introduced a series of video conferencing platforms for citizens to interact and transact with government agencies and organizations. MyAADELive enables citizens to issue certificates for the government's tax platform.
- MyKEPLive enables citizens to transact and request certificates and documents from Citizen Service Centers throughout the country.
- MyConsulLive allows citizens as well as Greeks of the diaspora to transact with Consular Offices around the world, thereby removing barriers such as distance.
- MyOAEDLive enables citizens who are unemployed to request services and guidance from the Unemployment Office.
- Finally, the myEFKALive platform of the National Social Security Agency (e-EFKA) has been added.

COVID-19 Volunteers, Digital Solidarity, City Solidarity, and Animal Solidarity Platforms

During the first lockdown, the Ministry launched a number of digital platforms that were part of the wider plan of government initiatives. The most basic was the volunteer platform where citizens could register and declare their availability to help local hospitals or other institutions. Another important platform was #DigitalSolidarity, a platform through which the Ministry presented companies that offered free products and services to consumers

during the lockdown period, such as educational and entertainment materials as well as B2B services. The participation of businesses and organizations in the digital solidarity.gov.gr platform and citizens in ethelontes.gov.gr is still steadily increasing. Currently, the services provided for free or at a lower cost have exceeded 130, and, at the same time, more than 11,000 of our fellow citizens have expressed their desire to volunteer in the health sector (Press Release of the Ministry of Digital Governance, 2020).

Live Streaming Theater plays from the National Theater of Greece

In coordination with the National Theatre, the Ministry of Digital Governance created infrastructure for live streaming performances so that theatrical art can continue to be provided, during quarantine periods, to all citizens who will enjoy it from the comfort of their homes. Furthermore, the Ministry of Digital Governance undertook the creation of a platform for the online display of the cultural material that has been produced by the bodies of the Ministry of Culture and Sports (Ministry of Culture and Sports), the antiquities services, and its museums. At the same time, the platform was informed about the presentation of cultural events internationally (Press Release of the Ministry of Digital Governance, 2020).

Application Usage Statistics

Two years have passed since the launch of gov.gr. The Unified Digital Portal of the Public Administration started by integrating 501 digital services and adding two new ones known as the digital version of the declaration and authorization. Today, gov.gr provides 1,370 digital services, which has helped in facilitating the daily life of citizens and businesses (Press Release of the Ministry of Digital Governance, 2022). More specifically:

- 7,936,034 different citizens have used gov.gr in issuing at least one document or submitting an electronic statement.
 - 159,346,146 documents or statements have been issued/submitted electronically.
 - 6,285,764 declarations and 2,189,684 authorizations have been issued.
- Many unique citizens made use of the above services implemented by

IDIKA SA (IDIKA, 2022). More precisely:

- 1) Paperless prescription: 3,320,000 citizens (the percentage of immaterial prescriptions exceeds 40% of all prescriptions).
- 2) National Registry of Patients with COVID-19: 11,915,800 (applies to both Greek citizens and foreigners who have undergone a diagnostic test within the territory).
- 3) Registry of Vaccinations against COVID-19 : 7,880,000
- 4) Number of home vaccinations: 102,600
- 5) Monoclonal drug administration platform: 2,650

- 6) Antiviral drug administration platform: 20,850
- 7) Diagnostic Self-Test Disposition System: 7.835.000

Furthermore, Table 1 shows data on the number of digital appointments, while Chart 1 shows the course of prescriptions and Charts 2 to 6 shows the course of vaccinations in our country. Some details about the agencies where the “myDeskLive” platform has been deployed and is working productively are as follows (Press Release of the Ministry of Digital

Body	Platform	Start of Platform Operation	Sum of Digital Appointments
Independent Authority for Public Revenue (IAPR)	myAADElive	1/5/2020	66.342
Citizens' Service Centre (CSC)	myKEPlive	27/7/2020	115.785
Manpower Employment Organization (OAED)	myOAEDlive	9/12/2020	41.985
Ministry of Foreign Affairs (Consular Authorities)	myConsulLive	28/12/2020	2.643
National Social Security Agency (e-EΦKA)	myEFKAlive	22/7/2021	277
National Land Registry	myKTIMATOLOGIO live	22/2/2022	276
Municipality of Chania	myDIMOSLive	14/3/2022	5

Governance, 2022):

Table 1. Digital Platforms, source: (IDIKA, 2022)

Below is a diagram of the course of prescriptions for the years 2019-2021 per month (IDIKA, 2022):

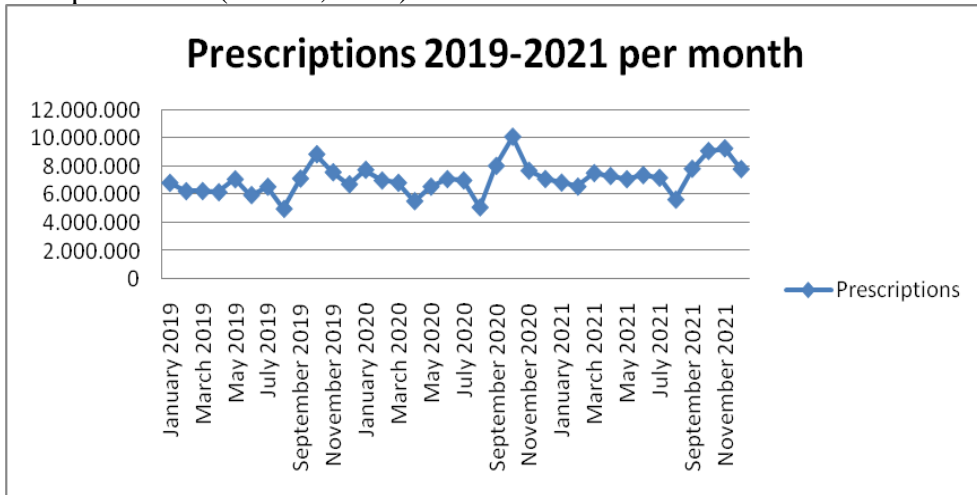
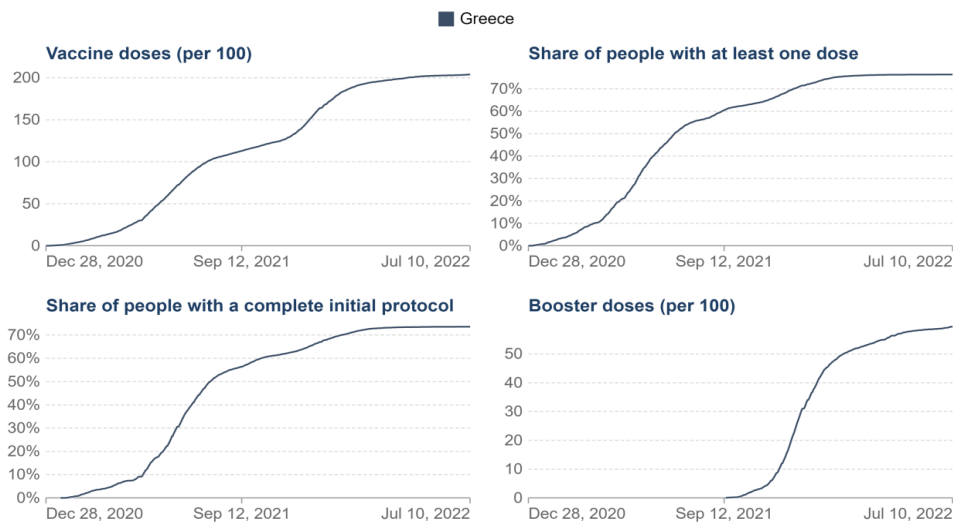


Figure 1. Prescriptions for the Year 2019-2021 Per Month, Source: (IDIKA,2022)

It was noted that the introduction of paperless prescription service, in March 2020, did not affect the behavior of the population of prescriptions, as the general pattern that had already been established was generally maintained.

COVID-19 vaccine doses, people with at least one dose, people with a full initial protocol, and boosters per 100 people



Source: Official data collated by Our World in Data

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Figure 2. Vaccinations in Greece, Source: (Ritchie et al., 2020)

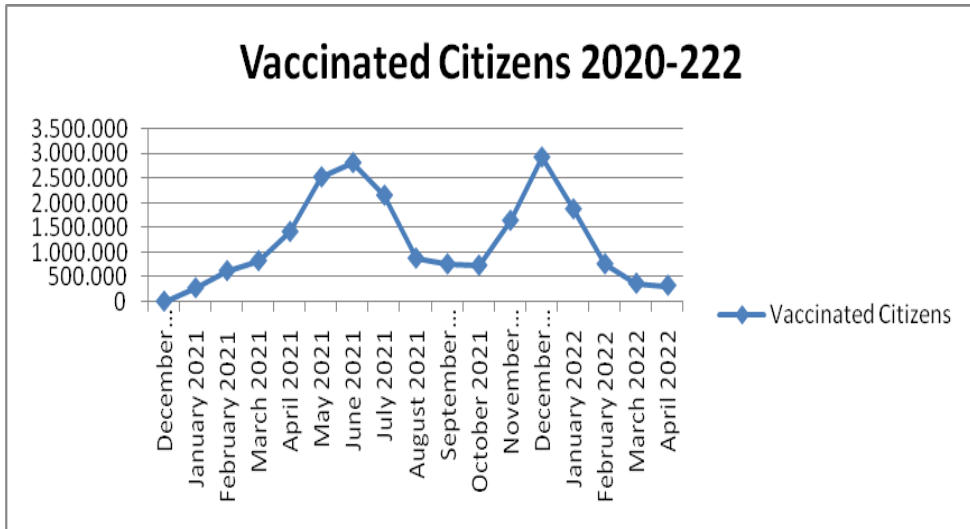


Figure 3. Number of Vaccinated Citizens in Greece, Source: (IDIKA, 2022)

Regarding vaccinations, it was noted that the population was vaccinated gradually. A key reason for this is the prioritization based on specific population groups. Vaccines also appeared gradually, while from September 2021, a booster third dose was added.

Public Acceptance

The results showed that the majority of the practices used by the government were accepted by the public. However, most of the digital services were recognized by the participants even if they had not used them themselves (Chatzopoulou et al., 2021).

6. Results

Until 2019, Greece lagged significantly behind other European countries on the average in terms of digital governance. A different policy aiming at the development of digital governance applications was adopted in mid-2019. The pandemic acted as a blessing in disguise and contributed to an impressive acceleration of the digital transformation processes of the central administration. The main objective include: 1) effectively implementing lockdowns, 2) limiting the spread of the virus, and 3) achieving highest vaccination rates among citizens. Furthermore, from March 2020, a large series of digital applications was implemented to achieve the above goals.

- To ensure that, quarantine protocols were followed, the 13033 text service was also used. This service was rated by the OECD as a global best practice in digital responses to COVID-19.

- Greece has developed a digital multi-channel vaccination platform which supports its overall vaccination strategy. In addition, the paperless prescription service was also used (March 2020).
- To manage the administration of monoclonal drugs to patients with COVID-19, the Monoclonal drug delivery platform was implemented. In addition, to manage the administration of antiviral drugs to patients with COVID-19, the antiviral drug delivery platform was also introduced.
- For the state reviews of the epidemiological situation of COVID-19 in the country, the National COVID-19 Patient Registry was launched.
- From August 2021, those who were registered in the paperless prescription service had the option to use the MyHealth app. The Ministry launched the MyHealth app which houses all healthcare-related digital services and data from and for the citizens.
- The government managed to digitalize other basic public administration certificates and services, thereby making more digital public services available to citizens and thus contributing to the decongestion of public structures with the ultimate goal of reducing the spread of COVID-19 and supplying faster and more efficient services to citizens. Moreover, the digital platform, myDeskLive.gov.gr, played an important role in the management of the pandemic as digital appointments contributed to limiting the spread of the coronavirus. More specifically, this platform promoted the creation of digital service channels to eliminate travel to and from the physical points of provision of services to citizens, thereby saving time and avoiding overcrowding, an imperative task, due to the special conditions of the pandemic.
- In coordination with the National Theatre, the Ministry of Digital Governance created infrastructure for live streaming performances so that theatrical art can continue to be provided, during quarantine periods, to all citizens who will enjoy it from the comfort of their homes. Furthermore, the Ministry of Digital Governance undertook the creation of a platform for the online display of the cultural material that has been produced by the bodies of the Ministry of Culture and Sports.
- The spread of COVID-19 provided the opportunity to further strengthen Gov.gr at the level of bestowing upon citizens better public services. For example, important life events that required complex bureaucratic processes, such as birth certificates, were simplified and digitalized.
- Moreover, during the first lockdown, the Ministry launched a number of digital platforms that were part of the wider plan of government

initiatives. The most basic one was the volunteer platform where citizens could register and declare their availability to help local hospitals or other institutions. Another important platform was #DigitalSolidarity, through which the Ministry presented companies that offered free products and services to consumers during the lockdown period, such as educational and entertainment materials as well as B2B services. The participation of businesses and organizations in the digitalsolidarity.gov.gr platform and citizens in ethelontes.gov.gr is still steadily increasing. Currently, the services provided for free or at a lower cost have exceeded 130, and, at the same time, more than 11,000 of our fellow citizens have expressed their desire to volunteer in the health sector.

In summary, we see that through digital governance applications, the implementation of the lockdown was controlled. However, at the same time, many procedures were made digital so that there would be no need for physical presence in public services for their processing. Furthermore, monitoring and confirmation of vaccination appointments for the defense against COVID-19 became possible. Electronic prescribing was promoted and continuous monitoring of the number of COVID-19 cases was also possible. Finally, performances of the National Theater, as well as the content of many of the country's museums, were converted and transmitted in digital format. In addition, volunteerism was promoted to strengthen hospitals and other units.

Conclusion

The COVID-19 pandemic has highlighted many functionality issues for many daily activities of citizens. The need for quick and immediate interventions to mitigate the consequences of the pandemic prompted the Ministry of Digital Governance to implement and establish easy-to-use and privacy-friendly digital services. The establishment of Gov.gr as a central platform for public administration information and services, the digital platform myDeskLive.gov.gr for the remote service of citizens and businesses through digital appointments planning, and finally the creation of paperless prescription, which is one of the most popular digital government services in Greece and also the backbone of the development plan for the vaccination program against COVID-19. Thus, this has contributed to limiting the spread of the coronavirus by providing better services and promoting vaccination to the largest possible percentage of citizens. State measures to deal with the COVID-19 pandemic and its consequences demonstrate the importance of leveraging the digital resources of public administration (networks, connectivity and interaction of digital skills). Digital transformation is a huge challenge for the future and its impact is significant even in countries where

initially it wasn't a priority, such as Greece. The COVID-19 pandemic provided an opportunity in such countries to change this approach. The ultimate goal of each government should be the development and implementation of innovative digital reforms, which will aim at integrating all government services on the internet and the evolution of countries into digital state-societies.

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