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Geo-Visualization Tools in Cultural Heritage Management

Abstract:
During the recent decades there has been a period of rapid transition in most of the world's cities. In such a context the traditional city centres-where most of the cultural heritage of the world countries is found- are threatened by a number of developments such as population congestion, infrastructure expansion, atmospheric pollution etc.

As a result, great interest has been exhibited by decision makers in effective preservation/conservation policies which alleviate the pressures caused by the above negative developments.

Monuments constitute an integral part of the historical and cultural identity of a country, region or city. Apart from their potential role as tourist resources they are also the everyday 'habitat' of local societies marked by their own indigenous values. As a result, there has been recently a shift in focusing on policy support tools which incorporate both the qualitative and quantitative aspects of monument conservation. These tools are dedicated to ensure that future generations will enjoy the cultural goods; the same qualities in their access to monuments as at present. [1].

Towards this end there is need for tools and methods, in support of the decision making
process, enabling the efficient Management of our Cultural Heritage

Keywords: Geo-visualization, Heritage Management, Google Earth,

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1. Introduction

The paper focuses on the development of a Geo-visualization system that supports decision makers. The system provides structured information on the potential attributes of the monument under preservation/conservation, so that aesthetic, financial, social and historical aspects to be included in the decision process. Apart from the value added for planning purposes, the system will enable the visualization of the monument's technical characteristics that is rather useful in a decision support/making environment. The system, as a web-based application, has enormous potential contribution since all information is accessible to the broader decision making community but also to potentially interested stakeholders wherever issues at stake arise between the decision makers and the broader community.

More precisely, in the first part of the paper the state-of-the-art of the existing Geo-visualization tools is presented (e.g. web-based GIS, the Virtual Reality Modelling Language (VRML) and the Google Earth software), while the second part elaborates the role of Geo-visualization tools in the decision making process.

The third part, in turn, describes the methodological framework of the proposed system incorporating the steps of the: a) topographic surveying of the monument under study for the 3D reconstruction of the monument's basic geometry, b) image acquisition for texture modelling using photogrammetric techniques and finally c) the implementation of a 3D web-based representation. The integration of such a tool in the planning process is strengthening both the participatory and negotiation potential of the decision-making process.

In the fourth part a case study is presented, using the monument of "Aerides" in the Plaka area. The application could be used for multiple purposes in the decision-making process namely as a representation tool but also as a technical support tool identifying damages of the monument throughout the years and increasing awareness on the matter.

Finally, the paper is concluded with some prospective remarks on the use of such policy support tools in the broader context of conservation planning.

2. Geo-Visualization Tools

In this section, the concept of Geo-visualization is discussed and several Geo-visualization tools are described.

2.1. Geo-visualization concept

A wide range of definitions appeared in the literature regarding the concept of Geo-visualization. Certain differences appear among these definitions, depending on the specific use of Geo-visualization. A representative definition of the Geo-visualization concept introduced by Van den Brink et al. [2]: 'Geo-visualizations are two-dimensional or three-dimensional visual representations of data that have a geographic reference. Geo-visualizations can be used to exchange spatial information in spatial planning processes.'

Based on the above definition several Geo-visualization tools have been built.

These are described in the following section.

2.2. Geo-visualization Tools

Geo-visualization tools are divided into two main groups, namely the traditional and the computerized Geo-visualization tools. The traditional group comprises methods such as pen and paper, paper maps, photographs and physical models, which are

methods that do not apply any kind of technology [3]. These are very simple Geo-visualization methods and their description is beyond the scope of the present paper.

On the other hand, the computerized methods are GIS Mapping, Three Dimensional (3D) Modelling, Virtual Reality (VR) and Urban Simulation, which are computer-based methods. The paper describes a series of computerized Geo-visualization tools, which do not only use technology to represent objects but also use web-based infrastructure, providing thus the possibility to represent objects in a wide range of audience via the World Wide Web.

The computerized Geo-visualization tools that are described below are: a) the web-based GIS, b) the Virtual Reality Modelling Language (VRML) and c) the Google Earth Platform. All these tools have the capability to represent objects via the internet.

2.3. Web Based GIS

A representative definition for GIS was given by Kingston et. al [4]: 'GIS is an advanced computer tool box for the input, storage editing, manipulation, update, integration, analysis, visualization and output of spatial data'. The web-based GIS platforms provide users the capability to process spatial data via the Internet.

One of the most representative examples of web-based GIS platform is the so-called Virtual Slaithwaite that is a Geo-visualization tool specializing in informing people. This project is held in Slaithwaite Village, located near to the city of Yorkshire in Great Britain. In this platform, a 2 Km2 is represented in a web-based GIS platform, providing people of Slaithwaite the opportunity to: select different spatial objects (e.g. road, building etc.) and also to express their views on the future development of the certain area or object, e.g. the construction of a new building.

2.4. Virtual Reality Modeling Language (VRML)

Virtual Reality Modelling Language (VRML) is a Geo-visualization tool that reconstructs the urban and rural environment. According to Laurini [5], VRML is:'… a wide-field presentation of computer-generated, multi-sensory information which tracks a user in real time.'.

There are several virtual reality application fields, such as Virtual Reality Modelling, Virtual Reality Walkthroughs, Virtual Archaeology and Urban Planning [6]. In each of the above fields, a different use of the virtual environment is presented, aiming at the achievement of different goals. In the paper, the Virtual Reality Modelling is applied, using the VRML in order to represent the 3D real scenes, like roads, buildings etc.

Using the VRML language, a digital environment has been built, providing the user the capability to navigate freely inside the reconstructed model. In this context, the user can explore the reality in a virtual environment. VRML programming language is an Internet based tool that can be used to visualize infrastructure and present it via the Internet to the WWW users.

2.5. Google Earth

The Google Earth gains gradually more attention as a Geo-visualization tool. The Google Earth is a platform that uses a mosaic of satellite images, overlaying additional information such as national boundaries, roads, 3D buildings, places/points of interest etc., on WGS84. This platform can be used in order to design, visualize and place objects in their geographical position.

Figures 1 and 2 are representing two characteristic examples of Google Earth implementation that shows infrastructures attached to satellite images. More specifically, Figure 1 represents alternative ring road in the protected Natura area of Vistula in Poland [7], while in Figure 2, a wind turbine reconstruction is presented [8].

Figure 1: Alternative ring road in Vistula Area

Figure 2: Wind Turbine representation in the Google Earth platform

3. The Role of Geo-Visualization Tools in Decision Support/Maing Process

The role of Geo-visualization tools in the decision support/making process is very important. This role will be discussed in the following, based on the fundamental characteristics of these tools, namely object reconstruction; integrated representation system; and user interaction.

• Object reconstruction

The Geo-visualization tools are able to reconstruct the object of interest (e.g. historical monuments, temples, statues etc.) and to place them in their exact geographical position. In this sense, decision makers do not only have a better, more realistic view of the object of interest, based on its geometric and architecture features, but also do have a view of the surrounding environment characteristics.

• Integrated representation system

The Geo-visualization tools are perceived as integrated representation systems, mainly due to two specific characteristics:

- The first characteristic relates to their capability to correlate information to the reconstructed object. In this way, Geo-visualization tools users are looking the reconstructed object, reading parallel certain information of the features they examine.
- The second important attribute of the Geo-visualization tools is that they can integrate huge amount of information, i.e. 3D reconstructed objects. For example, it would be realistic, just in one platform, to incorporate all historical monuments of Athens with their specific characteristics, providing thus an ideal tool for heritage management purposes.

• User interaction

Geo-visualization tools play an important role in the decision making process based on their potential user interaction and the publicity via the WWW. These attributes form the basis for the provision of information to the public in respect to changes in the reconstructed objects (e.g. rehabilitation works on monuments), validating in this way the decision making process.

4. Methodological Framework

This section describes the methodological framework that is necessary for the 3D object reconstruction and its representation on a web-based platform. This framework is consisting of three main stages, namely: a) topographic surveying of the object of interest, b) image acquisition and c) development of the 3D web-based representation platform.

4.1. Topographic Surveying

In this stage, fundamental topographic techniques are used, in order to build the basic object geometry under a georeference framework.

The step of topographic surveying is composed of two steps: a) the use of a GPS system and b) the use of a Total Station.

• Use of GPS System

In the first step of the topographic surveying stage, two reference points near the measuring object are established. Using the GPS system, the coordinates of the reference points in EGSA ’87 system (national datum) are defined.

• Use of Total Station

In this step, the basic geometrical/architectural features (e.g. edges, curves, height of the object etc.) are measured. The products of this step are ground plans and facades of the measuring object that enclose the necessary information for the object reconstruction. All measurements are also held under EGSA ’87.

4.2. Image acquisition

The second stage of object reconstruction refers to image acquisition. The images will be draped into object’s basic geometry in order to create the textured model.

4.3. 3D Web-based representation

At the final stage, the images and its 3D rough model are integrated in a 3D web- based representation.

The selected representation platform should fulfill two basic requirements. Firstly, the platform should drape the images on the object. Secondly, the whole representation system should be able to incorporate in a web site without using complex procedures.

5. The Case Study of Aerides

The system described in the previous sections was implemented in the historical monument of Aerides, in the Plaka area, Athens. A short description of the historical and the architectural characteristics of the monument is given. Then, is the presentation of the reconstruction phase which consists of: a) Topographic surveying; b) Image acquisition; and c) 3D web-based representation.

5.1. Short Description of the Monument

The Aerides monument, also called Tower of the Winds or Horologion, was built by Andronicus of Cyrrhus. The Tower of Winds is located on the Roman agora, at the historical centre of Athens. The monument has an octagonal structure of 3.4 m side length and 12 m height. In each side of the monument a marble wind statue is illustrated; in the North side the wind of Boreas, Kaikias in North-East, Apeliotis in East, Eurus in South-East, Notus in South, Lips in South-West, Zephyrus in West and Skiron North-West. Figure 3 is presenting the North East side of Aerides.

Figure 3: *North East side of the monument of Aerides*

Table 1 presents the most important architectural characteristics of the monument, such as the winds' representations mentioned previously.

Table 1: *Architectonic Features of the Monument*

Wind	Statue	Wind	Statue
Boreas (N)		Notus (S)	
Skiron (NW)		Eurus (SE)	
Zephyrus (W)		Apeliotis (E)	
Lips (SW)		Kaikias (NE)	

5.2. Monument Reconstruction

Figure 4 is presenting the ground plan of the monument as an output of a quick topographic surveying. The red lines represent the wall of the monument while the green one the steps. Only representative points were captured during surveying campaign in order to describe the general outline/geometry of the monument.

The Tower of Winds is North oriented, which was expected since the monument was the astronomic centre in the ancient years and was confirmed by current GPS measurements.

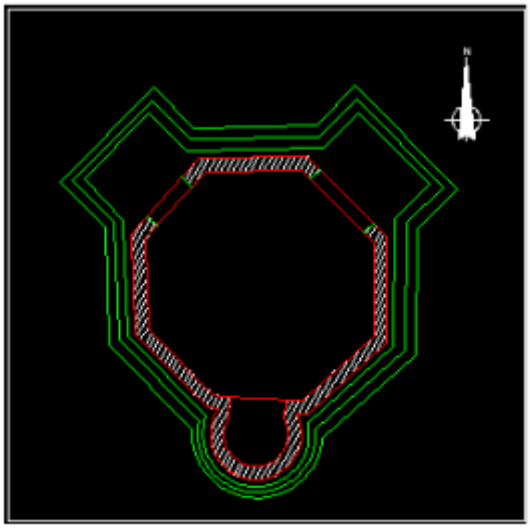
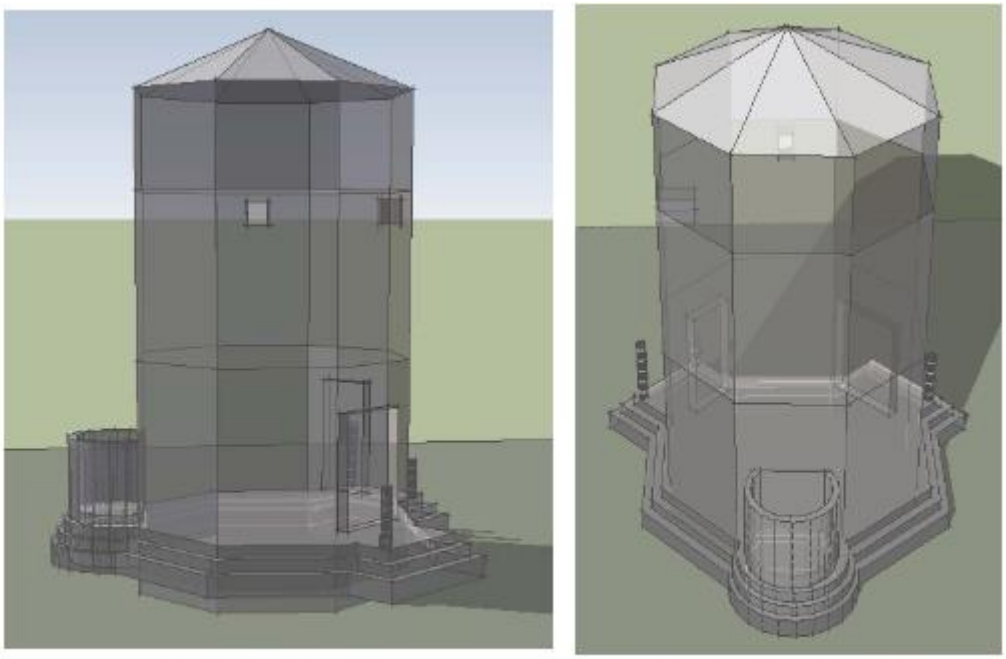


Figure 4: Ground plan of the Monument

The next procedure concerns the 3D reconstruction of Aerides. For this purpose the Google SketchUp [9] software was used. The output of this process is showed in Figure 5.



East side of Aerides *South side of Aerides*

Figure 5: Geometry of the reconstructed monument

Using the Google SketchUp software, the images are draped to the geometry model so as to create the textured model, as illustrated in Figure 6.

North side of Aerides *East side of Aerides*

Figure 6: 3D reconstruction and textured model

Then, the monument is transformed to its absolute geographical position. For this purpose, Google Earth software was used, and the output of this process is given in Figure 7.

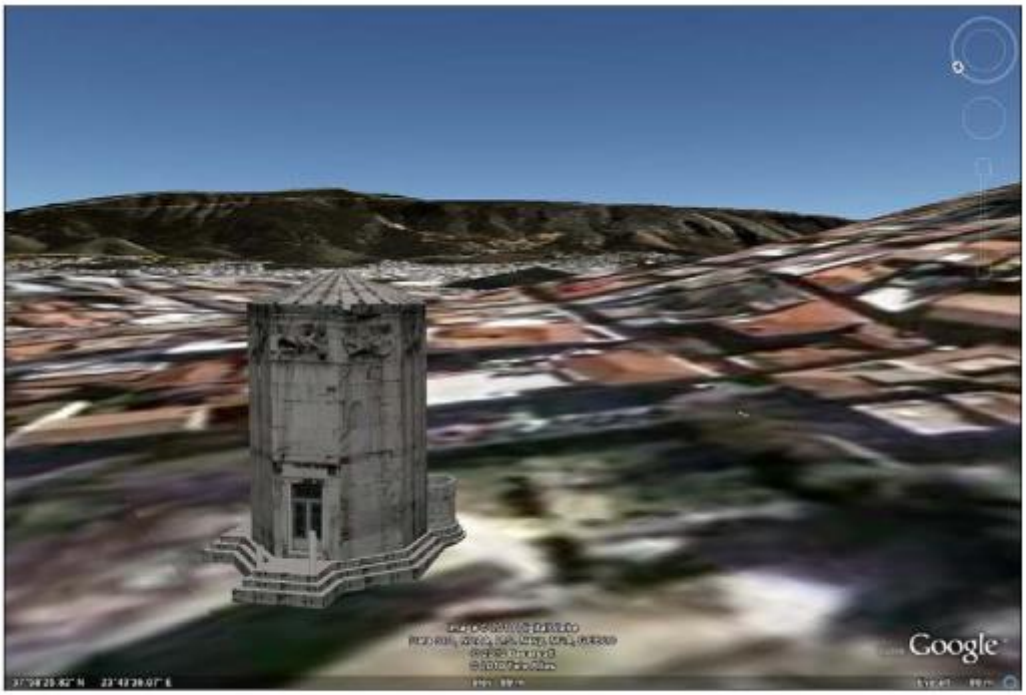


Figure 7: The monuments of Aerides placed in Google Earth

Finally, we have the release of the Aerides model in the Internet. For this purpose, a web site is developed that embeds the 3D Google Earth representation. In

this platform, the users can explore the specific architectural features of the monument, measure various geometrical features (e.g. distances) and read important historical and other useful information for the monument.

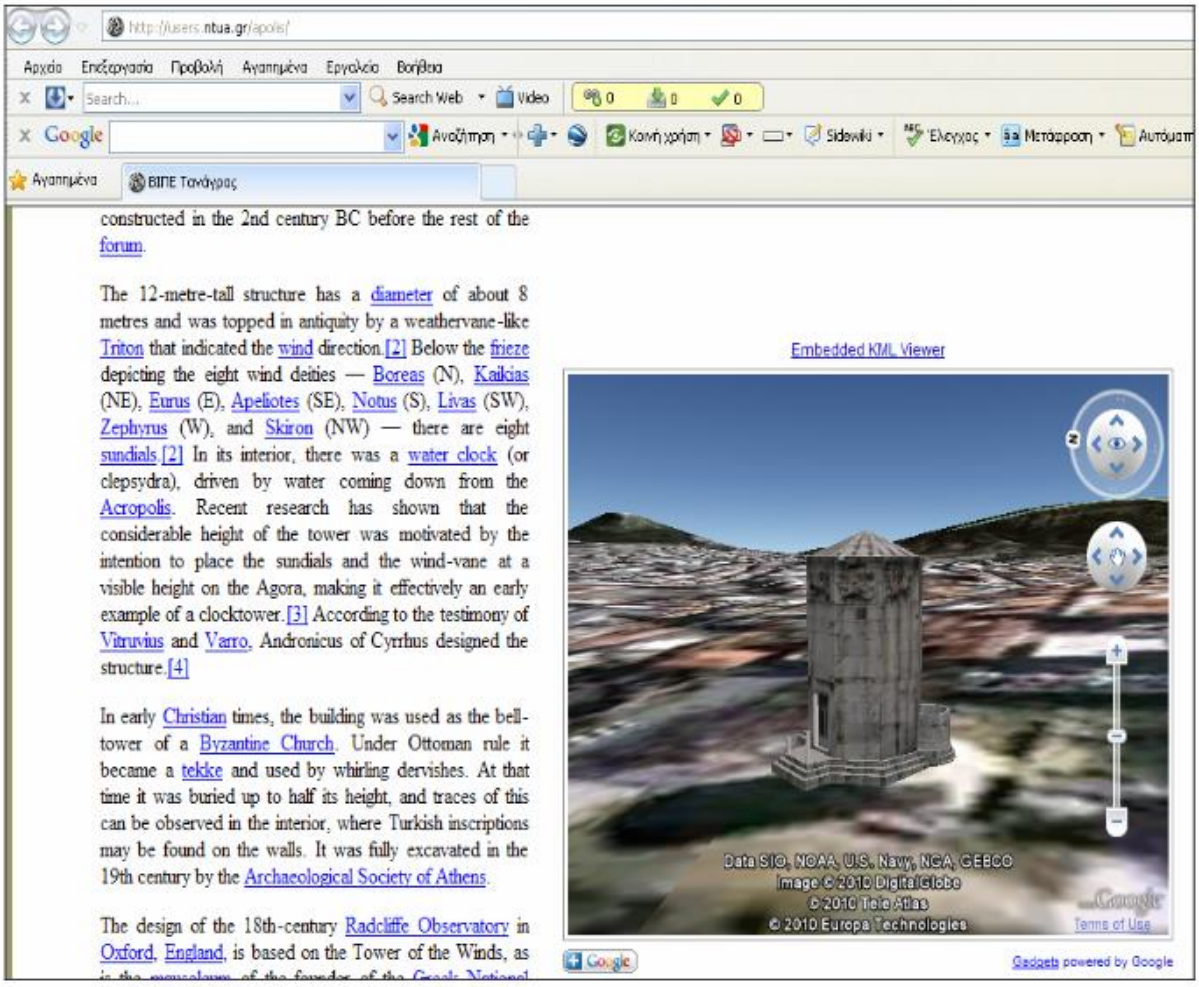


Figure 9: Google Earth monument representation embedded in the web

6. Results

The methodological framework described in section 4, was applied in the historical monument of Aerides. The main objective of this process was the reconstruction of the monument and the presentation of the monument depiction via the internet in the broad public. The monument of Aerides was represented using the Google Earth platform and was embedded in a web site.

The output of this process is a web site that embeds the reconstructed monument of Aerides and gives the opportunity in the web site visitors to navigate themselves freely inside the virtual environment of Google Earth platform. As a result, an interactive representation system has been built that allows users to explore the geometric and special architectural features of the monument in their physical size.

The proposed web-based Geo-visualization platform includes another important element which is the parallel presentation of 3-d monument's view with useful information of the monument in a textual form. In that sense, the 3-D monument's reconstruction can be accompanied by historical information, information relevant with rehabilitation works etc.

7. Conclusions

The proposed representation system can be used to cover many aspects of monuments rehabilitation, preserving the cultural heritage and providing an appropriate management tool. Some of the Geo-visualization system applications are the following.

Firstly, the web based Geo-visualization system can be used from decision making centres as a planning tool in which the monuments that need rehabilitation appear together in a common Geo-visualization platform. In this sense the system could be a useful tool for the monuments management by decision making centres.

Secondly, the representation system can be applied as an information tool for the broad public, informing the people for the rehabilitation works in the monuments appeared in the Geo-visualization platform. In this way, information relevant to erection works or rehabilitation techniques used for the preservation of the monuments could be provided by the proposed platform.

Finally, within the representation system capabilities is the use of the proposed system for educational purposes, increasing the peoples' awareness for the preservation of the monuments. The fascinating, virtual environment can attract easily people to explore the reconstructed monuments and diffuse significant information, enabling this way people to understand the monuments preservation necessity.

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Cultural Management and Local Development: A Study for Greece

Abstract:
There is a huge literature for cultural management and local development. The last decades have brought about many basic and fundamental changes in cultural management models and cultural heritage, with the introduction of new technologies and new innovations.

The recent financial and the pandemic-health crisis, made more apparently the need for alternative models and funding resources for cultural management and cultural organizations, that can be acted as a milestone for the sustainability, and sustainable development.

The current needs have made apparently necessary a new modern strategic planning of cultural organizations that will be able to secure the necessary financial resources for the exploitation of cultural resources and subsequently be able to support sustainability and the local development.

This paper attempts to analyse cultural management and the effects in local development. It will be focused in a case study of cultural management and local development in Greece.

Keywords: Culture, Cultural Policy, Greece

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1. Introduction

The concept of culture is linked to the issues of education, training, culture, communication, entertainment and socio-economic development. Cultural goods are usually referred to the intellectual and artistic creation, which emerges from a specific cultural formation process and a specific cultural production process, that corresponding in the production of specific (material and non-material) cultural products or specific cultural services.

Cultural product is a result of an individual or a collectively creativity regarding the cultural activities. Moreover, cultural services including the whole range of services for the promotion of cultural events or exhibitions as well as specific services that provide cultural information, such as libraries, documentation centers, websites and museums, (Unesco, 2017).

The term of culture heritage and cultural development are also referred to the evolution of the human race including all relevant cultural activities, artistic-spiritual activities, morals, customs, education, which shape people's lifestyle and behavior over time, (Unesco, 2017).

Among the main determinant factors affecting the sustainable local development are the factors of that of cultural heritage and cultural management. The issue of sustainability and the development of cultural organizations is quite important, because they are contributing towards the enhancement of cultural and social development, and furthermore have positive implications in the society and economy, such as, in social cohesion, quality of life, and sustainable development, (Gandzias, G.K. & Korres, G., 2011)

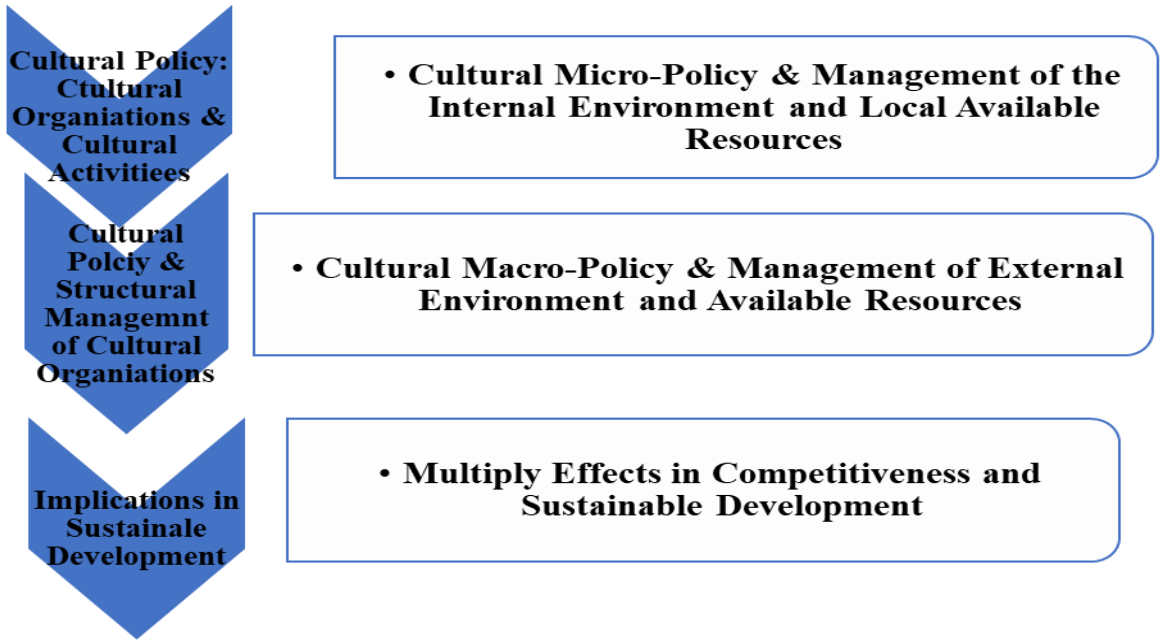
This article attempts to analyse cultural management and the effects in local development, emphasising in a Greek case study.

2. A Strategy for Cultural Management

The term of cultural management for a country, usually refers to the process of improving and expanding the benefits of cultural heritage and cultural production to the local development. Moreover, the conditions formed in the cultural, natural, social and economic environment interrelated and directly affecting the context and of economic planning, management and programming of cultural policy and cultural organizations. (European Parliament, 2011)

Figure 1 illustrates the cultural policy planning, including both the micro-policy based in the internal environment of the country and macro-policy orientation that based in the outer-international environment and the cultural effects and implications. Figure 2 illustrates the main socio-economic determinants and the actions of cultural policy.

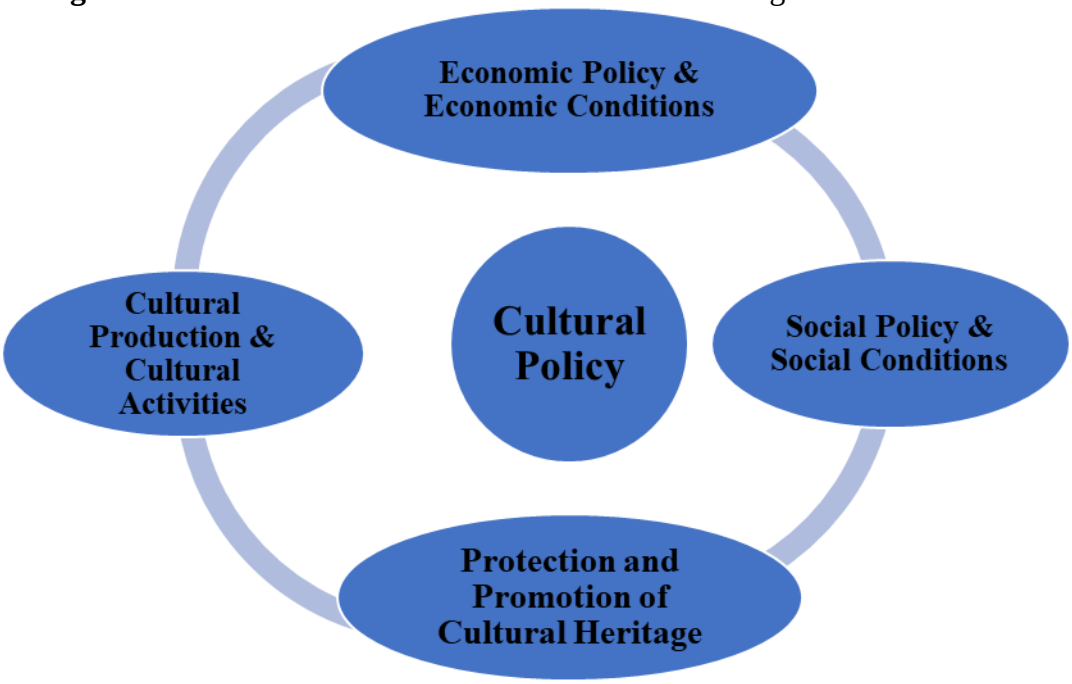
Figure 1: The Effects of Cultural Policy and Strategic Management of Cultural Organisations and Cultural Activities



Source: Own Elaboration

Cultural policy and cultural organizations are focusing in the protection and promotion of cultural heritage and furthermore in the production of cultural goods and cultural activities, while at the same time contributing towards the sustainable development and aiming both in economic growth and social development of a country.

Figure 2: The Main Determinant Factors and Networking Axes of Cultural Policy



Source: Own Elaboration

Strategic policy and cultural management contribute in the substantially through the protection and promotion of cultural heritage, the development of cultural production and cultural activities and affecting the local development-and sustainability of a country. The cultural management is directly interrelated with the following factors (Korres 2002).

- the financial planning of cultural organizations
- the cultural heritage and cultural stock, including the available cultural resources and the relevant production process
- The available resources of a country and the internal environment of cultural organizations including the infrastructures, funds, human resources, technologies, etc.
- The international system and the external -outer environment, that includes all these factors that affecting the country, the cultural policy and the cultural organizations, such as, the economic, social, political and technological conditions (PEST analysis).

In particular, cultural management and strategic policy in the times of economic crises will be influenced by the following factors (Gandzias and Korres 2011):

- The cultural heritage and the particular characteristics of the country-region
- The current production processes of cultural goods
- The conditions prevailing in the market.
- The degree of penetration of digital technology both in the internal and external environment of the cultural unit.

2. Cultural Policy, Economic Crisis and the Effects to Greek Economy

According to UNESCO (2017), cultural policy including all those political practices, that using human, technological, capital and material resources, and aiming to protect and promote cultural heritage, and also to increase the production of cultural products and services that can be satisfied the cultural needs, in order to succeed the sustainable socio-economic development

Cultural policy or otherwise so-called 'specific sectoral cultural policy' is usually focusing in the specific actions and including a range of certain cultural activities, such as museums, theaters, publications, visual arts, cinema, etc.

Cultural activities and the cultural sector are closely interrelated and can be affecting the key economic and social figures of a country, such as, the production system, the value-added and GDP of a country, the employability and the employment income in all related socio-economic sectors.

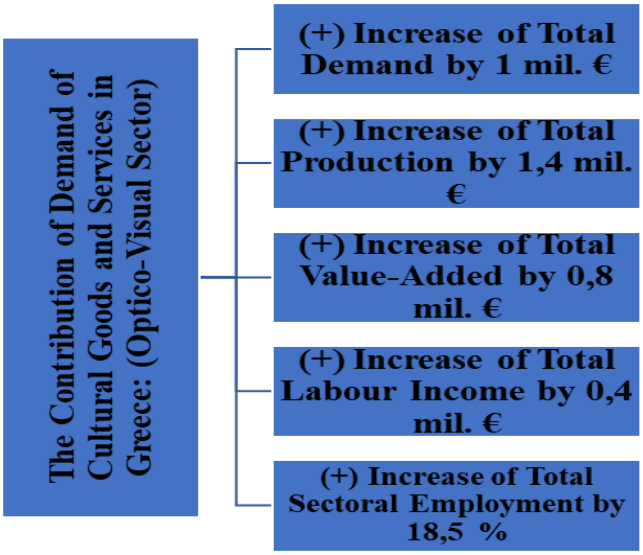
The recent economic and pandemic crisis have been apparently affected both the cultural sector, the cultural activities, but also all the inter-connected sectors and the related socio-economic variables of a country.

Figure 3 illustrates the multiply socio-economic effects of cultural policy and cultural activities in a sectoral analysis of optical-vision sector in Greece. As we can notice, the production of cultural goods and the cultural activities can be implied several multiply socio-economic effects that also determine the role of sustainability and sustainable development.

Furthermore, the protection and the promotion of cultural heritage and cultural activities will be implied several positive effects for the sustainable development of a country and consequently will be contributed positively in the main socio-economic variables, such as, the income, employability, GDP and therefore, will be induced the competitiveness level, the social cohesion and welfare of a country.

In the last two decades, the global economic-financial and pandemic crises had direct consequences on culture, while the so-called cultural crisis had an impact on cultural activities and the production of cultural goods. Moreover, the increase in unemployment, the increase in social inequalities, poverty and the reduction of the welfare state had also affected the cultural sector and cultural activities. Especially in times of economic crises, the productivity of cultural goods is affected by the conditions prevailing in the global economy.

Figure 3: The Multiply Efects of Cultural Activities: The Sectoral Effects of Visio-Optical Sector in Greece, (2015).



Source: Own Ellaboration, (Database: Eurostat, ELSTAT), (I.R.D., 2019)

Looking at the cultural sector and cultural activities, and using an example of the audiovisual sector in Greece, such as, media, television and radio, we can observe that the increase in the demand for cultural products and services of the specific sector by 1 million €, will have multiple positive economic and social effects and will increase the total production of cultural products and services by €1.4 million, and consequently the added value (GDP) by €0.8 million, and furthermore the corresponding income by € 0.4 million and also will increase the employment in the specific sector of audiovisual media by 18.5%. (I.R.D., 2019)

3. Summary-Conclusions and Priorities

Each culture has been developed over time in a specific area, with specific characteristics and structure. Moreover, cultural heritage can be divided into two main categories: tangible cultural heritage, such as archaeological sites, museums and works of art, and intangible cultural heritage, such as customs, traditions, cultural activities, etc.

Cultural policy that aiming the long term to protect and promote cultural heritage, and also to succeed both the quantitative increase and at the same time the qualitative development of cultural activities and the production of cultural products of a country.

Cultural policy depends from a number of important factors, such as, the stock of cultural heritage, the availability of human resources, economic conditions and economic policy, social policy, the political system, the infrastructures and international technological environment, the managerial skills etc.

Cultural policy will be determined the production of cultural activities and cultural products and therefore will be affecting the main socio-economic variables and the sustainable development. The delimitation and redefinition of cultural policy and cultural heritage is one of the necessary conditions for the delimitation of sustainable development.

The economic crisis had a negative effect with dramatic reductions in budget' allocation and funds for culture, while in the last fifteen years with the economic and the pandemic crisis, had seriously negative effects both in the government expenditures for the culture, and also to secure additional funding from private individuals through sponsorships and donations that consequently affecting the sustainability and development of cultural organizations and cultural sector. Moreover, the reduction in spending on culture and cultural actions has multiply negative effects and socio-economic implications.

Cultural organizations, especially in times of crisis, must remain active, and outward-looking for new innovations, new technologies and digital transformation, in order to be able to protect and promote cultural heritage and moreover to create contemporary attractive cultural products, which will be linked to the economy and society and therefore to contribute towards the general public and sustainable development.

Table 1 illustrates a SWOT analysis (Strength, Weakness, Opportunities and Threats) for cultural sector in Greece, emphasizing in the internal and external environments of cultural activities and cultural sector.

Table 1: SWOT (Strength, Weakness, Opportunities and Threats)

	SWOT Analysis	
	The key positive axes to achieve goals	**The key negative axes to achieve goals**
Internal Environment	**Strengths:** • Uniqueness of Cultural Heritage, Cultural Products and Cultural Activities • The Availability of Specialised Human Resources • New Technologies, New Innovations and Digital Transformation for Cultural Products and Cultural Activities.	**Weakness:** • Bureaucracy and potential delays in decision-making due to bureaucracy • Lack of new technologies-digitization & digital technologies • Lack of communication-skills, inadequate marketing & communication policy
External Environment	**Opportunities:** • Networking with International Cultural Organisations and Expertise • Collaboration and Participation with Local Communities. • The Diffusion and Implementation of New Innovation and New Technologies in Cultural Activities and in the Cultural Heritage.	**Threats:** • Economic, energy and pandemic crisis • The increasing competitiveness • International political, social and economic circumstances, (environmental crisis, economic and health crisis etc.)

Source: Own Ellaboration

The growth in the production of cultural goods and cultural heritage create positive externalities with multiplying positive effects in areas such as, of employment-income, at the level of services, transport, communication, product promotion, exploitation of the natural environment, creation of new tourist areas and innovative cultural programs, creation of cultural, commercial, scientific, exhibition centers, recreation centers, utilization of available resources, etc., that contributing both towards the economic development and also towards the social and cultural development.

The cultural policy in current period in Greece should be focused on the protection and in the promotion, development and highlighting of the local cultural heritage. In the long-term cultural strategy and cultural planning will be implied a number of cumulative positive effects regarding both for the key socio-economic and cultural sectors, such as, in the employment, at the level of services, transport, communication, product promotion and in the connectivity with sectoral activities, and furthermore will be enhance the exploitation of the natural environment, the creation of new tourist areas and innovative cultural programs, creation of cultural, the commercial, scientific, the exhibition centers, as well as recreation centers, utilization of available resources, etc., and furthermore will be contribute towards the economic development and social cohesion and also to sustainability and to local sustainable development.

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Reviewing the Role of Maritime Spatial Planning in Sustainable Development in the North, South Aegean & Crete Regions[1]

Abstract:

There is a huge literature for maritime spatial policy and planning. The issues of spatial, economic and social development can be usually measured and illustrated by main economic and social indicators and can be measured at national or regional level. In most of the literature, using time-series and benchmarking analysis with economic, spatial and social indicators, we can measure the implications and reach in safe conclusions on the issues of maritime spatial planning and furthermore to determine the key factors for economic and social development.

Main economic and social data and indicators capture the context of spatial, economic and social development, at national or regional level, using a comparative analysis of spatial economic and social data, as the basis for future maritime spatial planning, along with the determination of the key factors of the socio-economic development process.

This article aims to document, present and analyze the framework of maritime spatial planning and its contribution to balanced sustainable development. More specifically, the paper examines, through a longitudinal and cross-comparative study, the Aegean Sea regions in Greece, focusing on North Aegean, South Aegean and Crete.

Keywords: Maritime Spatial Planning, Sustainable Development, Economic-Social Development, North Aegean, South Aegean, Crete

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1. Introduction

Maritime spatial planning is usually determined through the relevant national policies and legislation. One of the main objectives of maritime spatial strategy planning is to enforce the utilization of marine and coastal activities and furthermore to succeed in enhancing sustainable development (Korres, Pavlogeorgatos and Kokkinou, 2015).

This article intends to examine and analyze the context of maritime spatial planning and coastal areas and its contribution to sustainable development, using mixed methodology, i.e. literature review and use of secondary statistical data with descriptive statistics. Moreover, this article will emphasize in the periphery of Aegean Sea, and especially in the North Aegean, the South Aegean and Crete regions.

2. A Benchmarking Analysis for the North-South Aegean and Crete Regions: A Theoretical Model and Estimations

A large number of studies have suggested that there is a close correlation between regional spatial policy and maritime planning, regarding factors of productivity and development, and economists have analysed different possible views of why productivity growth has declined. These alternative explanations can be considered across the lines and effects of regional spatial policy and maritime planning and may be grouped into the following categories (Korres, 2009):

- the capital factor and new investment may have been insufficient to sustain the level of productivity growth, due to insufficient level of regional spatial policy and maritime planning;
- the technology factor, for instance a decline in innovation might have affected productivity growth;
- the increased price of raw materials and energy;
- government regulations and demand policies that affect the productivity level;
- the skills and experience of the labour force may have been deteriorated or under-utilised;
- the products and services produced by the economy have become more diverse; and
- productivity levels differ greatly across the regions;
- new opportunities and activities arise, through the regional spatial policy and maritime planning, in order to reduce the regional disparities and enforce the regional cohesion and convergence.

For the level of productivity, we can use real GDP as a proxy, reflecting the structural change, in order to decide to which degree these variables add to the explanatory variables of the model. We will use HC, as a proxy of Human Capital for the total level of knowledge appropriated in the country (or *productivity*). Investment share (INV) has been chosen as an indicator of growth in the capacity for economic exploitation of innovation and diffusion; the share of investment may also be seen as the outcome of a process in which institutional factors take part (since differences in the size of investment share may reflect differences in institutional system, as well).

We have tested the following version of the model:

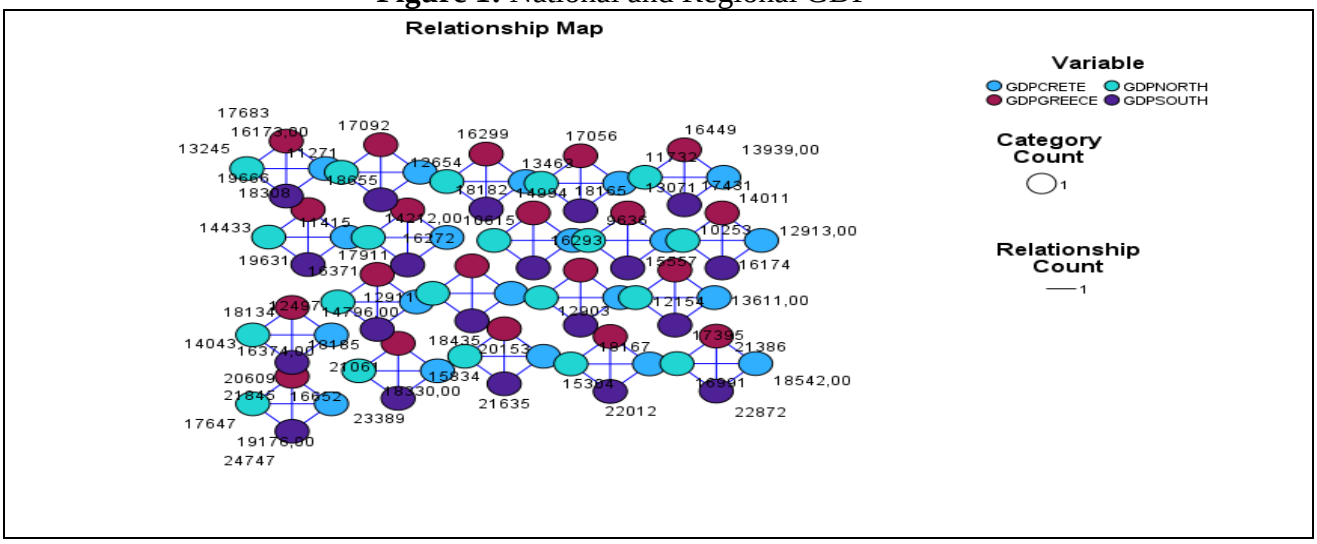
$$GDP(\text{or } PROD) = f[HC, INV] \text{ (basic model)}$$

The first model may be regarded as a pure *supply model*, where economic growth is supposed to be a function of the level of human capital and investment share (HC, INV with a positive sign). However, it can be argued that this model overlooks differences in overall growth rates between periods due to other factors and especially differences in economic policies, for example, as the correlation between productivity and patenting is much closer than between productivity and research expenditure.

Following this model (Korres, 2009) we can test the basic gap model, reflecting structural change, in order to determine the degree to which these variables have added something to the other explanatory variables of the model. Investment share (INV) has been chosen as an indicator of an improvement in the capacity as the outcome of a process in which institutional factors take part (since differences in the size of investment share may reflect differences in the institutional system). The basic model is tested for the variables of GDP, and investment as a share of GDP. The explanatory power (or the overall goodness of fit of the estimated regression models) is not very high, but this is not surprising for cross-sectional data. However, there is a problem with inter-dependence between the variables. For this reason, we shall focus on the relationship between productivity and innovation. Most of the variables have the expected signs. In both cases we used the same approach, first testing the basic model and then introducing the terms of trade and export variables.

In the following analysis, the determining factors of the economic development for the North and South Aegean and Crete regions are, firstly, the level of the investment base and, secondly, the human resources. Moreover, the relationship between GDP and determining factors, that is, the level of investment and the level of human resources will be analyzed both for national and regional level, in a study of the regions of the South and North Aegean and Crete. For the analysis, statistical data derived from the Hellenic Statistical Service covering the years 2000-2020, in constant prices. We will also be based on this database, in order to estimate the forecasts for the next decade.

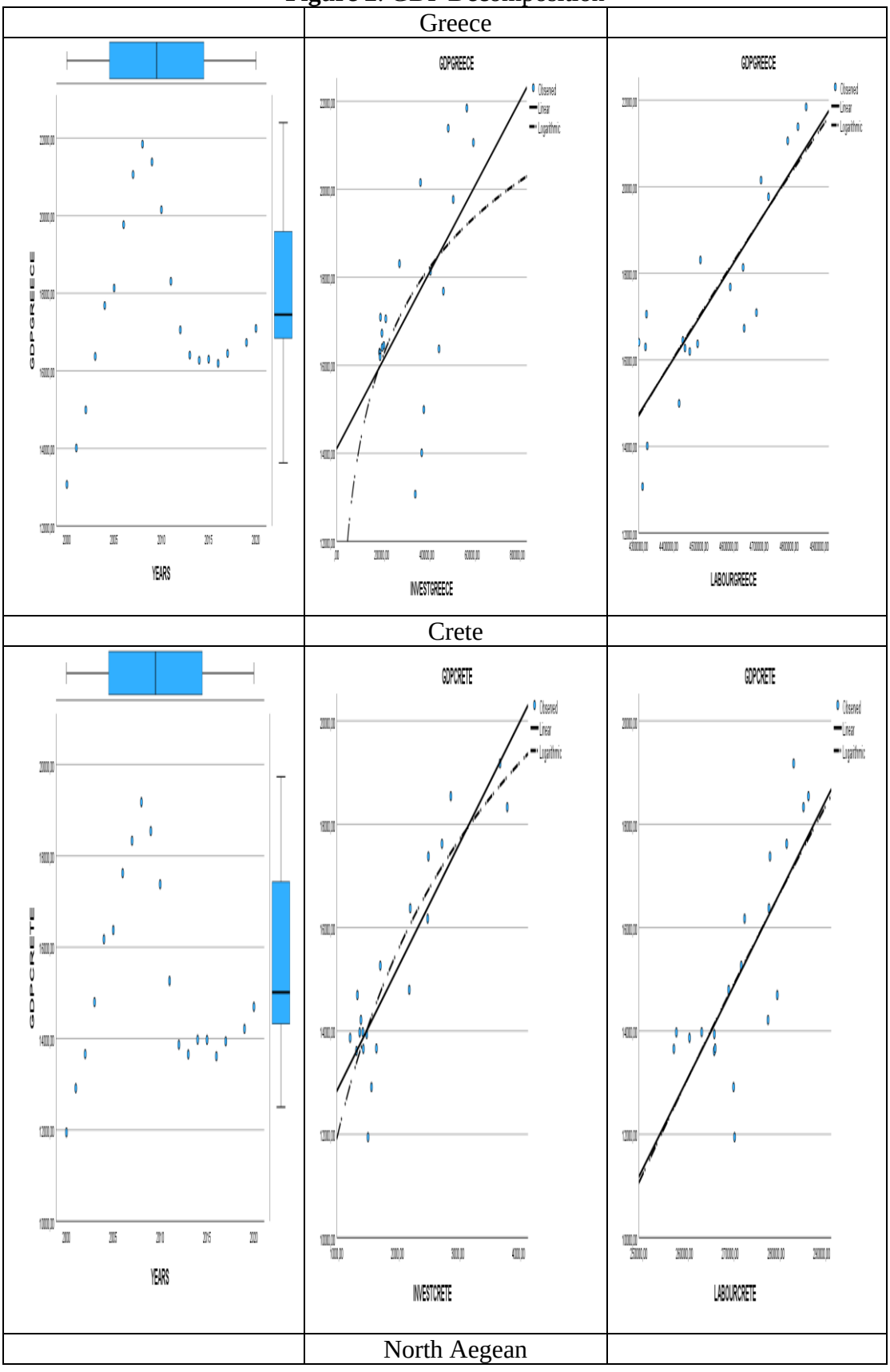
Figure 1: National and Regional GDP

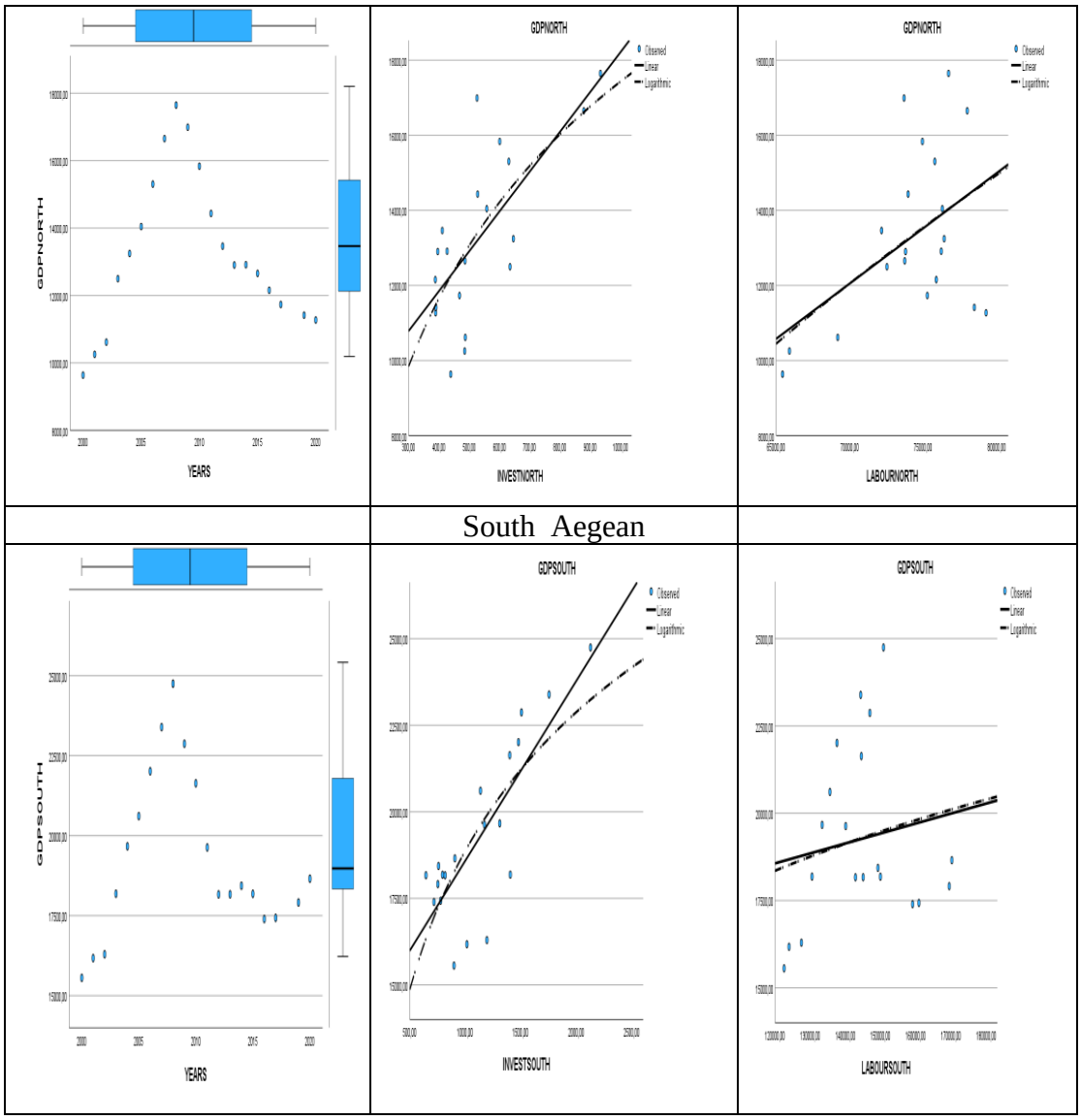


Source: Own Elaboration

The analysis demonstrates the close relationship between the formation of the GDP at the national level and the regional GDP, especially the GDP of the South Aegean and Crete regions, which are two regions which, due to their economic production activity, contribute a large percentage to the formation of the national GDP.

Figure 2: GDP Decomposition





Source: Own Elaboration

According to the results of the model, it appears that there are statistically significant positive relationships between the level of GDP per capita and the determinants for the regions of the North and South Aegean, as well as the region of Crete, in relation to the determinants of Human Resources and the level of Investment, as shown in the following Table 1:

Table 1: Estimation Results

Greece

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,863[a]	,745	,715	1268,84469

a. Predictors: (Constant), INVESTGREECE, LABOURGREECE

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	79803207,506	2	39901603,753	24,784	<,001[b]
	Residual	27369436,294	17	1609966,841		
	Total	107172643,800	19			

a. Dependent Variable: GDPGREECE
b. Predictors: (Constant), INVESTGREECE, LABOURGREECE

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	-31010,476	8725,330		-3,554	,002
	LABOURGREECE	,011	,002	,821	5,191	<,001
	INVESTGREECE	,011	,026	,064	,402	,693

a. Dependent Variable: GDPGREECE

Crete

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,919[a]	,844	,826	860,32923

a. Predictors: (Constant), INVESTCRETE, LABOURCRETE

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	68012464,179	2	34006232,090	45,944	<,001[b]
	Residual	12582828,621	17	740166,389		
	Total	80595292,800	19			

a. Dependent Variable: GDPCRETE
b. Predictors: (Constant), INVESTCRETE, LABOURCRETE

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	-2728,625	8470,794		-,322	,751
	LABOURCRETE	,052	,033	,226	1,562	,137
	INVESTCRETE	1,921	,378	,737	5,088	<,001

a. Dependent Variable: GDPCRETE

North Aegean

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,781[a]	,610	,564	1505,72625

a. Predictors: (Constant), INVESTNORTH, LABOURNORTH

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	60241072,538	2	30120536,269	13,285	<,001[b]
	Residual	38542596,012	17	2267211,530		
	Total	98783668,550	19			

a. Dependent Variable: GDPNORTH
b. Predictors: (Constant), INVESTNORTH, LABOURNORTH

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	-6762,362	6896,331		-,981	,341
	LABOURNORTH	,202	,095	,331	2,119	,049
	INVESTNORTH	9,433	2,323	,633	4,061	<,001

a. Dependent Variable: GDPNORTH

South Aegean

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,889[a]	,791	,766	1224,84233

a. Predictors: (Constant), INVESTSOUTH, LABOURSOUTH

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	96474300,411	2	48237150,206	32,153	<,001[b]
	Residual	25504058,539	17	1500238,738		
	Total	121978358,950	19			

a. Dependent Variable: GDPSOUTH
b. Predictors: (Constant), INVESTSOUTH, LABOURSOUTH

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	2608,736	3382,015		,771	,451
	LABOURSOUTH	,070	,021	,377	3,296	,004
	INVESTSOUTH	5,784	,732	,904	7,899	<,001

a. Dependent Variable: GDPSOUTH

Source: Own Elaboration

Also, is of great interest to estimate the forecast, regarding the development of the national and regional GDP, for each respective region:

Table 2: Forecast Decomposition of National GDP

Model Statistics

Model	Number of Predictors	Model Fit statistics R-squared	Ljung-Box Q(18) Statistics	Ljung-Box Q(18) DF	Ljung-Box Q(18) Sig.	Number of Outliers
LCL from GDPGREECE-Model_1-Model_1	0	,804	.	0	.	<,001

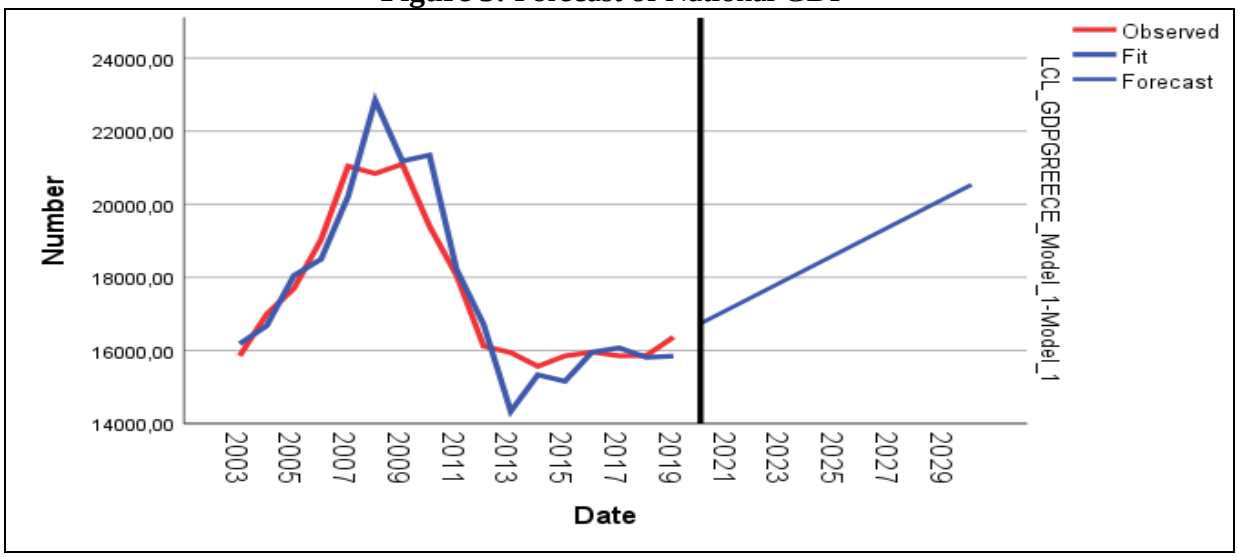
Forecast

Model		2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
LCL from GDPGRECE-Model_1-Model_1	Forecast	16735,65	17115,50	17495,34	17875,18	18255,02	18634,86	19014,70	19394,55	19774,39	20154,23	20534,07
	UCL	18638,12	20927,50	23575,89	26538,71	29783,02	33284,07	37022,56	40982,91	45152,25	49519,68	54075,87
	LCL	14833,19	13303,49	11414,79	9211,65	6727,02	3985,65	1006,85	-2193,82	-5603,47	-9211,22	-13007,73

Source: Own Elaboration

The figures of national GDP show a clear upward trend, which also converges with the relevant analyses.

Figure 3: Forecast of National GDP



Source: Own Elaboration

Looking the figures of the forecasts, it becomes clear that a positive growth rate of these figures is expected in the Greek GDP, until the year 2030. This growth rate is mainly due to structural changes that have taken place in the Greek economy in the previous years, such as fiscal adjustment, consolidation of the banking and credit system, liberalization of the markets, attraction of foreign investments, as well as the exit of the country from the fiscal surveillance regime, which had entered, as a result of the fiscal and financial crisis during 2008-2018.

Table 3: Forecast Decomposition of Regional GDP

Model Statistics

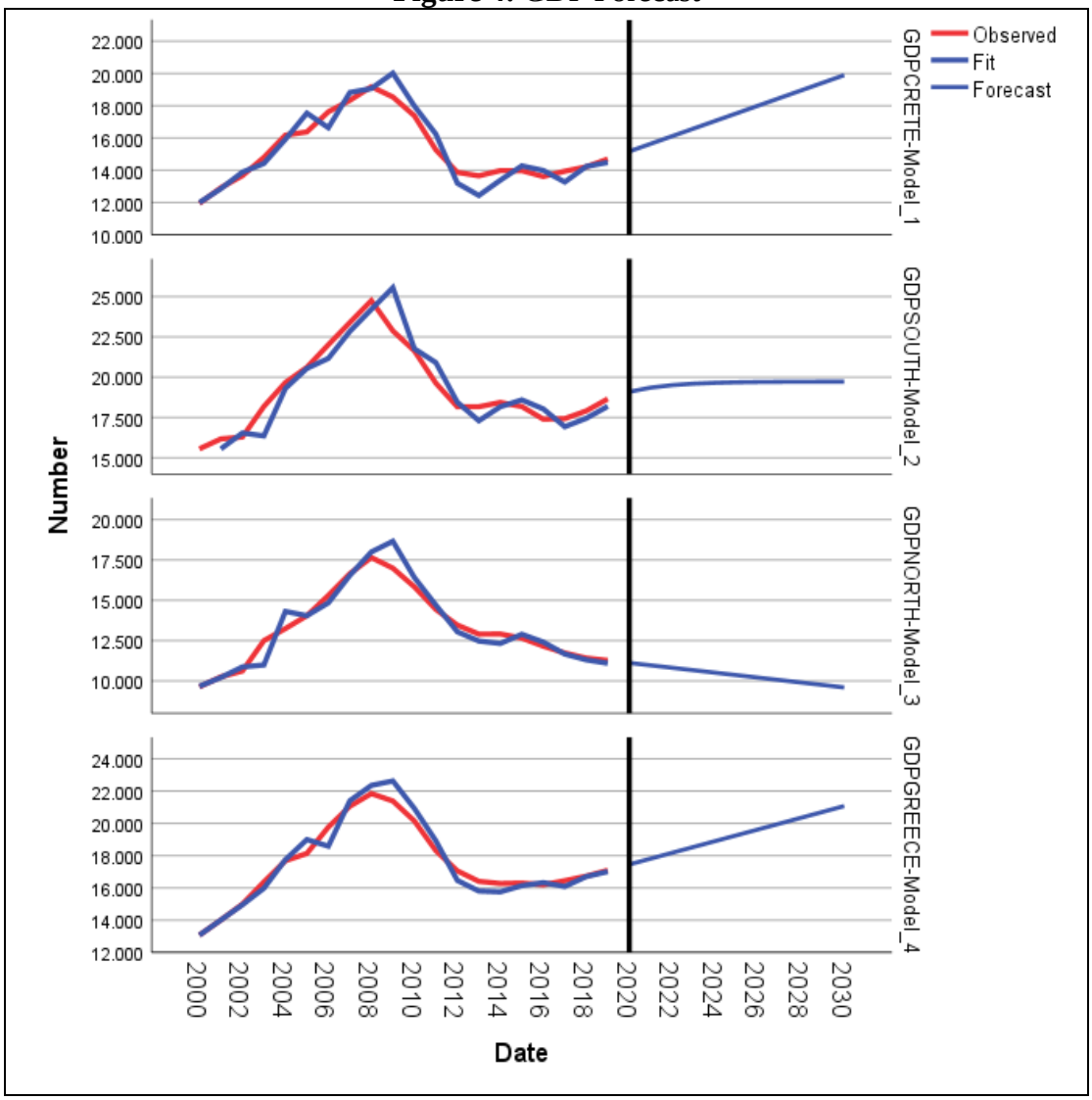
Model	Number of Predictors	Model Fit statistics	Ljung-Box Q(18)			Number of Outliers
		R-squared	Statistics	DF	Sig.	
GDPCRETE-Model_1	0	,884	7,819	17	,970	<,001
GDPSOUTH-Model_2	0	,850	9,012	17	,940	<,001
GDPNORTH-Model_3	0	,920	4,487	17	,999	<,001
GDPGREECE-Model_4	0	,941	5,817	17	,994	<,001

Forecast

Model		2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
GDPCRETE-Model_1	Forecast	15167,56	15640,25	16112,94	16585,64	17058,33	17531,02	18003,71	18476,40	18949,09	19421,78	19894,48
	UCL	16635,72	18857,67	21450,30	24361,11	27554,03	31002,77	34687,20	38591,27	42701,81	47007,74	51499,60
	LCL	13699,40	12422,83	10775,59	8810,16	6562,63	4059,27	1320,22	-1638,47	-4803,62	-8164,17	-11710,65
GDPSOUTH-Model_2	Forecast	19094,53	19354,19	19507,59	19598,21	19651,75	19683,38	19702,06	19713,10	19719,62	19723,47	19725,75
	UCL	21077,44	23080,03	24862,65	26438,08	27837,39	29092,38	30230,27	31272,94	32237,54	33137,43	33983,00
	LCL	17111,62	15628,35	14152,53	12758,35	11466,11	10274,38	9173,86	8153,26	7201,70	6309,52	5468,51
GDPNORTH-Model_3	Forecast	11118,77	10966,63	10814,49	10662,36	10510,22	10358,09	10205,95	10053,81	9901,68	9749,54	9597,41
	UCL	12466,85	13925,01	15725,06	17818,48	20171,94	22761,22	25567,73	28576,68	31775,91	35155,22	38705,88
	LCL	9770,68	8008,25	5903,93	3506,24	848,50	-2045,05	-5155,83	-8469,06	-11972,56	-15656,14	-19511,07
GDPGREECE-Model_4	Forecast	17453,99	17815,98	18177,97	18539,97	18901,96	19263,95	19625,94	19987,93	20349,92	20711,91	21073,90
	UCL	18665,11	20524,02	22709,30	25173,08	27883,18	30816,36	33954,90	37284,69	40794,17	44473,66	48314,88
	LCL	16242,87	15107,95	13646,65	11906,85	9920,73	7711,53	5296,98	2691,17	-94,33	-3049,83	-6167,07

Source: Own Elaboration

Figure 4: GDP Forecast



Source: Own Elaboration

The effort to attract human resources that are currently abroad also contributes to this, as well as the increase of investment interest in the country, in the sectors of tourism, energy and services, where the main challenges for Greece are summarized as follows:

- The first refers to the adaptation of the country in the context of programming, which is clearly of strategic nature, and departs quite far from the consolidated "labor-centered" model, on which the planning, administration and implementation mechanisms of the programs have been built and operated for a number of years. This adaptation must pervade not only the central administration at all its levels (ministries, regions, organizations, etc.), but also the local self-government, which actively participates in the submission of proposals, the formulation of planning and the implementation of projects.
- The second challenge that Greece faces is the ability of the country, and especially of the regions that exceed the EU development target with the strong financial support, to formulate alternative effective and sustainable regional development strategies, which will ensure the future progress and prosperity of lagging regions.

This development approach of the Greek economy, however, is not expected to spread at the same rate to all regions of the country. At this point, after mentioning that the existing infrastructures, the investment attractiveness of each region, the economic system that has

been structured in each region, along with the special regional development characteristics, are the parameters that will determine the development dynamics of each region.

Consequently, a projected development perspective is observed in the regions of Crete, mainly, and the South Aegean. Both regions are expected to grow further, with Crete expecting growth rates above the national average.

Finally, regarding the regional analysis, the following diagram refers to the forecasts regarding the evolution of the GDP, both at national level and regional level for the regions of Crete, North Aegean and South Aegean.

The South Aegean region does not reach the comparatively high growth rate of Crete or South Aegean regions. Subsequently, while the North Aegean region, due to its particular development characteristics, is expected to show a development recession, taking into account its border character, the absence of strong tourism and investment activity, the absence of development of high added value sectors and the lack of specialized human capital.

Regions should maximize their resources and capabilities, minimize risks and seize opportunities in order to compete successfully at national and regional level, through not only economic process, but also through a broad social activity process, which includes the dynamics of many different companies, research bodies, universities, and regional development bodies, in general (Van Lierop, 2018a, b, c, 2017).

In this direction, policies related to the identification of spatial maritime policy will be expected to enhance the above socio-economic factors and the level of convergence.

The level of government policy also includes the policy regarding the strengthening of the interaction between the actors of the existing investment system, as well as the cultivation and utilization of networks between businesses. At this point, emphasis should be placed on actions such as the creation of networking contacts, through industrial circles or sectoral groups and facilitating the approach between businesses, encouraging the creation of intermediaries, or making use of existing structures that could take on the role of communication and collaboration.

3. The Maritime Spatial Planning

The maritime spatial planning aims to focus on the maritime and coastal areas and the related activities, in order to analyse the efficient and productive use of local resources of energy production, maritime transport, fishing, aquaculture, tourism, and the extraction of raw materials, with multiple positive socio-economic effects, such as, on growth, investment, employment, social cohesion and sustainable development.

Legal framework of maritime spatial planning refers to all relevant sectors and related activities for both maritime and coastal areas, including the following main activities (Korres, Pavlogeorgatos and Kokkinou, 2023):

- activities related to fishing,
- activities related to aquaculture,
- the creation of facilities and infrastructure for sub-sea projects,
- the exploitation and extraction of oil, natural gas, and other energy resources, raw materials, and minerals for the production of energy from renewable and conventional sources,
- transport, infrastructure,
- the protected areas for biodiversity,
- activities related to scientific research in the maritime space and coastal areas,
- activities related to submarine cables and pipelines,
- activities related to tourism,
- the protection of natural and cultural environment and the protected marine archaeological sites and marine monuments.

The main axes of maritime spatial planning concerns with management, strategy, and information activities in the maritime and coastal space, in order to succeed in multiple positive effects and furthermore to achieve coherent and sustainable development (Korres, Pavlogeorgatos and Kokkinou, 2015). The maritime spatial planning is a managing process for the maritime and coastal space and related activities, as illustrated in Figure 5 (Korres etc, 2023).

Furthermore, the main objectives of maritime spatial planning could be summarized into (Smith, et al., 2011):

- Enhancing balanced sustainable development by increasing the production and utilization of local resources, and also affecting employment, income and competitiveness.
- Enforcing spatial and social cohesion, and furthermore the connectivity and collaboration between maritime and coastal areas and related activities.
- Enhancing rational and integrated spatial maritime and coastal activities, with respect to environmental protection
- Succeeding efficient utilization of local resources, such as, energy resources and the extraction of raw materials, maritime transport, shipping, the protection of marine cultural heritage, fishing and aquaculture, tourism, and the protection of natural and cultural environment.

Figure 5: The Flows of Maritime Policy and Spatial Planning
(Source: Own Elaboration)

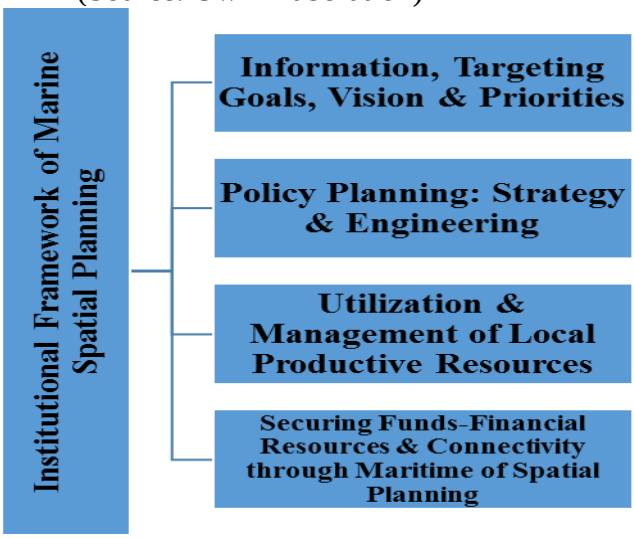
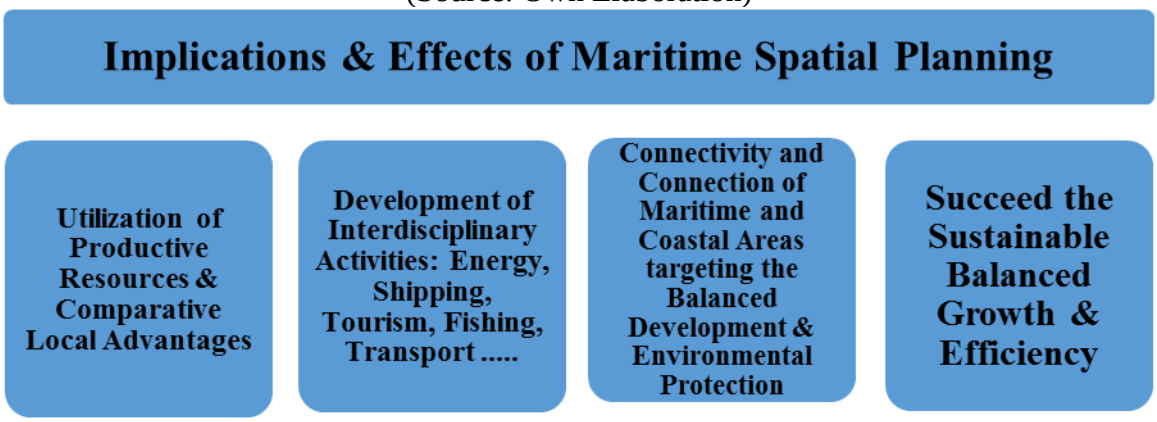


Figure 6 illustrates the main micro-effects and macro-implications from maritime spatial planning, (Korres etc, 2023):

Figure 6: Implications and the Efficiency of Maritime Policy and Spatial Planning
(Source: Own Elaboration)



European Union introduced the Integrated Maritime Policy (IMP) policy, as a policy framework, aiming to promote sustainable development of all maritime and coastal activities. The Integrated Maritime Policy (IMP) will develop and enhance the collaboration between different national, European and international policies (European Parliament, 2022).

The Integrated Maritime Policy (IMP) is a policy framework aiming to promote sustainable development of all related activities in maritime and coastal areas, by improving the coordination of policies, affecting oceans, seas, islands, coastal and outermost regions and maritime sectors, as well as cross-sectoral tools (European Parliament, 2022), mainly focusing on the main objectives and axes of Integrated Maritime Policy (IMP), (Korres et., 2023):

- to maximize the capacity and sustainable use of oceans and seas, in order to develop maritime and coastal areas;
- to build a knowledge and innovation base for maritime policy, through an integrated European strategy for maritime research (Horizon 2020 program);
- to create a European strategy for maritime policy and to improve the quality of life in coastal areas by encouraging coastal and maritime tourism;
- to promote the EU leadership in international maritime affairs and to enhance the collaboration in maritime and coastal areas;
- to increase the collaboration and participation in the "European Atlas of the Seas" web application, and to promote European maritime heritage.

The Greek regions can be formulated with the following goals, as follows (Van Lierop, 2018a, b, c, 2017):

- Exploitation of the connection of the regions with metropolitan regions
- Sustainable Rural Development
- Protection of the natural environment, reconstruction of the countryside and sustainable management of natural resources
- Integrated development
- Strengthening and upgrading tourist activity
- Upgrading urban and semi-urban centers
- Support the development of human capital

4. Summary and Discussion

Sustainable development includes long-term economic development and also, environmental protection, social development, social cohesion and social integration. On this matter, spatial, economic and social level can be captured and measured using main economic and social data and related indicators for both national and regional levels. The main indicators and measures for economic development are the GDP (Gross Domestic Product) and investment rates, whereas the corresponding measurement and indicators for social development are the employment and the GDP per Capita level (Per Capita Income), respectively. (Korres, Pavlogeorgatos and Kokkinou, 2023)

Regarding the evolution of GDP in Greece, there is an apparent rapid negative growth rate following the 2004 Olympic Games. By the end of the Olympic Games and the subsequent financial crisis of 2008-2018, growth rate in Greece has presented a significant decrease. By the end of the financial and pandemic crises, and due to budgetary and financial changes, growth rate in Greece seems to be recovering in recent years.

Using the above figures and according to these data, the same path is followed by the regions of Crete and South Aegean, while the region of North Aegean continues to show a downward trend. However, there is a positive correlation for the investment factor that seems to be stronger in the regions of Crete and South Aegean, and less strong in the region of North Aegean.

Within this framework, a contemporary maritime spatial policy planning will certainly affect both the main macroeconomic and socio-economic indicators, and furthermore will determine the level of sustainable development. It is noteworthy that in the region of Crete, the primary sector is highly developed, with a strong presence of local agricultural associations, agricultural cooperatives and the development of productive activities and networks across borders. The natural environment of the island has contributed to the development of tourism sector, with Crete region alone hosting, on average, 22% of the total number of tourists in Greece. Furthermore, the increase in the population rate in the region of Crete has contributed significantly to the increase of the labor supply. Moreover, low unemployment rate is one of the main strengths of the Cretan economy. Unlike other island regions in Greece, in Crete there is still a balance between the growth of primary and tertiary sectors, even if the main part of the investments is directed more towards tourism, with tourism being the second most dynamic sector of the economy, after agriculture.

South Aegean region has a lower growth rate in comparison to Crete, however, it expects a smaller increase in the growth rate, due to the related flows of the tourism sector. Moreover, the region of North Aegean is generally characterized as a small region with a long distance from the administrative center of the continental country, facing a wide range of development problems. A serious problem for the region concerns the aging population and the major problems regarding aging population and de-population. Around 19% of the economic active population is employed in the primary sector and 61% in the tertiary sector. Employment in the secondary sector has remained stable at around 20%. Tertiary sector produces 70% of value added, while primary and secondary sectors contribute with 14% and 16%, respectively. The low productivity of the primary sector is mainly due to traditional cultivation methods, the lack and exploitation of water resources and the fragmentation of agricultural holdings.

Finally, according to these data, North Aegean region, with its particular developmental characteristics, is expected to face economic stagnation and developmental recession, due to its border character, lower tourism flows and low investment rates and related activities, in addition to the lack of industrial activities, and the low value added of the primary sector.

Summarizing the most important development inequalities that may will affect the specific target figures of Greece can be summarized into:

- Greece faces challenges in terms of spatial balance with the main characteristics being the over-concentration of economic activities in the metropolitan region of Attica and a multitude of disadvantaged areas, such as the island regions.
- Regarding the modernization of the infrastructure, the productive environment, and the skills of the country's human resources, in many cases an innovative development orientation was adopted that led to organizational and institutional reforms, as well as the support and training of the human resources.
- Structural reforms is an important success factor, since without creating inflationary pressures, they lead to higher productivity and consequently increase the dynamics of growth and employment. Greece has promoted structural reforms and these should be completed and extended.
- These improvements should be aimed at promoting structural changes and modernizing the economy, higher growth rates in the long term and real convergence, mainly by raising capital in investments that will contribute more to the growth of productivity and employment.

Regions should maximize their resources and capabilities to minimize risks and seize opportunities, in order to compete successfully, both nationally and regionally. Innovation is recognized and analyzed, not simply as an economic process, but as a broad social activity

and process, which includes the dynamics of many different businesses, research institutions, universities, and regional development agencies, in general.

With reference to the Greek regions, the comparative development advantages refer mainly to their geographical location, natural resources, archaeological-historical and cultural monuments and specialization in the production of high-quality agricultural products. These advantages create great possibilities for the development of a modern and extroverted production system, with the parallel development of tourist activities.

On the other hand, the problems and developmental weaknesses of the Greek regions refer mainly to the lack of the necessary infrastructure and the low level of technological modernization and entrepreneurship rate of high value-added productive activities.

In conclusion, maritime spatial planning is expected to have a positive impact on the key factors and the main economic and social indicators, such as, GDP growth, employment, investment, income, social cohesion and convergence rate, between the regions of the South-North Aegean and Crete.

Maritime spatial policy and planning can be determined as a main key-point for sustainable integrated development. This article attempts to analyze the issues of maritime spatial planning and its contribution to the balanced sustainable development in a case study of the South-North Aegean and Crete regions. The main economic and social indicators provide us an overall information on the spatial, economic and social level and status, for both national and regional level.

This article attempts to analyze the maritime spatial planning and the effects using various economic and social indicators, in a cross-comparative analysis for the regions of North Aegean, South Aegean and Crete. The islands of the North-South Aegean and Crete areas are facing a lot of differences, as illustrated by the main economic and social indicators, such as GDP, employment, investment and per capita income.

The maritime and coastal activities are usually interrelated and there are strong linkages, targeting to promote the sustainable use of maritime activities and also to enforce sustainable development in maritime and coastal areas. Maritime spatial policy and planning should take into account all related factors, such as, land-sea interactions, environmental protection and the risks of over-exploitation of coastal and maritime environment.

The main purpose of global maritime policy in spatial planning is to define and to encourage the utilization of maritime and coastal activities in the related areas, in order to promote sustainable development, with a lot of different multiple effects.

Furthermore, contemporary maritime spatial policy and planning should be harmonized in accordance to international institutional and legislative framework, in order maritime spatial policy planning to be able to contribute substantially, affecting a lot of positive multiply effects on (Korres, Pavlogeorgatos and Kokkinou, 2023):

- increasing productive and efficient utilization of regional resources and capabilities,
- increasing value added and GDP growth rates and investments,
- increasing employability and income,
- protecting natural and cultural environment,
- inducing social cohesion and sustainable development,
- targeting the economic convergence and cohesion between the specific regions of Crete, South and North Aegean.

In conclusion, maritime spatial policy and planning will play a crucial and substantial role on integrated sustainable development, and therefore, in a number of multiply effects, such as, the utilization of local resources, the environmental protection, the growth of local production system, the connectivity and interlinkages between sectors and moreover the positive socio-economic effects and the impact on social cohesion and convergence, between the regions of the South-North Aegean and Crete.

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The contribution of a mega-event to the tourism development of the host country

Abstract:
Purpose – The purpose of the research is to capture the short-term and long-term positive results from the organization of a mega-event in the tourism development of the host country. Individual objectives concern the economic, social and cultural effects of a mega sports event, the economic, environmental and social effects on tourism, as well as possible opportunities through the creation of new ones and the improvement of the existing sports and tourist infrastructure.
Design/methodology/approach – 1. What are the short-term benefits of organizing a mega-event in tourism? 2. What are the long-term benefits of organizing a mega-event in tourism (heritage of the tourism product)? The bibliographic review will be used methodologically to answer the research questions, through the use of secondary research sources.

Findings – The impact that major sporting events have is huge for the host countries, in terms of tourism and the revenue generated by visitors, the visibility that the country acquires, as well as the awareness of the people on issues related to its culture and culture. The benefits for the host country are many, both in the short and long term. **Research limitations/implications –** The results have shown that the benefits are varied, but further research is needed, with a focus on the environmental footprint and sustainable practices applied to such events.
Practical implications – The aspect of usefulness of the research will provide information about the real results of organizing a popular mega-event, the opportunities it gives to the local community, as well as the immediate financial benefits. Furthermore, it will highlight that the international tourism industry has recently intensified its efforts, so that sports tourism grows into a strategic factor in the reshaping and planning of a country's tourist traffic, with emphasis on the proper rational organization and future utilization of infrastructure.
Originality/value – The research becomes original, as it focuses on the organization of a mega-event and the positive impact it had on levels of tourist demand, despite the adversity generated by the fact of the terrorist attack.

Keywords: Mega-events; Giga-events; heritage; financial benefits; tourist infrastructure; sustainability.

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1. Introduction

Sports tourism is an important alternative form of tourism with increasing importance for the promotion of a country and its ranking in a privileged position in the global list of the most popular tourist destinations. At the same time, it is a strong incentive for investments in modern sports structures but also in the upgrading of existing tourist structures, thus contributing to economic development (Wright, 2016). In recent years, there has been an increase in competitiveness among countries aspiring to host major sporting events.

However, taking on an event is an expensive and time-consuming process. The host city/country is called upon to engage in a continuous struggle to create and maintain those favorable conditions that will ensure the continuous development and strengthening of the heritage of the event (Leal de Oliveira et al., 2020). In some cases, the phenomenon of a country's inability to maintain its attractiveness as a tourist destination after the incident is observed. Therefore, it becomes necessary to continuously upgrade the tourist product, create new tourist infrastructure, as well as maintain it.

An example of a successful mega-event and its corresponding contribution to the development of sports tourism was the organization of UEFA Euro 2016 in France, amid terrorist attacks, which was hosted in thirteen cities. In fact, in 2016 France was the most popular European destination, due to the increase in (besoccer.com, 2017) tourism in several French cities, which hosted sports activities. Regarding the heritage of the event in the country and its possible utilization for additional economic and tourist development, the investments made in sports facilities are indicative.

2. The tourism impact of mega events in host countries

Major sporting events are social events that attract billions of spectators around the world and are sponsored by the world's most powerful transnational corporations (Grix and Lee, 2013). In this context, states compete with each other in terms of sports, economics and soft power exercise. By undertaking such manifestations n, host countries expect to project their identity and specific cultural characteristics, their technological and economic power, to increase their credibility on the world stage, as well as their tourist inflows (Grix & Lee, 2013). The organizational developments that take place, significantly increase the value of the destination and its attractiveness. World major sporting events, such as the Olympic Games or the Football World Cup are an occasion and fertile ground for host countries to create a positive image, but the inability to take advantage of the opportunities presented may affect them (Giulianotti, 2015).

The allure of hosting a mega-event has increased significantly over the last two decades (Rowe & Baker, 2012). The advent of professionalism in sports, coupled with the world's highest per capita income and improvements in transmission technology, made mega-events a truly global experience, but countries and regions increasingly see these events as potential lucrative opportunities, encompassing great potential tangible and intangible benefits for the host (Horne & Manzenreiter, 2004).

The example of the Olympic Games is suitable for studying the short- and long-term benefits that the host country reaps. In particular, it is the main reason why cities/countries "need" mega events (Nooij et al., 2013). Creating an identity for a city/country is essentially a marketing strategy, which aims to highlight all its positive characteristics and strengthen its economy (Gratton & Preuss, 2008). Building this identity through hosting major sporting events can be complex and costly, but it is also effective due to the attractiveness and popularity of sporting events and the subsequent interest of investors and companies (Warren, 2018).

In a globalized environment, the possibilities that the organisation of major sporting events can offer for the host country are not limited to the economic sphere, but take on wider and varied implications (Müller, 2015b). Tourism is one of the world's leading growth sectors

in the service industry. Although many factors influence its development, one of the most noticeable contributions comes from world sporting events. In this context, countries around the world want to host such events in order to improve their position in the world rankings and exercise soft power.

An example of the use of Olympic diplomacy as a tool of soft power was the opening ceremony in China, which was used as a "showcase", with the aim of presenting the country's rich history and success to the world (Berkowitz et al. , 2007). China presented itself as an emerging state, so as to enhance its communication dynamics in the media (Ni, 2008). In particular, Olympic diplomacy focused on demonstrating China's economic progress, through the promotion of a technologically advanced organization of the Olympic Games and above all a country that is politically stable, as well as sensitive to addressing environmental issues by promoting the "Green Olympics" (Beyer, 2006). Alongside foreign policy goals, Olympic diplomacy was also used to consolidate China's nationalism, with the government or its government gaining more popularity and support (Luša, 2017).

Also of particular interest are the countries that, through hosting mega-events, expect to improve their economy and strength, which are characterized as emerging economies (Rosado & Paul, 2017). Despite the criticism and competition brought about by the division of countries into emerging and non-emerging, the role of major sporting events in their promotion and development is unquestionable. A typical example is South Africa, a country that hosted the football World Cup in 2010. When hosting mega-events, other opportunities were born for the economies of emerging countries, such as through trade and business deals made (Bravo et al., 2018). In addition to establishing partnerships, creating a positive image and strengthening the economy fosters a sense of security in potential visitors (Deffner & Labrianidis, 2005). In fact, those who choose to visit the country to watch the sports closely, will advertise and promote its culture and civilization (Lepp & Gibson, 2011).

2.1 Short-term benefits of holding a mega-event for the host country

Research on the impact of sports mega events is extensive and focuses mainly on economic outcomes such as individual income, employment and taxable business sales (Hotchkiss et al., 2003). However, only short-term economic benefits are often found. The focus of the studies is on the hospitality and tourism sector, as mega events promote the tourism market and international arrivals, which increase during their conduct (Vierhaus, 2019). In anticipation of these tourist inflows, host countries are often required to increase their investments, prior to the event, in hotels or infrastructure, such as the beautification of the city, the construction and expansion of stadiums, the upgrading physical and digital infrastructure and building entertainment areas (Dollinger et al., 2010).

Numerous studies focus on individual manifestations, and empirically, the evidence remains mixed. For example, Depken and Stephenson (2018) found that sports competitions increase hotel bookings, but Depken and Fore (2020) argued that there was no significant change in revenue or served customers in catering and accommodation. However, short-term capacity constraints may reduce any potential benefits, especially when it comes to seasonal events or individual games (Porter, 2000). Thus, in order to reap additional benefits, the construction of additional infrastructure capacity may be required. This is true even when major sporting events are hosted in cities with an organised transport network or modernised infrastructure. As presented by Baumann and Matheson (2018), Rio de Janeiro had to build 15,000 new hotel rooms for the 2016 Olympics despite the fact that it was already an established and popular tourist destination (Baade et al., 2021).

At the same time, when the United States hosted the FIFA World Cup, using income as a substitute for the amount of economic activity, 13 cities hosting the event, actually accumulated net losses during this period (Baade et al., 2021). In addition, Tien, Lo and Lin (2011) showed that based on a sample of 24 summer and winter Olympics, there is only weak

evidence that hosting a mega event is financially beneficial. The findings suggest that the resulting benefits are only identified during pre-Olympics preparation and are short-lived. Confirming this finding, Billings and Holladay (2012) showed limited evidence supporting any long-term effects of hosting the Olympics. Moreover, Lamla, Straub and Girsberger (2014) did not see significant economic benefits at macroeconomic level when investigating the impact of the 2008 European Football Championship in Switzerland.

On the other hand, Rose and Spiegel (2011) showed that mega event hosts are enjoying a permanent increase in commercial opening. The majority of studies looking at the impact of hosting a major sporting event focus on the event itself and in fact after the event. This is perhaps why there seems to be a lack of data highlighting a positive effect of hosting such an event. Confirming this, Brückner and Papa (2015) found that hosting the Olympics leads to a positive impact on economic growth. This ex ante effect causes an increase in investment and production both in the short and long term for the future host. However, there are still advantages, albeit in the short term, for 'failed candidates'. Given the weak evidence of the positive impact of mega events on traditional measures of economic activity, research has, again, focused on the results of the service sector resulting from sports tourists (Jones and Ponzini, 2018).

As for sports competitions, the scale of international visitors is much larger, as is the length of their stay. In particular, the 2014 football World Cup in Brazil increased tourist arrivals by about a million visitors, while only 100,000 international tourists arrived for the summer summer 2016 Olympic Games in Rio de Janeiro. In combination with the above data, Li et al. (2013) showed a significant increase in international visitors to Beijing in 2008, however, their numbers were limited due to the lengthy process of obtaining an entry visa to attend the Beijing Olympics, which may have discouraged further sports tourists from attending (Li & Song, 2013). Proponents of organizing the Olympics state that during the event, these tourist arrivals create a significant increase in both hotel occupancy and local retail (Rudkin & Sharma, 2020).

The research findings largely support this view, as Porter and Fletcher (2008) presented that hotel occupancy increased both during the Summer Olympics in Atlanta, but also during the Salt Lake City Winter Olympics. On the other hand, the 2006 FIFA World Cup in Germany caused an increase of about 700,000 additional hotel nights by foreigners, but no impact was found during the 1998 World Cup in France. Nevertheless, there is insufficient support that these increases in tourist arrivals are permanent. Dansero and Puttilli (2010) claimed that although the number of tourists increased in the city of Turin and its metropolitan area after the 2006 Winter Games, this increase was short-lived. Similarly, Solberg and Preuss (2007) showed that the Sydney Olympics resulted in a brief increase in tourism, but this was followed by a prolonged period of stagnation (Allmers & Maennig, 2009). To capitalize on the greater profits from these sports tourists, businesses in the host area can increase their investments before the event, to maximize future profits (Dollinger et al., 2010).

Such a way would be through the construction of additional infrastructure usually associated with hosting major sporting events. These upgrades are not limited to sports facilities (Kontokosta, 2012). They also include improvements to general infrastructure, such as reconstruction throughout the city, strengthening of transport and telecommunications infrastructure and construction of hotels, bars, restaurants and entertainment areas (Dollinger et al., 2010). The level of this infrastructure development may vary between cities, but the demands for investment are still high (Gratton & Solberg, 2007). Moreover, even if visitors increase in the short term and only around the mega event itself, it can be expected that investments and profits at the enterprise level will increase (Kaplanidou et al., 2016).

Exploring the enterprises located in the industrial sector is both interesting and vital, as they are often involved in the manufacture of intermediate goods needed to organize mega

events. For example, manufacturing companies may undertake to provide inputs for new hotels and stadiums or provide furniture and equipment for restaurants and bars (Davis, 2020). Other enterprises can support these efforts by providing telecommunications, metallurgical construction, textiles, petrochemicals, minerals and mechanical components. In addition, the technology sector may provide products and services to ensure appropriate levels of security throughout the timeframe. Compared to seasonal events, where tourists return every year, the demand for the host area may never be as great as it was during the mega events event. These problems are exacerbated when event stadiums fail to be reused and become known as "white elephants" (Davis, 2020).

2.2 Long-term benefits of hosting major sporting events

The long-term benefits of hosting major sporting events for host countries are also very important. In particular, through the hosting of international sports organisations, countries can emerge as custodians of a world heritage (Luša, 2017). In this way they exert attraction, highlighting the truths they desire and gaining new momentum. In a connected and competitive world, hosting Mega Events can be a soft power exercise tool, significantly affecting the global landscape. Clearly, the benefits are not limited to tourism, since the preparation for sports competitions requires the movement of athletes, finding sponsors, entering into partnerships, etc. (Fan, 2010). Throughout this process of organization and management, a fundamental element is the strategies used, among them the branding of the host country/city (Luša, 2017). In other words, hosted sporting events and other events become an opportunity to connect the city with the characteristics and values of the event (Fan, 2008).

City branding is a strategy that finds application in many fields and is now largely used by states (Bjerke & Naess, 2021). According to Lynch (1960) identity is the degree to which a person can recognize or recall a place, differentiating it from others. Each city has a unique identity, which consists of images and memories that are either negative or positive. The image of the city essentially consists in terms of urban elements, such as monumental buildings, public spaces and other special features. From a general point of view, city branding is mainly based on three main characteristics, which are the image, uniqueness and authenticity. Almost every city has city branding on its agenda in order to reshape its image (Kapelioti, 2019).

Kotler et al. (1996) argue, in fact, that places are products whose identities and values must be designed and marketed, like other commercial products. According to Ashworth (2009) one of the goals of branding of the city or place is to discover or create uniqueness, which makes the city different from the others. The main goal in the manufacture of brands for cities is the articulation of the city in the globalized world. For a city to develop successfully, it needs economic wealth and an attractive image. Thus, the branding of the city should deal with how culture and history, economic and social development, infrastructure and architecture, landscape and environment, among other things, can be combined into a marketable identity that is acceptable to all people (Zhang, 2011).

As a holistic approach, city branding serves as a promotional tool for creating a unique image of a city. The ultimate goal is to attract expanded population groups, mainly including potential visitors from outside the country and enabling them to perceive and positively evaluate its culture. Achieving this goal requires the involvement of different parties or actors and of course careful long-term planning (Bjerke & Naess, 2021). In this context, major sporting events are suitable for supporting these goals, however, as the scale and requirements of the branding manufacturing process grow, so do the potential opportunities and threats to the country (Kavaratzis & Hatch, 2013).

A recent example concerns Qatar, which will host the World Football Championship in 2022 (Al-Emadi et al., 2017). There were many opportunities for the country, which

contributed to strengthening its negotiating capacity and position in international relations. However, since the announcement of the hosting of this great sporting event by Qatar, there have been reports of poor working conditions of people who mainly arrived in the country from India, Pakistan, Nepal for the construction of sports facilities. Press reports said more than 4,000 people had lost their lives working for the Cup preparation projects in Qatar (Zumi, 2020).

Major sporting events, such as the FIFA Olympics or World Cups, have been used by host countries to promote their values and communicate them to domestic and global audiences (Preuss, 2007).These experiences support the transfer of the special characteristics that the nation stands for and thus contribute to the strengthening of the country's "brand", differentiating it from others. This process mainly includes corporate branding, public management and cultural geography (Hereźniak & Florek, 2018). For this reason, all the above characteristics and elements that appear each time on the occasion of hosting major sporting events have been linked to the emergence of the country as a model, enabling it to introduce new policies, directly or indirectly. In fact, intangible results create in the long run many more opportunities and benefits for the country hosting the games and are a legacy for national and world sport itself (Cornelissen, 2008).

However, undertaking an event is a costly process in terms of resources and time. The host city/country is called upon to engage in a constant struggle to create and maintain those favorable conditions, which will ensure the continuous development and strengthening of the heritage of the event (Chen et al., 2013). In some cases, the phenomenon of a country's inability to maintain its attractiveness as a tourist destination after the event is observed. So, it becomes necessary to constantly upgrade the tourism product, create new tourist infrastructure, as well as maintain them. Hosting a major sporting event and increasing tourism does not guarantee that revenues will be kept at the same level for the country (Müller, 2015a). Barcelona, Seoul and Atlanta experienced an increase in hotel occupancy before the Olympics, but also a decrease in average occupancy during the Olympic year, as well as in the first years after the Games. Barcelona saw revenues drop by almost 60% in the next 2 years after the Games (McKay & Plumb, 2001). Barcelona's strategy was to use the Olympic Games to create the image of the cultural city. Although the number of tourists continued to grow, it was not enough to balance the reconstruction costs spent on hotel accommodation. Lillehammer, on the other hand, is an example where unrealistic optimism has caused overinvestment in the local hotel sector (Teigland, 1999). Although tourism increased after the Games, it was not enough to balance the increase in supply. As a result, there have been several bankruptcies in the tourism industry.

In recent years, the competition to host a large sporting event has led to great competition, because the number of reception applicants has increased. Thus, the creation of stadiums and other sports facilities does not guarantee that the destination will be elected as the host of major sporting events in the future. In particular, there is talk of the co-organization of the 2030 World Cup by Greece, Egypt and Saudi Arabia, while other countries have submitted similar proposals. Starting in 2026, the World Cup will expand into a 48-team tournament, likely requiring some nations to work together to host an event of this size. With Asia hosting in 2022 (Qatar) and North America in 2026 (USA, Canada and Mexico), it leaves the opportunity to welcome 2030 to Africa, Europe and South America. The Oceania region does not have the infrastructure for a 48-team World Cup, especially after Australia joined the Asian confederation (Borg, 2022).

The intention of the countries to take over the World Cup, even through co-organization, reveals the recognition of the benefits that accompany hosting a major sporting event (Borg, 2022). In addition to the investments that will be made in infrastructure and the attraction of visitors from the countries involved, the long-term benefits emerge equally important. Among them are the collaborations at the level of tourism, business and of course

the formation of a cooperation framework to achieve a common interest that will benefit the co-organizing countries (Bjerke & Naess, 2021). Even if this creates import leaks that reduce the benefits to the local economy, it is nevertheless a smart strategy, going beyond potential long-term demand.

2.3 The example of the UEFA Euro 2016 competition in France

An example of a successful mega-event and its corresponding contribution to the development of sports tourism was the organization of UEFA Euro 2016 in France, amid terrorist attacks, which was hosted in thirteen cities, contributing 1.2 billion euros to the country's revenue, with 51% of them being revenues from tourism. In fact, in 2016 France became the most popular European destination, due to the increases in several French cities, which hosted sports activities. Regarding the heritage of the event in the country and its possible use for additional economic and tourist development, the investments made in sports facilities are indicative (besoccer.com, 2017).

In particular, France welcomed 1,216,000 visitors throughout the tournament, of which 70% French and 30% foreign, exceeding the expectations of the organizers. In addition, the experience of the Fan Zone turned out to be very positive: a survey of the general public shows a satisfaction rate of 92%, with no noticeable differences between age groups or nationalities. The balance sheet is also positive, as for the protection of the city, since no damage was caused to shops, nor were there any public disturbances. The accompanying programme implemented by the City of Paris, with 400,000 beneficiaries, resulted in the organisation of 84 events in various districts, including 14 art installations (Borg, 2022). At the same time, Paris drastically reduced the environmental impact of the tournament. The deputy mayor pointed out that France was the first mega event country to receive the ISO 20121 certification, which is the most demanding in the world in terms of environmental conservation. More than 160 actions were directed in this direction: from the eco-design of modular structures to the sorting and recycling of 132 tons litter collected (Borg, 2022).

In terms of tourism impact, for the first time, Paris has regained a level of tourist traffic similar to that it had before last November's attacks. The number of visitors in June 2016 was 1 to 2% higher than in June 2015, with the increase mainly due to Europeanvisitors. Revenues from tourism amounted to 625.8 million euros, with 35% coming from accommodation, 30% from restaurants and food services, 20% from purchases and visits and 15% from the transport sector. In the communications part of UEFA's hospitality, the Eiffel Tower Fan Zone welcomed more than 3,100 journalists who filmed around 6,000 reports broadcast to 100 million viewers in more than 100 different countries. As for posts on social networks, these totaled more than 17 million views (sportsbiz.co.ke, 2017).

3. Methodology

3.1 Purpose and objectives of the investigation

Purpose is at the core of research, as it encapsulates the central theme around which it develops, while defining the direction in which it moves. Based on the purpose, the research questions and research objectives are then formulated (Creswell, 2012). Therefore, it is necessary to be clear, predetermined and specific, in order to create the appropriate questions, which will then be answered through research. In this way, the resulting data will be measurable and usable, while they are expected to help in the development of the study and in the enrichment of the subject under investigation.

In this case, the purpose of the research was to capture the short- and long-term positive effects of the organization of a mega-event on the tourism development of the host countries and especially France, as the host country of UEFA Euro 2016. Specific objectives relate to

the economic, social and cultural effects of a mega sports events, the economic, environmental and social impacts on tourism, as well as possible opportunities through the creation of new and the improvement of existing sports and tourism infrastructure.

3.2 Research Questions

The effectiveness of the research concerns both the goals and the questions that will be asked, as well as the answer to them, through the conclusions that will emerge (Creswell, 2012). Based on the data of this research, the research questions are defined as follows:

1. What are the short-term benefits of organizing a mega-event in tourism?
2. What are the long-term benefits of organizing a mega-event in tourism (heritage of the tourist product)?

To answer the research questions, the literature review was methodologically used, through the use of secondary research sources.

3.3 Originality and usefulness of research

The originality and uniqueness of a survey lies in the content or methods it uses. It is important for a study to be characterized as original, because in this way new parameters and characteristics in a subject are studied and thus new evidence arises or older conclusions are questioned. This process evolves both thinking and methodology, as well as research objects (Creswell, 2012).

In the case of France, as the host country of a mega event, the research becomes original, since it focuses on the organization of a mega-event and the positive impact it had on levels of tourist demand, despite the adversities created by the fact of the terrorist attack. The usefulness of the survey will provide information on the actual results of organizing a popular mega-event, the opportunities it gives to the local community, as well as the immediate economic benefits. It will also highlight that the international tourism industry has recently intensified its efforts so that sports tourism becomes a strategic factor in the reconfiguration and planning of a country's tourist traffic, with emphasis on proper rational organization and future utilization of infrastructure.

3.4 Results - Proposals for further research

The literature review that took place highlighted important data on the research on the tourist benefits of hosting a mega event. In particular, through the research used, it became clear that the short-term benefits are not limited only to the country's revenue, the increase in accommodation occupancy or the promotion of its brand, but include a number of obvious and invisible aspects. For example, the examination of the impact on industrial enterprises has largely been ignored, while the numerous studies focus on individual manifestations, and empirically, the evidence remains mixed. Still, the majority of studies examining the impact of hosting a major sporting event focus on the event itself (Kaplanidou et al., 2016). Therefore, there appears to be value in considering the above parameters.

In terms of the long-term benefits of hosting a mega event for a country, hosted sporting events and other events become an opportunity to connect the city with the characteristics and values of the event (Fan, 2008). Each city has a unique identity, which consists of images and memories that are either negative or positive. Thus, it becomes necessary to constantly upgrade the tourist product, create new tourist infrastructure, as well as maintain them. In the example of France, which has been studied, a new, interesting aspect of the environmental impact and opportunities for the host country has emerged. In particular, Paris drastically reduced the environmental impact of the tournament. The deputy mayor pointed out that France was the first country to organize mega events, which received the ISO 20121 certification, which is the most demanded in the world in terms of environmental conservation. More than 160 actions were directed in this direction: from the eco-design of

modular structures to the sorting and recycling of the 132 tons of waste collected (Borg, 2022).

It is concluded that the present literature review has brought to light gaps and omissions of previous research, while highlighting points that should be explored in future studies. At the same time, he underlined the importance of sustainability, as a concept that must be inextricably linked to the organization of a major sporting event. Through the case study of France, the importance was highlighted, not only of examining the environmental footprint that a major sporting event leaves in the host country, but also of the actions it must take to protect citizens, guests and future generations. It is important that major sporting events, such as the Olympic Games or UEFA event, are aligned with the Sustainable Development Goals as set by the United Nations. In fact, the IOC identifies as a priority social development and sustainability, which can be achieved or even promoted through sport. The conditions caused by the pandemic have given rise to innovations, which are expected to be further developed in the future. France's hosting of UEFA was a fertile ground and an opportunity to implement sustainable solutions. The challenge is to continue to apply similar practices in future sporting events, so that they become an axis and an example for all countries (Tzavaras, 2021).

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Divergent Behavior in Schools: Forms, Causes, and Management Strategies

Abstract:
This study examines the phenomenon of deviant behavior in schools and classrooms, exploring the forms of deviant behavior and the reasons that lead students to adopt such behavior. It also seeks to study practical models for addressing deviant behavior and the techniques used to address this phenomenon and manage the classroom.

Keywords: deviant behavior in school, behavioral issues, classroom management

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1. Introduction

Educators are confronted with a multitude of behavioral challenges when it comes to their students within the classroom. Effectively managing and addressing these behavioral issues, especially delinquent or unwanted behaviors, is a pressing concern. Recent studies conducted in Greece highlight a notable increase in the prevalence of deviant behavior among students (Poursanidou, 2016).

This surge in deviant behavior can be attributed, at least in part, to the ongoing socio-economic crisis in Greece. The escalating crisis has significantly impacted the living standards of numerous families and has taken a toll on the mental well-being of children. The adverse economic circumstances experienced within households have profound emotional effects on the development and behavior of children, often resulting in the exhibition of deviant behaviors within the school environment (Doliopoulou, 2015).

As educators grapple with these complex challenges, understanding the underlying socio-economic factors and their influence on student behavior is crucial. Additionally, exploring effective intervention strategies, involving parents and communities, and promoting mental health support for both students and their families are paramount in mitigating the impact of these adverse circumstances on students' behavior and fostering a conducive learning environment.

2. Deviant Behavior in School - Behavioral Issues

Deviant behavior in a school setting encompasses a range of disruptive actions and misconduct exhibited by students. According to Christakis (2012), behaviors are deemed problematic or unwanted when they disturb the individual displaying them or those around them, causing discomfort and distress. This notion is echoed by Paraskevopoulos and Herbert (2013) who define school misconduct by a series of adverse behaviors, including verbal and psychological attacks, insults, and the exertion of power over weaker peers, instilling fear, pain, and persistent anxiety.

The manifestation of undesirable behaviors among students presents a significant challenge in the educational landscape, requiring attention from educators across all levels. These behaviors not only impede the effectiveness of the educational process but also undermine the establishment of a positive and safe classroom environment, which is crucial for optimal classroom functioning (Poursanidou, 2016).

Expanding on this, it is important to delve into the various forms of deviant behavior in schools, their underlying causes, and the potential strategies to mitigate and address these issues effectively. Moreover, exploring the role of educators, parents, and the wider community in fostering a nurturing environment conducive to positive behavioral development is essential in comprehensively understanding and tackling deviant behavior in the school setting.

3. Forms of Deviant Behavior in School

According to Comfort (2017), the types of deviant behavior prevalent in schools include:

School Absenteeism: This refers to a situation where a child is absent from school and classes without justification and returns to school at any time. This habit leads students to spend their time in inappropriate places.

Behavioral Problems in Class: Students often fail to complete assignments, do not follow instructions and the teacher's commands, and exhibit lack of attention.

Bullying: It is a form of aggressive behavior where some students intimidate others to demonstrate superiority (physical attacks, threats, verbal humiliation).

Tardiness: Students arrive late to school and class when the morning assembly is almost over and, in some cases, when the teacher has already started the class. This often leads to disruption in the class.

Theft: Students tend to take things that do not belong to them at school without permission.
Substance Abuse, Smoking, Alcohol Consumption
The behavioral problems exhibited by children in school are categorized as follows:

- Aggression
- Vandalism
- Violation of rules
- Challenge to adult authority

The forms of delinquent and antisocial behavior in school are categorized into: (Tselepídou, 2021)

1.Student and school functioning rules:
•Absences
•Tardiness
•Disobedience
•Non-participation in school events
2.Student and classes:
•Non-participation in class
•Bag absence and lack of preparation for home
3.Student and teacher relationship:
•Disrespect towards teachers
•Verbal abuse
•Inappropriate behavior
•Disturbance of the class
4.Among students:
•School bullying
•Physical violence
•Verbal violence

4. Causes of Deviant Behavior in Schools

The main causes of deviant behavior in schools can be categorized into biological, psychological, and social factors. Biological causes manifest as physiological peculiarities of adolescents, such as certain damage or issues. Psychological causes lie in the peculiarities of children concerning their temperament and character, while social causes reflect the interaction of adolescents with society, family, and school (Comfort, 2017). In reality, numerous factors play a role in deviant behavior. These include genetic factors, personality, upbringing, environment, and social influences. The following are considered the primary causes of deviant behavior in schools (Hanimoglu, 2018).

4.1 Psychological Approaches

The psychoanalytic approach may suggest that all individuals have repressed, unconscious impulses that lead to social deviation. Learning theories, on the other hand, may indicate that these behaviors are learned by observing others engaging in deviant behaviors. Research shows that social influences can play a significant role in the initiation of substance use and addiction (Comfort, 2017, Kremser, 2014).

4.2 Biological Approaches

Biological approaches suggest that genetic influences play a significant role in deviant behavior. Regarding addiction, for example, genes may play a crucial role in the development of substance use problems. Genetics also influence temperament and overall personality. These characteristics can affect the likelihood of an adolescent displaying deviant behavior (Comfort, 2017, Kremser, 2014).

4.3 Sociological Explanations

A sociological explanation is Merton's theory, which suggests that there is a discrepancy between a society's goals and the means individuals have to achieve these goals. Consequently, people often turn to deviant behaviors (such as theft or drug dealing) as an easy way to attain these means (Comfort, 2017, Kremser, 2014).

4.4 Family Environment

The family is a crucial factor in the development of deviant behavior in school children. The first influence on children comes from their parents, making parents the most influential individuals in a child's life. According to Freud's Psychoanalytic Theory, each person has the potential to develop deviant behavior. However, this can be avoided through the process of identification, where we tend to base how we think, act, and feel in comparison to successful individuals. In a study by Karinga (1998) regarding the deviant behavior of secondary education students in Kenya, 88.9% of principals and 70% of teachers cited family background and poor upbringing as the primary cause of deviant behavior (Comfort, 2017, Kremser, 2014).

5. Practices for Addressing Deviant Behavior in Schools - Psychoeducational Approaches: Theoretical Models

There are theoretical models for understanding behavioral problems and organizing an intervention program:

- **Biogenetic Model**

Emphasizes that problematic behavior stems from internal causes (genetic or medical) and is treated as a physical symptom that needs to be addressed by tackling these causes first. This can be addressed through therapeutic methods such as pharmacotherapy and exercise (Gjone & Stevenson, 1997, OEPEK, 2008).

- **Psychodynamic Model**

Sigmund Freud's psychodynamic model emphasizes experiences in childhood. Anxiety arises from unconscious conflicts that threaten the child, and in dealing with these threats, symptoms develop (Freud, 1959). Psychoanalysis is the therapeutic technique that supports that unconscious conflicts need to be conveyed and understood by the patient to eliminate the behavioral disorder. The therapeutic program includes psychotherapy for the child (and in some cases for the parents), with the significance of a tolerant and receptive educational environment being crucial (OEPEK, 2008).

- **Behavioral Model**

In the behavioral model, problematic behavior can be modified through "preparation." This is achieved by associating a behavior with a particular stimulus. For example, a child feels happy and excited on Fridays, but this behavior is also associated and repeated through reinforcement of positive behavior and imposition of sanctions for negative behavior. The intervention focuses on using applied behavior analysis techniques to teach the child new acceptable ways of behavior and restrict unacceptable ones (OEPEK, 2008).

- **Humanistic Model**

In the humanistic model, the emphasis is on enhancing the child's positive self-perception through continuous encouragement to take initiatives and develop responsibility. The intervention takes place in an open, personal framework where the educator functions as a refuge and catalyst, and the child has the free choice of educational goals and activities (Rogers, 1961)

- **Ecological Model**

In this model, particular emphasis is placed on the child's interaction with the people in its environment. The intervention involves educating the child to function within the family, school, neighborhood, and broader social environment (OEPEK, 2008).

6.Managing Deviant Behavior in the Classroom

Deviant behavior in the classroom increases the anxiety levels of educators and simultaneously changes the dynamics of the class. The use of various psychological methods can modify deviant behaviors encountered in schools. This approach is based on the systematic application of psychological principles. Behavioral change can simply be defined as the systematic application of principles derived from theories of learning and experience in psychology. The techniques used to reduce unwanted behavior help increase positive student behaviors. In reducing these unwanted behaviors within the school, there are many strategies that can be implemented, such as: (Panagakos, 2016)

1. There should be trust in the student.
2. The educator must have self-awareness and self-improvement in psychoeducational matters.
3. Effort to understand the individuality of each student, especially the psychological climate prevailing at home.
4. Activities should be substantial and aligned with the students' interests.
5. There should be organization during work in the classroom, in order to limit the appearance of problematic behavior.
6. Assignment of "helper tasks" to delinquent students so that their boredom is alleviated.
7. There should be collaboration with the family.

7. Conclusion

The role of the teacher is crucial and significant, as through their behavior, they can determine the students' emotions either positively or negatively and manage their peculiarities. Behavioral problems in the school class are related to both the way the educational process is structured today and the interaction between the student and the educator. It is, therefore, imperative to take immediate action within the school environment, and children with deviant behavior should be able to highlight themselves through the educational process and not be stigmatized and marginalized (Smith, 2021)

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