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Guest-Editor
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Guest-Editor

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The Greek spatial planning system and its contribution to urban resilience

Abstract:
Urban resilience is a set of practices and policies developed to make cities less vulnerable to sudden or chronic stresses. Today as the urbanization, the environmental degradation, the social inequalities the climatic crisis, are some of the problems most cities face, it is important for cities to be resilient. The basic aim for achieving urban resilience is to define social ecological networks and network infrastructures of urban space at spatial and temporal scales, to maintain or return to desired functions in a case of a disturbance, to adapt to changes and to rapidly transform systems that limit current and future adaptive capacity. The above actions should be supported by a framework that promotes better urban-rural interconnection for the development of safe flows of people and products, improves the quality of services provided, protects the biodiversity in the urban area and the wider urban environment, encourages polycentric and compact urban areas, and ensures networks of accessible public spaces. So, the achievement of urban resilience as urban planning is involved is based on the development of compact cities, that promote sustainable urban mobility, develop multi centric areas and promote open and green public spaces with participatory processes. The question that arises is how Greek cities can become resilient and what are the tools of spatial planning that can lead to resilient cities. The current paper is examining the framework for spatial planning in Greece, and it is investigating the tools for urban regeneration, land uses definition, sustainable mobility promotion and urban governance. It examines the role of citizens in urban planning procedures, and it evaluates the opportunities and the weaknesses of the existing spatial planning system to make Greek cities resilient.

Keywords: Urban resilience, Greek spatial planning, participatory planning, sustainable urban mobility, urban regeneration.

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1. Introduction

The term resilience comes from the Latin verb "resilio", which refers to recovery. It was initially used in the ecological sciences, and then its use extended to other scientific fields, as psychology, political science, and geography (Christopherson, Michie, & Tyler, 2010). The first scientific use of the term was made in 1973 by Holling in his work "Resilience and Stability of Ecological Systems". According to the author, resilience is defined as the measure of the systems maintenance and their ability to absorb change and disturbance and still maintain the same relationships between their variables (Holling, 1973). During the following years, the concept of resilience was introduced to many sciences.

Resilience includes planning to minimize the effects of potential changes and develop measures to deal with the stresses a system experiences afterwards (Tas_an-Kok, Stead, & Lu, 2013). It refers both to mitigating the effects of stresses, as well as to rebalancing and optimizing the properties of the system itself under stressess (Martin-Breen & Anderies, 2011). As resilience is the process of adapting to pressures, it is structured by four phases, which are (Gunderson & Holling, 2002): exploitation and expansion, conservation, decline and reorganization (Simmie & Martin, 2010). The global organization "Resilience Alliance" defines resilience as the ability of a system to absorb disturbances while maintaining its structure and function. This organization created the panarchy model which essentially led to the evolution of resilience from a theory to a way of thinking (Walker & Salt, 2006).

The panarchy model refers to the hierarchical structure, according to which systems adapt to the continuous changes by passing through several stages. So, resilience is a complex concept, which is used by many sciences and attempts to interpret the ability of systems to react to changes and adapt to a new situation.

As the urban space is a complex system that includes several subsystems, the concept of resilience is a term that has been increasingly used in recent years to describe the capacity of cities to cope with economic, environmental, and social changes. In this context, urban resilience, is a key parameter for urban space. Intense urbanization, climate change, social inequalities and pandemics have made urban space vulnerable to adverse living conditions. In this context, the development of urban resilience is a key parameter for the improvement of cities residents living conditions (Carmin, Anguelovski, & Roberts, 2012). The term urban resilience was initially used in 1990 to relate the urban space with the consequences of environmental degradation, but also to social issues (Lu & Stead, 2013) (Mileti, 1999).

During the next decades many definitions related to urban resilience have been formulated. Urban resilience is defined as the degree to which cities respond to change, the point at which they are reorganized in order to create new urban structures and processes so that they can respond to new conditions (Alberti, et al., 20032003). During the same year, Godschalk refers to resilient cities, citing the fact that the urban space is a set of systems not only of the natural space, but also of the citizens (Godschalk, 2003). Adger's work develops the concept of social resilience (Adger, 2000), while many researchers have dealt with resilience in relation to natural disasters (Godschalk, 2003).

The term urban resilience was clearly formulated by Campanella and Vale in 2005 in their book “The Resilient City” (Vale & Campanella, 2005). Through the study of cities that suffered disasters from natural and man-made phenomena, they defined that urban resilience, is the ability of the city to return to an earlier state or enter a new state, after a sudden violent or even a long-term change.

In the following years, many definitions were formulated for urban resilience. Most scholars define it as the set of practices that cities develop in an effort to face phenomena such as environmental, economic and social crises, with the risk of the effects of climate change as a key parameter. In the following years, the definition was enriched by Martin-Breen & Anderies, who defined the changes that can occur in the city in different categories, sudden changes (earthquakes, wars, etc.) and long-term ones (e.g. economic crisis, fiscal policies) (Martin-Breen & Anderies, 2011). From another point of view, Pickett, Cadenasso, & McGrath, in 2013 attempted to define the concept of the non-resilient city. They defined as non-resilient city as a city characterized by poverty, crime and a degraded environment (Pickett, Cadenasso, & McGrath, 2013).

Leichenko states that urban resilience is the ability of a city to respond to shocks and stresses, which can be measured based on characteristics such as flexibility, the ability to learn and develop innovation, and governance in terms of easy adaptation (Leichenko, 2011). Shocks and stresses are defined as events as structural changes in the economy (usually changes in the productive base, e.g. deindustrialization), economic crises (e.g. Greek debt crisis), migration flows (e.g. recent migration crisis), natural disasters (earthquakes, floods, extreme weather events), man-made disasters (industrial accidents, terrorist attacks), pandemics and epidemics, disruptions in energy supply and changes in the leadership/governance of a city.

An important parameter that largely determines urban resilience is the way city dwellers can organize themselves, creating citizen networks, residents' communities and policy makers who can contribute to the achievement of urban resilience through coordinated actions (Collier, et al., 2013). After all, many of the challenges of urban resilience arise from the way the city's infrastructure was developed in previous phases, as well as their geopolitical characteristics.

In 2016, a survey of the definitions of urban resilience that have been formulated over time found that 25 different definitions have been formulated (Meerow, Newell, & Stults, 2016). The research scholars came up with a new definition of urban resilience, which attempted to summarize all the aspects and sectors of the city, which the definitions already formulated have, to a lesser or greater extent, attempted to include.

The engagement of international agencies with urban resilience began in 2002, but it was introduced to the agenda of international organizations and agencies in 2015. In 2010, the UN campaign entitled "Making Cities Resilient" with a time horizon of five years 2010-2015, had as its main objective the promotion of resilience and the development of innovative ideas for dealing with risks (United Nations Office for Disaster Risk Reduction, 2010). In 2012, the United Nations handbook "How to make cities more resilient-A handbook for Local Government leaders" defined the characteristics that make cities resilient the ten basic principles for developing resilient cities and the phases to achieve urban resilience (Molin Valdés, Rego, Scott, Valdés Aguayo, & Bittner, 2012). According to this manual, cities are resilient when risks are minimized because their populations live in areas with infrastructure such that can ensure a standard living quality and at the same time have develop the resources and mechanisms to respond before, during and after the appearance of chronic or sudden unpredictable changes.

In 2013, the Rockefeller Foundation through the 100 Resilient Cities program proceeded to the development of a cities network which will promote urban resilience strategies (Resilient Cities Network, 2021).The World Bank in 2013, through the

"Resilient Cities" program, recognized the need for the development of resilient cities and committed to finance the response to natural disasters with an emphasis on the reconstruction of affected urban areas (Jha, Miner, & Stanton-Geddes, 2013). In the following years, fighting poverty and promoting partnerships between the private and public sectors were added to the World Bank's goals. In 2014, the United Nations in collaboration with the European Union developed a tool for assessing resilience, the "City Resilience Scorecard", which includes two levels of assessment (United Nations Office for Disaster Risk Reduction, 2014). In 2015, the World Bank highlighted the need for cities to adapt to climate change and to develop tools and mechanisms to respond to economic, environmental, natural, and technological risks (World Bank, 2015). Key goals include eradicating poverty, financing resilience, developing partnerships, and promoting resilience in more cities.

The UN in 2015, in the Sendai Framework for the reduction of natural disasters 2015-2030, defines resilience as a new parameter for dealing with natural disasters in the context of sustainable development and the fight against poverty and refers to the need for integrating resilience into policies and programs (United Nations, 2015). In 2015, world leaders approved at the Agenda for Sustainable Development, the 17 Sustainable Development Goals to solve the economic, social, and environmental problems (Fig.1.). Protecting the environment, tackling climate change, production, and consumption, strengthening education, research and innovation, inclusive development, through the encouragement of partnerships, are the base for the formulation and implementation of targeted policies, for achieving sustainable development.

Figure 1: The 17 Sustainable Development Goals according to the 70th General Assembly of the United Nations.

Specifically for cities, the 11th goal that formulates the proposals goals for sustainable cities and communities until 2030, gives the following basic directions (UN HABITAT, 2020):

- Ensure access for all to adequate, safe, affordable housing and basic services, and slum upgrading.
- Provide safe, affordable, accessible, and sustainable transport systems for all, improving road safety, mainly through the expansion of public transport, with

emphasis on the needs of those in a vulnerable situation, such as women, children, people with disabilities and the elderly.

- Improve inclusive sustainable participatory, integrated, and sustainable planning for all.
- Strengthen efforts to protect and preserve the world's cultural and natural heritage.
- Reduce deaths and the number of people affected by natural disasters, as well as the direct economic losses relative to global gross domestic product due to natural disasters, including water-related disasters, focusing on protecting the poor and people who are in a vulnerable situation.
- Reduce the adverse per capita environmental impact of cities, paying particular attention to air quality and waste management.
- Ensure access to safe, inclusive, and accessible green and public spaces, especially for women, children, elderly and people with disabilities.
- Support positive economic, social, and environmental linkages between urban, peri-urban and rural areas, through the strengthening of national and regional development planning.
- Increase the number of cities and settlements that adopt and implement integrated policies and plans that address social inclusion, resource efficiency, climate change mitigation and adaptation, disaster resilience, and development and implementation of integrated disaster risk management at all levels, in line with the Sendai Framework for Disaster Risk Reduction 2015-2030.
- Support less developed countries, through financial and technical assistance, to build sustainable and durable buildings using local materials.

In the Paris Agreement on climate change in 2016, resilience projects as a key parameter for the development of space. According to the Agreement, the development should be carried out by increasing its capacity to adapt to the adverse effects of climate change and strengthening resilience to climate change, while it becomes necessary to improve the resilience of socio-economic and ecological systems, through economic diversification and the sustainable management of natural resources.

In 2015, the New Urban Agenda sets as a key objective to make cities and settlements safe, resilient, and sustainable and to adopt and implement risk and disaster reduction and management, reduce vulnerabilities, promote immediate response to natural and man-made hazards and adaptation to climate change. Strengthening the resilience of cities and settlements is proposed to be achieved through the adoption and implementation of integrated policies and plans, as well as ecosystem-based approaches and the integration and up-to-date disaster risk management, at all levels, with the aim of reduce vulnerabilities and risks, particularly in areas most vulnerable to risks, such as slums. From this Agenda, the transition to strategies based on an assessment of all possible risks emerged as a key commitment to address the immediate needs of residents affected by natural and man-made disasters and conflicts.

In 2018, the OECD (Organization for Economic Co-operation and Development) highlighted the four axes that must be assessed to determine the degree to which a city is resilient (Figueiredo, Honiden, & Schumann, 2018). It defined economy, environment, society, and governance as the four main parameters that define the urban system (Figure 2.).

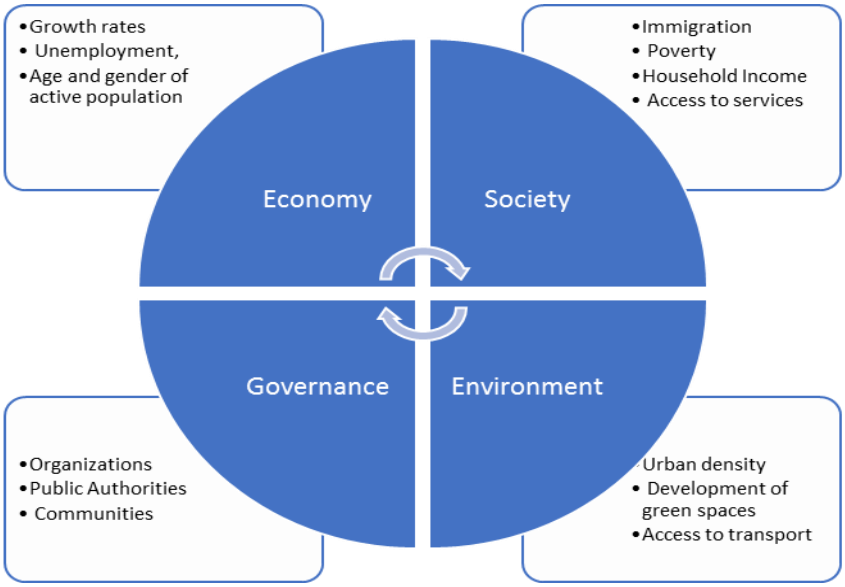

Figure.2: The four urban sectors that define urban resilience.

In 2019, the United Nations formulated five key directions for strengthening urban resilience. Governance, stakeholder participation, proper resource management, planning and implementation, and technology enhancement (UN Office for disaster risk reduction, 2019).

Today, the development of resilience is a basic condition for urban areas. The recent COVID-19 pandemic has been the reason to review the operating conditions of cities and the parameters for their planning. The United Nations, in the guidelines for cities planning in the time of the pandemic, distinguish the proposed interventions in terms of their implementation time horizon into short-term, medium-term, and long-term with the aim of social, environmental, and economic well-being.

2. The resilience of Greek cities through the spatial planning system.

Planning is a complex process that involves analyzing an issue and formulating proposals to balance the needs of the parties involved. It is based on the recognition of the objectives, the formulation of the strategies to achieve them, the obtainment of the required means for their implementation, and the continuous monitoring of all the steps for its completion. Spatial planning is a practice that synthesizes policies for the development of space with other policies that affect its nature and function and refers to the development of frameworks and principles that determine development and infrastructure (Healey 1996) and shape a better society (Healey and Hillier 2008).

Spatial planning includes the organization of actions in space, and it is divided into two basic categories in relation to the forms in which it is developed:

- The first is the strategic spatial planning. It defines medium-term or long-term goals for the development and organization of the space and the general directions for the formation of residential areas, areas of productive and business activities and protection areas, in national or regional scale.
- The second is regulatory spatial planning. It defines the rules for the use and construction of urban and rural areas.

In Greece today, spatial planning is practiced in national, regional, and local level and is formulated, depending on its nature, in strategic and regulatory. The Spatial Strategic plans include basic directions for the country's spatial organization

that set the main axes, the medium-term and long-term spatial development goals and the proposed measures and actions for the national development. This framework forms the basis for the coordination of the individual programs in relation to the development and cohesion of the Greek territory and is based on the Development Strategy of the Country for each programming period, the public investment program, the national and European policies for the protection of the environment and for other issues related to the country's development.

Regulatory spatial planning includes two basic categories of plans, Local Spatial Plans and Special Spatial Plans. These plans are sets of texts, maps and diagrams that define the standard spatial organization and development, land uses, and any other restrictions and measures, required for the integrated spatial development and organization of an area.

The above spatial planning tools set the basic strategies for urban and rural development, and they define sustainability as basic axes for planning. They define compact urban development, open and public spaces networks and sustainable mobility as basic factors for urban development. They also propose urban regeneration interventions as key tools for the revival of the existing urban areas. It is obvious that as sustainable development is a prerequisite for urban resilience, the existing spatial planning framework is in accordance with the basic terms for urban resilience. But still these plans set the basic strategies that should be specialized and aligned with other planning strategies, as mobility strategies, to be effective. So, in the following section the paper examines the framework for urban regeneration, land use planning, and mobility planning to examine how the basic strategic and regulatory plans principles are applied.

2.1. The urban regeneration framework and urban resilience.

In accordance with the Urban planning law, urban regeneration is the set of directions, measures, interventions and procedures of urban social, economic, residential, and special architectural nature, which aim to improve the living conditions of the inhabitants and the built environment and protect the cultural, historical morphological and aesthetic elements of an urban area.

Urban regeneration is a key tool for enhancing urban resilience. In Greece, the regeneration programs that have been implemented since 1980s focused on small-scale interventions in cities with an important historical character and on interventions for organized mass housing. In the following years, European funding programs led to a series of urban regeneration programs that were still limited to pedestrian networks.

According to the basic Urban planning Law (2508/1997), an urban area should be regenerated if it presents at least one of the following criteria

- It has large building densities or deficiency of public spaces.
- Conflicts in land uses.
- Lack of protection and promotion of its historical, archaeological, and cultural elements.
- Increasing deterioration of the aesthetics and in general the quality of the built environment of the area and its natural elements, and
- Downgraded housing stock.

The regeneration process can include:

- (1). Reconstruction of an urban area or even an individual building block, which entails the reconstruction of at least the largest part of the area.
- (2). Improvement of communal spaces in the area by interventions in the internal layout, uses, facades of the buildings, with the necessary spaces and networks

- (3). Improvement of the form and aesthetics of the public spaces.
- (4). The regeneration of an area requires the preparation and approval of a) preliminary regeneration proposal, b) regeneration programme, and
- (5). Theurban regeneration project.

A basic tool for urban regeneration that was legislated in 1999 aimed to promote integrated urban planning strategies in cities or specific urban areas, which present critical and complex problems of downgrading, social and economic cohesion, and environmental degradation, while in 2012 the first efforts for urban regeneration according to this framework were activated.

Despite the long-term evolution of the regeneration framework, so that the interventions in the area are comprehensive and include beyond the interventions in the physical space and actions for the social and economic dimension, to date most of the regenerations are fragmentary limited to reforms of public space. Urban regeneration projects are mainly carried out by the public sector, with the private sector remaining inactive as no public-private partnership renewals have been carried out to date (Yiannakou and Vlahvei 2014). Another important weakness of the urban regeneration projects is the complex and time-consuming procedures for their implementation, which are also one of the reasons for their very limited application.

Regarding participation, which is a key parameter of urban resilience, even though participation and consultation procedures are foreseen for by the existing institutional framework of regeneration, these are evaluated as fragmentary and selective. A representative example is the Syntagma public square, the most central area of Greece's capital which has been recently been regenerated (Fig.3.) without any consultation process

Figure 3: The Syntagma square after the recent regeneration.

Also, while efforts have been made in recent years with the contribution of new technologies to strengthen citizens' participation in planning, a significant portion of them appear skeptical about the implementation of the procedures and their actual inclusion in the procedures. Nevertheless, it is important to mention that in some cases informal participation of agencies was evaluated as successful in shaping the objectives of a regeneration project. Based on the above and taking into consideration that the achievement of resilient cities requires a flexible framework of integrated interventions, it is important to form a framework that will be based on the inclusion of citizens and will encourage cooperation between the public and private sectors, with less time-consuming and simplified procedures based on the public interest.

2.2 Land uses planning framework

In Greece, since the establishment of the Greek state, the plans that were legislated, defined the positions of public open spaces and public buildings, leaving the rest of the space available for other uses.

The Presidential Decree legislated in 1987 (P.D.166/D/1987-Categories and Content of land uses) has been decisive for Greek cities urban development as it defined groups-categories of urban functions that could be developed in urban areas. The trend of creating multifunctional zones and encouraging the coexistence of activities that show compatibility both with each other and with the urban space is evident in this legislation. From its application, several issues arose in relation with the possibility to regulate land uses as in many cases the freedom that was provided made the plans ineffective. A characteristic example is in the urban area of Chania, where the urban centers that were proposed (Fig.4.) in a nucleus form were not implemented but were developed in a linear form (Fig.5).

Figure 4: The proposed land use development in Chania in 1988
(The urban centers are shown with red color)

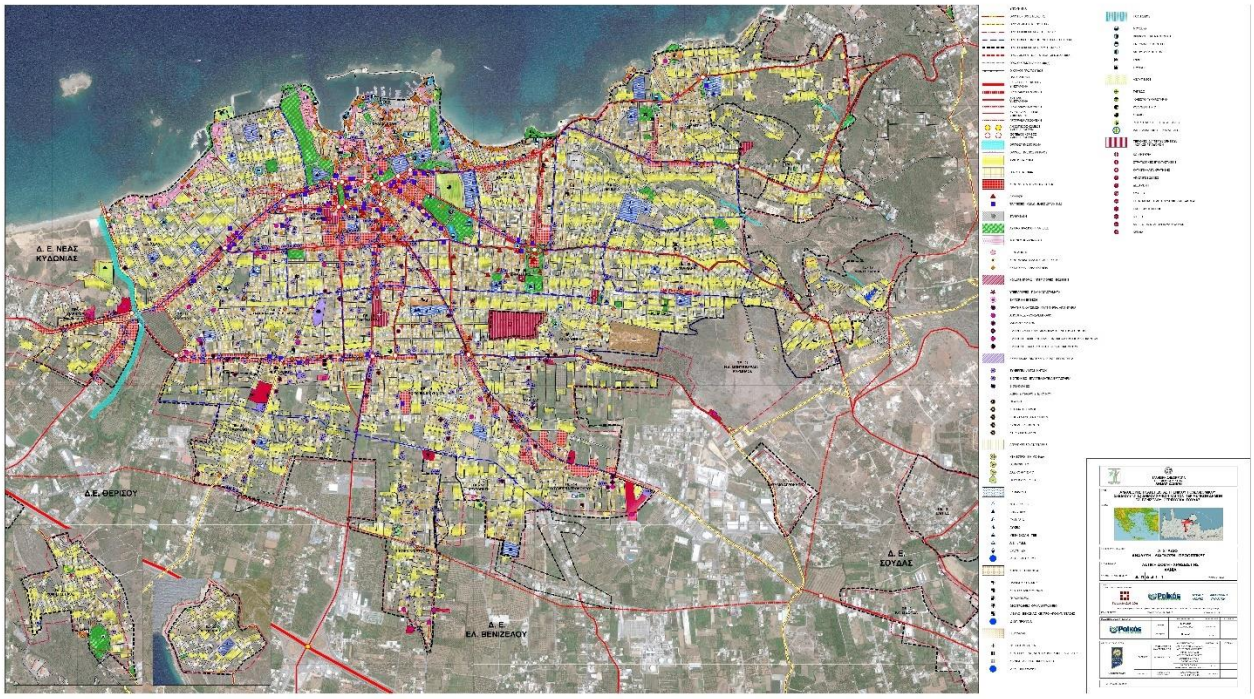

Figure 5: The existing urban centers allocation in 2015
(The urban centers are shown with red color)

2.3 Sustainable urban mobility plans and urban resilience.

Until recently, traffic planning was not an institutional obligation, so it was limited and fragmental. Sustainable Urban Mobility Plans have developed in recent years at a significant pace in European cities. In Greece, policies for the promotion of walking, the development of a bicycle and mass transport network and the reduction of vehicle traffic were recently promoted.

The Sustainable Urban Mobility Plans were gradually introduced in Greece since 2015, and officially legislated in 2021.

Their basic aim Purpose the creation of sustainable urban transport systems with effective utilization of urban space and existing infrastructure and transport services through:

- Strengthening public transport.
- Promoting pedestrians, bicycles, and light personal electric vehicles.
- Ensuring accessibility, safety, and protection in the transport network for users, with care for disabled people.
- Promoting road safety of road users including people with disabilities.
- Reducing of car traffic, mainly for private use.
- Promoting electromobility and alternative fuels in the transport sector.
- Organizing parking.
- Using new technologies to improve the use of the road network, support the combined use of means of transport and the planning of urban transport.

These plans are based on the principles of sustainable mobility, cooperation between the competent institutional authorities, the participation of citizens and all interested parties. They include mechanisms for monitoring and evaluating their performance, while the measures they propose are integrated into the individual sectoral policies.

Today in Greece, in many cities of different scales, Sustainable Urban

Mobility Plans are being prepared. From the experience gained so far, weaknesses are observed in relation to the multi-disciplinarity that should characterize these Plans. An important parameter that determines urban mobility is the distribution of urban functions defined through urban planning. Based on the existing framework, these plans are not coordinated with the Urban Plans, so they propose piecemeal traffic interventions that are not aligned with the uses that cause them.

2.4 Spatial governance in the planning of Greek cities.

Governance is defined as the coordination between the various levels of an administrative structure. Spatial governance is based on the participation of stakeholders and citizens in the application of spatial policies. In Greece, spatial governance takes place in the context of development policy planning, and it involves many different bodies that are connected vertically and horizontally.

The period of economic crisis was the reason for the revision of the development model and consequently of the spatial planning system. New tools and procedures were established for the exploitation of public and private real estate and new forms of tourism infrastructure were introduced, promoted with fast-track procedures to create favorable conditions for investments. These procedures have a limited application, they are not aligned with the existing framework, but they are more flexible to be able to satisfy the investor's needs. This framework was strongly criticized as it can lead to the circumvention of the existing planning and transfer the regulation of the space to policy makers without considering the expectations and disagreements of the citizens.

Today, in Greece, the administrative system is structured in such a way that the central administration has a strong role, and the local administration is limited, while civil society has a weak role. Additionally bureaucratic procedures, lack of information, overlapping of responsibilities, and clientelist political relationships create a situation that makes citizens suspicious and limits their participation in governance. This phenomenon results in the shift to informal processes of influencing decisions by some individual groups but also in the development of client relationships between citizens and politicians.

2.5 Participatory processes in the spatial planning system of Greece.

Spatial planning is a complex process which formulates directions and policies for the future development of an area. In recent decades, participative processes have been integrated into the processes of spatial planning so that, on the one hand, the planning will consider the needs of those involved, and on the other hand, it will ensure the consent of the citizens for the proposals that are formulated (Dimelli 2021).

In Greece since 1997 the participatory procedures were included in the spatial planning phases with the participation of Regional and Municipal councils in planning procedures. Until today, the lack of information and the weak promotion of consultation are important parameters that weaken the participation of citizens in spatial planning processes. At the same time, the ambiguities of the framework, and the political interventions have rendered citizens' participation inactive. In this context, it is important to emphasize that participatory processes are a basic condition of urban resilience as they can strengthen the sense of citizens' consensus and promote transparency and democracy in the decision-making process.

3. Urban resilience through the Greek spatial planning system.

Cities are complex systems that must develop characteristics which ensure flexibility, resourcefulness, safe transition to a new situation, responsiveness to change, learnability and dependence on local systems (Simonsen, etal. 2014). To achieve urban resilience, many sectors related to economic social and environmental planning are involved and integrated multi-level actions for the natural and man-made environment are developed.

Spatial planning is a parameter that can contribute to the achievement of urban resilience. The analysis of the spatial planning system of Greece revealed the need for continuous development and adaptation to new conditions. Through direct or indirect processes, efforts are being made to improve the spatial framework to make it more flexible, more efficient, and more participatory.

To link the spatial planning framework of Greece with the goals of urban resilience, the paper proceeds to the linkage of the Greek spatial system goals and actions with the City Resilience Index report issued by the collaboration of ARUP with the Rockefeller foundation (DaSilva, etal. 2014), which was updated in December 2015 (Bhoite, etal. 2015).

The Report refers to twelve objectives for achieving urban resilience, which are divided into four main categories. The first category is about citizens health and well-being within the cities. The second category refers to the economy and society, the third to infrastructure, and the fourth to leadership and strategy formulation.

The targets for developing resilient cities by each category are:

1st category: Health and well-being

1. Cities should provide minimum vulnerability for their residents.

In this context, it becomes necessary to ensure the supply of food, drinking water, the development of energy and drainage networks, as well as the provision of places of refuge. The affordable access to these services is decisive both in normal and in emergency conditions. Through the framework of spatial planning, the infrastructure networks are foreseen, and the places of refuge are ensured, which are implemented through regeneration programs. An important disadvantage is the time-consuming implementation procedures and the lack of citizen participation in the public space planning procedures.

2. Cities should ensure diversity in the livelihood of their residents and provide employment.

Through training, skills development, access to finance and entrepreneurship support, city dwellers can have choices and alternatives in the ever-changing conditions of urban space. Diversity is ensured through the context of land uses, which aims to form multifunctional urban areas. Still the lack of restrictions leads to a laissez faire in land uses allocation.

3. Urban policies should protect the health of their residents through infrastructure and the ability to respond to emergency situations.

Cities must develop health systems that are accessible to all and can also respond to emergency situations, such as in the case of a pandemic. This goal can be achieved through public health infrastructures and services that will contribute to physical and mental health of all social groups and will be planned according to all future possible new situations that can occur. Through spatial planning and traffic planning, the health infrastructures needed for cities and networks are foreseen so that these spaces are immediately accessible. An important weakness of the system is the lack of coordination between urban and mobility planning.

2nd category: Economy and society

4. Cities must develop communities that are active, interconnected and have a strong identity.

These communities support policies that include citizen participation for the development of the city and co-shape their common future. In these processes, the role of social networks and, more broadly, of new technologies, but also of physical planning, as the publics spaces, enhance social cohesion. In this action, the role of public space is important, which could be improved qualitatively and quantitatively through a flexible system for urban regeneration.

5. Cities must promote security and justice.

The goal is to reduce crime and ensure conditions of transparency and security through a system of laws and institutions that operate continuously in normal and emergency conditions. It is important to improve the conditions of spatial governance and strengthen the participation of citizens, which present weaknesses in the spatial planning system of Greece.

6. Cities must develop sustainable economy by attracting capitals investment.

Resilient cities promote infrastructure investment. Through the cooperation of the private and the public sector, infrastructures, cities can better respond to changing economic conditions and lead to long-term prosperity. In Greece still the cooperation between public and private sectors is weak.

3rd category: Infrastructure

7. Cities present reduced exposure to risks.

This objective is based on environmental management, infrastructure development and the institutionalization of regulations with a long-term objective for cities planning. This objective is based on sound environmental management, infrastructure development and the institutionalization of rules and regulations with a long-term objective for the design and operation of cities. Therefore, it is directly related to spatial planning regulations, which have as their main objective the design of

infrastructures and their interconnection. This action requires flexibility in the planning system, interconnection of the different plans and levels of planning and is depending by the participation of the residents, as it should be shaped based on their real needs. Still the above goals are not achieved.

8. They provide essential services.
Cities should develop efficiency of systems through their continuous monitoring and feedback mechanisms. Ensuring the efficiency of the systems is carried out through their continuous monitoring and the development of mechanisms for their feedback. In this context, although all frameworks provide rules for the revision of plans, the mechanisms for monitoring them are not defined.

9. Develop reliable transportation and telecommunications systems.
A key pillar for the development of resilient cities is the development of low-cost intermodal transport systems to achieve connections between people, goods and services. In this context, logistics and freight transport are key pillars for the development of resilient cities. Another important factor is access to new technologies and telecommunications networks that will contribute to the improvement of connection of people and services. Sustainable Urban Mobility Plans are based on the promotion of these principles, but it is important to continuously monitor and evaluate them to effectively contribute to the achievement of this goal.

4th category: Leadership and strategies
10. Ensure effective leadership and management.
Resilient cities must develop decision-making systems and consultation processes that maximize the participation of all stakeholders. Resilient cities develop decision-making systems and consultation processes that maximize the participation of all stakeholders. In this action, the spatial planning system of Greece shows weaknesses, both in the governance systems and in the participation of those involved in the planning process at all stages.

11. Encourage education and enhance research and innovation.
Citizens should have access to information, to be able to respond to the conditions that may arise. At the same time, through the development of networks with other cities, they can exchange good practices and know-how for the development of urban resilience. Research and innovation can contribute to strengthening spatial planning by promoting participation and developing systems for monitoring planning objectives.

12. Develop a comprehensive development plan, which expresses the vision for the city's sustainable future. A key objective is to coordinate and prioritize the actions to achieve resilience, which will include and interconnect all areas related to sustainable development
Finally, a key objective is to coordinate and prioritize the actions to be developed, which will include and interconnect all areas related to sustainable development. In this context, the spatial planning system of Greece shows weaknesses, as the spatial plans are characterized by fragmentation and are not interconnected with each other, but also with the other types of planning, especially the economic one. So it is important to strengthen participation and cooperation, develop more flexible and less

time consuming procedures and promote spatial tools interconnection in order to enhance the existing planning tools and assist to the achievement of urban resilience.

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Demographic regimes and insular populations: the case of the Ionian islands

Abstract:
This paper examines how demographic equilibrium was achieved in the Ionian islands, in the period 1920-2021. This period covers the two-thirds of demographic transition (second and third stage), which for the Ionian islands started in the mid-nineteenth century. In every stage of the transition, changes in mortality and fertility levels tended to destabilize the relationship between population and the limited resources of the islands. Migration is the key factor in understanding the demographic regime of these islands. Either negative or positive (emigration or immigration), population mobility has always been and still is the element that regulates natural increase and determines the real increase of the population. Whenever rates of natural increase were too high, emigration acted as a counterbalancing factor by taking population away from the islands, while when rates of natural increase reached very low levels from the 1970s onwards due to low fertility, immigration came as a substitute.

Keywords: Ionian islands, Demographic Regime, Demographic Equilibrium, Migration, Natural Balance.

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1. Introduction

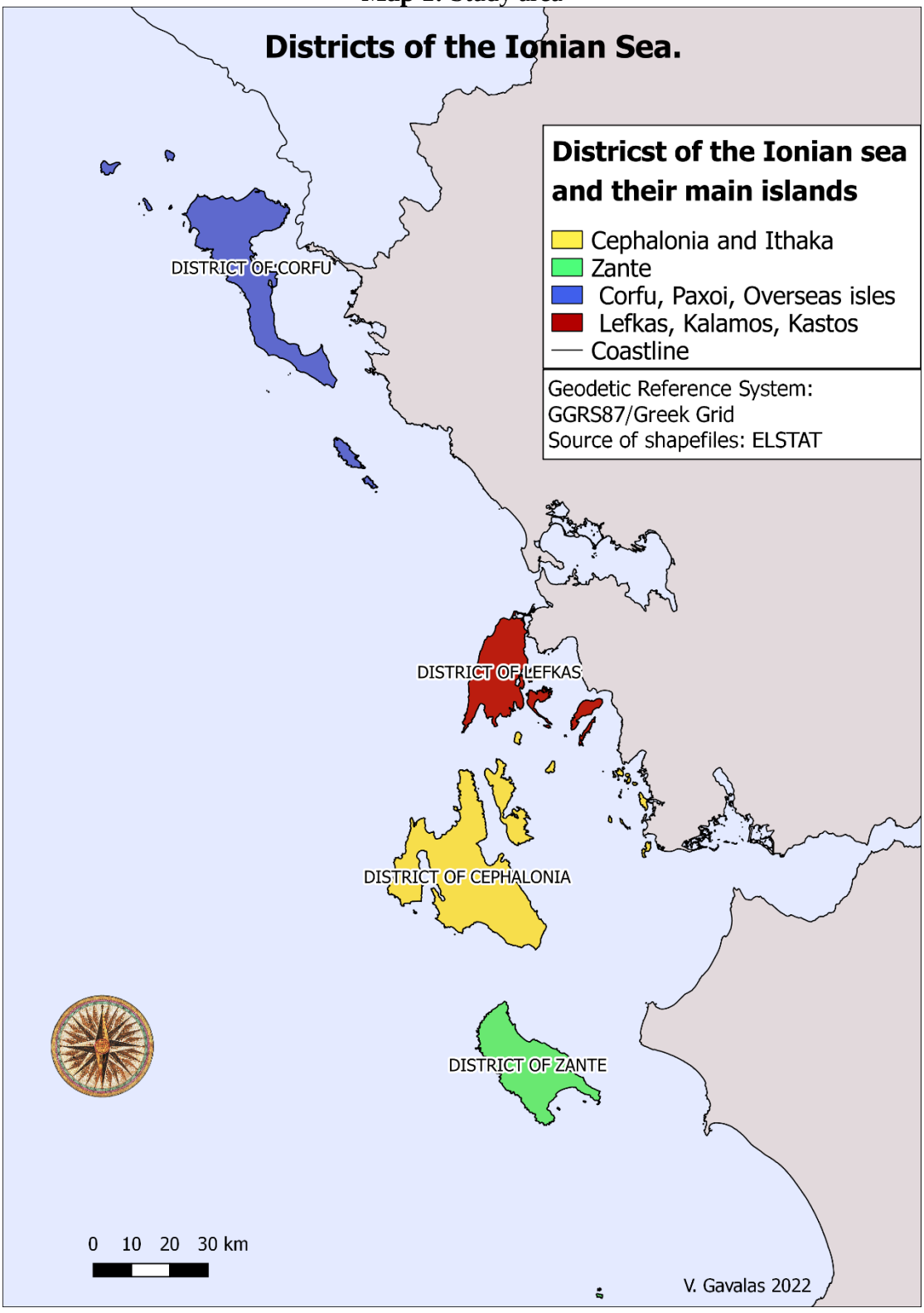
The term demographic regime is commonly used to describe the dynamic relationship between a population and its environment. This relationship determines the standard of living, the quality of life and the very survival of the population. A central concern for those who study demographic regimes is to observe the different ways in which nuptiality, fertility, mortality and migration may combine to keep the size of a given population in pace with the available resources of its ecosystem (Woods 2000:381).

The problem of population size was already from the 18th century related with food production, as we know it today. Indisputably, one of the most influential figures who concerned himself with the question of population and resources was the English economist Thomas Robert Malthus (1766-1834), whose theories still exert an influence in contemporary population studies. He was the main representative of the pessimistic view about population in the 19th century. His central idea was that, when a population is unimpeded its growth rate presents geometrical increase, while resources grow by arithmetical increase only. Food shortage leads to increased food prices and thus real incomes are depressed. This situation brings about "misery" and "vice", which tend to raise mortality and constitute what Malthus called the "positive" check of population growth. Consequently, population growth is restrained either by the "positive" check of high mortality from disease, war or famine or by the "preventive" check of late marriage (and abstinence before it). The main preoccupation of the "Principle of population", as Malthus called his theory, and the one which made it pessimistic, was that population will reach the maximum level of available resources in a very short time (Malthus, 1970). Although Malthus' model was regarded as a naturalistic interpretation of the lower-class degradation in the period of industrial revolution in England, it dominated the studies of demographic regimes and is still considered a classical interpretative framework especially for pre-transitional populations. Nevertheless, Malthus' model may have some relevance only in a closed population system, that is in a population where migration does not play an important role. In the case of islands, migration has always been an essential element of their demography, and therefore Malthus' model cannot be used to describe their demographic system. The fact that migration is integral part of island demography had been observed by early geographers. It is characteristic what one of them wrote at the beginning of the 20th century: "A small cup soon overflows. Islands may not keep; they are forced to give, live by giving. Herein lies their historical significance" (Semple, 1911: 299 quoted in Connell and King, 1999:3).

Yet, islands, as crossroads of sea roots, not only export people but also receive. There are a lot of examples of crossroads islands: The Cyclades in the middle of the Aegean archipelago, Mauritius in the western entrance of the Indian Ocean and Malta at the navel of the Mediterranean are only few examples of islands that, because of their geo-political importance, experienced huge immigration in different periods and developed cosmopolitan and polyglot populations (Gavalas, 2001; Connell and King, 1993).

This study intends to describe and analyze the demographic regime of the Ionian islands during, roughly, a hundred-year period (1920-2021).

Map 1: Study area



2. Data and methods

Primary data were taken from published vital statistics (statistics on the natural movement of the population) and from census returns covering the period 1920-2021. For the period before 1920 the only vital statistics available are those from 1864 (when the Ionian islands were annexed in the Greek State) to 1873 and a sole year, that of 1884. There is no complete time-series of data between two censuses before

1920, and moreover, this intermittent time-series is characterized by great under-registration of the vital events. (Valaoras, 1960:135; Siampos & Valaoras, 1969:602). Therefore, our study of the demographic regime of the Ionian islands will cover the period 1920-2021. Even in this period there are certain years that no vital statistics have been published (1939-1955). On the top of that, the vital statistics published for the early 1920s suffer from errors of coverage, mainly under-registration of births (Valaoras, 1960:135. Siampos & Valaoras, 1969:602).

Therefore, the number of live births for the years 1920-1923 has been corrected upwards, by 1.24 times. This correction coefficient was derived by juxtaposing the estimated number of births by Valaoras for the whole of Greece (Valaoras, 1960:135), with the published ones. For the missing years 1939-1940 and 1951-1955 vital events (births and deaths) were calculated by linear regression taking as independent variable (X) the time and as dependent (Y) the vital events. This method assumes that the number of births and deaths follows a linear trend from one year to the other. By and large, and with some compromise regarding data quality, we have at hand complete time-series of data on the natural movement of the population for the inter-censal periods 1920-1928-1940, and 1951-1961-1971-1981-1991-2001-2011-2021. In the 1940s (more specifically the intercensal period 1940-1951) there is a gap as far as vital statistics are concerned, since there are no published data, and consequently we cannot estimate migratory movements for that period.

The above-described data enabled us to estimate the population of the Ionian islands in an annual basis and to derive the crude rates of births, deaths and net migration for each year of the study period. The method with which the annual population was estimated is laid out in the appendix A. The "residual method" was used to produce migration estimates for inter-censal periods (Papadakis and Tsimpos, 2004). This method calculates the difference between the real and the natural increase of the population between two censuses and bestows this difference to net migration.

3. Migration and population dynamics

The interwar period (1920-1940) was an era of economic and demographic prosperity, as the population was increasing and reached the same levels as in the beginning of the 20th century, that is more than 250,000[2]. The growth rate of the population, however, decreased in the 1930s because of the out-migration from the Ionian islands. More specifically, 6.3% of the population left the islands between 1928 and 1940 (table 1). This net out migration comes in contrast with the net in-migration that was registered in the 1920s. A major event that changed the ethnic and demographic structure of the population of Greece in that era was the influx of refugees from Asia Minor that flooded the country in 1922-23. However, the number of refugees that reached the Ionian islands was too small to have a perceptible impact on the demographics of the islands: only 1.4% of the population of the Ionian islands were refugees in 1928 (according to the census of that year), while in Greece refugees made up almost 20% of her population. Nevertheless, the slight net in-migration that is observed in the Ionian islands in the 1920s (table 1) is likely to have been due to the coming of these refugees.

From 1928 to 1981, the Ionian islands were characterized by a continuous stream of out-migration. In the 1980s this trend was reversed, rather abruptly, and, as a result, in the 1980s and the 1990s a significant in-migration is registered in the

[2] The population of the Ionian islands was 254,494 in 1907, according to the relevant census. For the rest of the years see table 1.

Ionian archipelago, reaching 8% and 10% of the mid-population in those decades (table 1). From the 2000s onwards net migration continuous to be positive, but the rate of in-migration is much smaller than in the 1980s and the 1990s. People who came in the 2000s made up 1.5% of the mid-population in the decade, while migrants who came in the 2010s (2011-2021) constituted 0.5% of the total population of the Ionian islands.

Table 1: Indirect measurement of net migration in the Ionian islands; 1920-2021

Date of census (t)	**Population (P)**	**Real increase P_{t+n}-$P_{t=}$(1)**	**Natural increase $B_{(t,t+n)}$-$D_{(t,t+n)}$=(2)**	**Net migration (1)-(2)=(3)**	Net migration as % of total population $\frac{(3)_t}{\bar{P}_{(t-n,\ t)}} * 100 = (4)$
1920	224189				
1928	241488	17299	15778	1521	0.7
1940	250626	9138	24542	-15404	-6.3
1951	228597				
1961	212600	-15997	22651	-38648	-17.5
1971	184443	-28157	9048	-37205	-18.7
1981	182333	-2110	175	-2285	-1.2
1991	193734	11401	-4288	15689	8.3
2001	209608	15874	-3743	19617	9.7
2011	207855	-1753	-4815	3062	1.5
2021	200726	-7129	-8084	955	0.5

Source: births and deaths have been taken from annual official publications: Ministere de l' economie nationale 1924-1939; Statistique Generale de la Grece 1931-40; NSSG 1954, 1955a-1998a; Digital library of the Hellenic Statistical Authority (ELSTAT). (ELSTAT). Population figures have been taken from census returns.
Note: De facto population figures were used from 1920 to 1991. From 2001 to 2021 population census returns refer to permanent population.

Zante was losing population due to migration from 1920 to the 1970s (table 2). In the 1980s Zante started receiving population, instead of sending out, and the migration balance has a positive sign (net in-migration) until nowadays (2021). What is noteworthy in the population course of Zante is that the natural increase was negative (more deaths than births were registered) only in the 1980s and in the 2010s. This comes in contrast with the rest of the Ionian islands, where natural balance was negative all over the period 1981-2021. This is attributed partly to the higher fertility rates of the population of Zante (Gavalas, 2022) and partly to the younger age structure of her population. Indicatively, in 2011 there were 113 elderlies (65+) per 100 children (0-14) in Zante, while this ratio in the rest of the Ionian islands was more than 150.

Table 2: Indirect measurement of net migration in the District of Zante; 1920-2021

Date of census (t)	Population (P)	Real increase P_{t+n}-P_t=(1)	Natural increase $B_{(t,t+n)}$-$D_{(t,t+n)}$=(2)	Net migration (1)-(2)=(3)	Net migration as % of total population $\frac{(3)_t}{\bar{P}_{(t-n,\ t)}} * 100 = (4)$
1920	37482				
1928	40492	3010	3451	-441	-1.1
1940	41165	673	4826	-4153	-10.2
1951	38062				
1961	35500	-2562	5465	-8027	-21.8
1971	30187	-5313	2039	-7352	-22.4
1981	29862	-325	495	-820	-2.7
1991	32557	2695	-273	2968	9.5
2001	38883	6326	91	6235	17.5
2011	40759	1876	475	1401	3.5
2021	40508	-251	-357	106	0.3

Source: births and deaths have been taken from annual official publications:
Ministere de l' economie nationale 1924-1939; Statistique Generale de la Grece 1931-40; NSSG 1954, 1955a-1998a;
Digital library of the Hellenic Statistical Authority (ELSTAT). Population figures have been taken from census returns.
Note: De facto population figures were used from 1920 to 1991. From 2001 to 2021 population census returns refer to permanent population.

Corfu[3] registered a net in-migration of considerable size in the 1920s (4.6% of its mid-decade population were migrants), but from 1928 to 1971 the island was losing population due to out-migration in high rates (table 3). For the 1940s there are not data on vital statistics. Nevertheless, given the fact that natural balance was most likely positive (as it was in the pre-war years and in the post war period up to the 1970s), the population decline from 1940 to 1951 was, by all odds, due to net out-migration. The population hemorrhage of Corfu stopped in the 1970s, earlier than in the rest of Ionian islands, since in that decade Corfu recorded a net in-migration, which continued in the 1980s and the 1990s. Yet, in the 2000s (2001-2011) net migration became negative (net out-migration), something that is not observed in the rest of the Ionian islands. In the last decade of the examined period (2011-2021) Corfu becomes once more an island that receives more people than it sends away (table 3). Nevertheless, this net in-migration is not enough to outbalance the negative natural balance (the preponderance of deaths over deaths) and therefore, the population of Corfu is in continuous decline from 2001 onwards.

[3] The District of Corfu consists of the islands of Corfu, Paxoi, Antipaxoi and three small, inhabited islands in the north of Corfu (Othonoi, Erikoussa, Mathrakoi) known as Overseas islands (Diapontioi nisoi).

Table 3: Indirect measurement of net migration in the District of Corfu; 1920-2021

Date of census (t)	**Population (P)**	**Real increase P_{t+n}-$P_{t=}$(1)**	**Natural increase $B_{(t,t+n)}$-$D_{(t,t+n)}$=(2)**	**Net migration (1)-(2)=(3)**	Net migration as % of total population $\frac{(3)_t}{\overline{P}_{(t-n,\ t)}} * 100 = (4)$
1920	96373				
1928	106251	9878	5218	4660	4.6
1940	111548	5297	9152	-3855	-3.5
1951	105414				
1961	101800	-3614	8677	-12291	-11.9
1971	92933	-8867	4284	-13151	-13.5
1981	99620	6687	1369	5318	5.5
1991	107592	7972	-1146	9118	8.8
2001	111081	3489	-1880	5369	4.9
2011	104371	-6710	-2419	-4291	-4.0
2021	99847	-4524	-4999	475	0.5

Source: births and deaths have been taken from annual official publications:
Ministere de l' economie nationale 1924-1939; Statistique Generale de la Grece 1931-40; NSSG 1954, 1955a-1998a;
Digital library of the Hellenic Statistical Authority (ELSTAT). Population figures have been taken from census returns.
Note: De facto population figures were used from 1920 to 1991. From 2001 to 2021 population census returns refer to permanent population.

The District of Cephalonia (it consists of the islands of Cephalonia and Ithaca) followed the fate of the rest of the Ionian islands as far as population mobility is concerned. It was losing population from 1920 to 1980, while from the 1980s onwards it was converted from a sending to a receiving island regarding net migration. Within a century (1920-2021) it lost 41.3% of its population (table 4). Moreover, population decline until the 1960s was exclusively due to out-migration. From the 1970s onwards, as the rate of out-migration slows down and eventually turns to net in-migration, the negative natural balance is responsible for the population decline. In 1972 more deaths than births were recorded for the first time, and from there on the annual balance of vital statistics is always negative.

Table 4: Indirect measurement of net migration in the District of Cephalonia; 1920-2021

Date of census (t)	Population (P)	Real increase P_{t+n}-P_t=(1)	Natural increase $B_{(t,t+n)}$-$D_{(t,t+n)}$=(2)	Net migration (1)-(2)=(3)	$\frac{(3)_t}{\bar{P}_{(t-n,\ t)}} * 100 = (4)$
1920	64215				
1928	66414	2199	4292	-2093	-3.2
1940	66849	435	6430	-5995	-9.0
1951	47369				
1961	46300	-1069	5619	-6688	-14.3
1971	36742	-9558	1518	-11076	-26.7
1981	31150	-5592	-1282	-4310	-12.7
1991	32474	1324	-1864	3188	10.0
2001	37756	5282	-1434	6716	19.1
2011	39032	1276	-654	1930	5.0
2021	37698	-1334	-1436	102	0.3

Source: births and deaths have been taken from annual official publications:
Ministere de l' economie nationale 1924-1939; Statistique Generale de la Grece 1931-40; NSSG 1954, 1955a-1998a;
Digital library of the Hellenic Statistical Authority (ELSTAT). Population figures have been taken from census returns.
Note: De facto population figures were used from 1920 to 1991. From 2001 to 2021 population census returns refer to permanent population.

Lefkada is the island of the Ionian Sea that lost the most population (both in absolute numbers and a percentage of its population). In the 1950s alone, more than 11,600 inhabitants (35% of its population) left Lefkada to seek a better life in the urban centers of mainland Greece or abroad. Nevertheless, from the 1980s onwards in-migration is bringing population in Lefkada, and a small population growth was recorded in the 1990s and the 2000s. In pre-war years and up to the 1950s, though the net migration was negative, the population was growing because of the great natural increase (table 5).

Table 5: Indirect measurement of net migration in the District of Lefkada; 1920-2021

Date of census (t)	**Population (P)**	**Real increase P_{t+n}-P_t=(1)**	**Natural increase $B_{(t,t+n)}$-$D_{(t,t+n)}$=(2)**	**Net migration (1)-(2)=(3)**	$\frac{(3)_t}{\bar{P}_{(t-n,\ t)}} * 100 = (4)$
1920	26119				
1928	28331	2212	2817	-605	-2.2
1940	31064	2733	4134	-1401	-4.7
1951	37752				
1961	29000	-8752	2890	-11642	-34.9
1971	24581	-4419	1207	-5626	-21.0
1981	21701	-2880	-407	-2473	-10.7
1991	21111	-590	-1005	415	1.9
2001	21888	777	-1264	2041	9.5
2011	23693	1805	-885	2690	11.8
2021	22673	-1020	-1291	271	1.2

Source: births and deaths have been taken from annual official publications:
Ministere de l' economie nationale 1924-1939; Statistique Generale de la Grece 1931-40; NSSG 1954, 1955a-1998a;
Digital library of the Hellenic Statistical Authority (ELSTAT). Population figures have been taken from census returns.
Note: De facto population figures were used from 1920 to 1991. From 2001 to 2021 population census returns refer to permanent population.

4. Demographic regimes and insular populations

The term "demographic transition" was used to describe the changes that took place in historical Europe from the 18th century onwards. According to this theory pre-industrial societies, with high fertility and mortality and consequently a low rate of population growth (stage one), are followed by transitional societies in which mortality begins to decline but fertility remains high, so that considerable population growth ensues (stage two). Finally, after a time lag, fertility also declines leading to contemporary developed societies with low fertility and mortality and a low rate of population growth or even stationary populations (stage three). The theory implies that the entire process of demographic transition was unfolded in three stages, each one of which is associated with a certain level of economic development (Tsaousis, 1986. Tapinos, 1993).

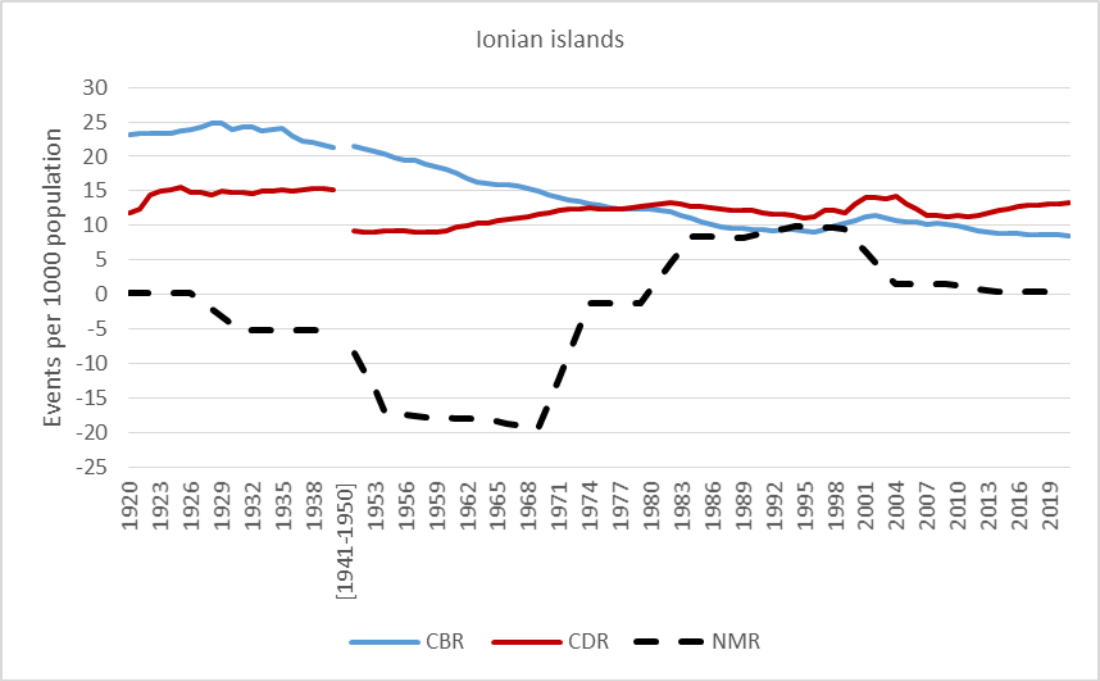
Nevertheless, even though the theory of demographic transition associates changes in mortality and fertility with economic development, it does not take into account population mobility, which in many cases, and most certainly in the case of the Ionian islands, is indivisible from this development. In the relevant literature, there is the hypothesis of mobility transition (Zelinsky, 1971) that tries to relate different stages of migration (as this was experienced by West-European countries again) with the stages of demographic transition. According to this theory in pre-transitional societies, where both mortality and fertility are high and the growth rate of population is very low, mobility is limited and insignificant. In transitional societies, where mortality begins to decline but fertility remains high so that considerable population

growth ensues, extensive internal and international migration moves take place. Finally, according always to Zelinsky's theory, when fertility declines, leading to contemporary developed societies with low fertility and mortality levels and low rate of population growth, the volume of migration is reduced, and population mobility is restricted within the frame of rural to urban moves.

Although this theory has been devised to fit the historical experience of west-Europe, and even there, is not completely applicable, we have formulated a series of figures to test whether Zelinsky's theory is relevant to the Ionian islands and to better understand the role of migration in the demographic system of the island populations.

In pre-transitional populations the crude rates of births and deaths oscillated at 35-40‰. When conditions were favorable (i.e. when there was no major epidemic, or famine or war or a combination of all these plagues), births were slightly more numerous than deaths and, therefore, populations were growing with a slow pace. Nevertheless, very often, pre-transitional populations were decimated by plagues and pestilence, with mortality rates exceeding 50‰, thus making population growth a very slow and agonizing procedure (Tapinos, 1993). This was the "old demographic regime" (or the first stage of demographic transition) that characterized all populations before the 18th century.

Figure 1: Net migration (NMR), births (CBR) and deaths (CDR) per 1000 population in annual basis (moving 5-year average). Ionian islands 1920-1940, 1951-2021.

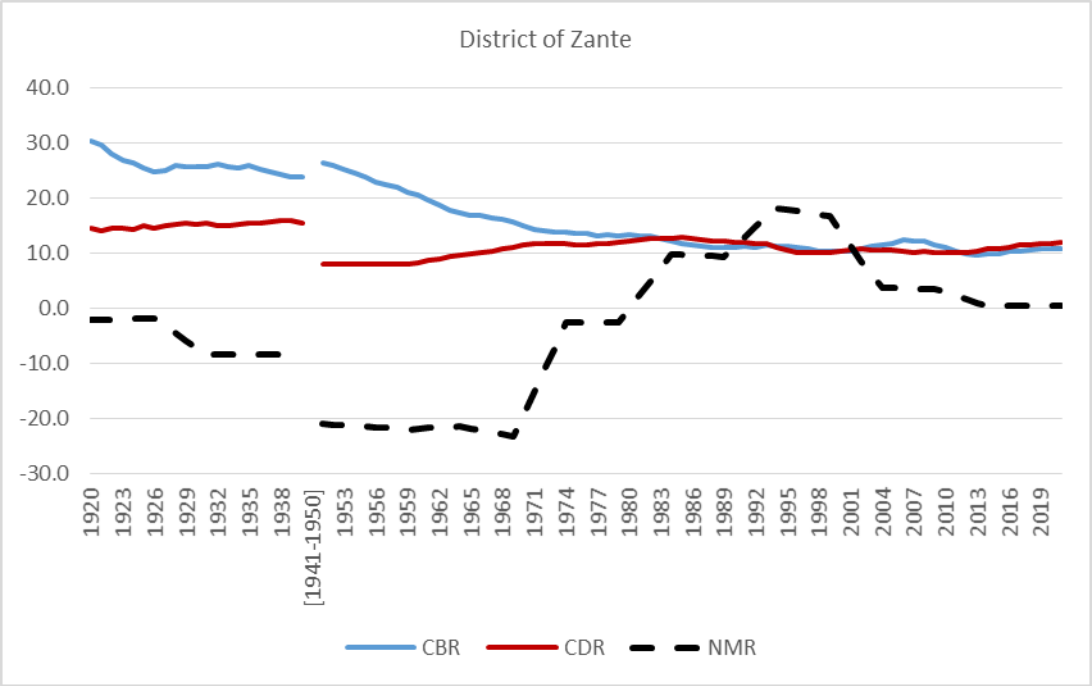


Source: table A.1

By looking at figure 1, it is obvious that in the 1920s the Ionian islands were already in the second stage of demographic transition. In the mid-1920s there were approximately 25 births per thousand population and only 15 deaths. This level of crude rates imply that mortality had started to decline in the 19th century and fertility had started its descending course most probably in the beginning of the 20th century (see also Siampos and Valaoras, 1969). The excess of births over deaths (which characterizes populations in the second stage of the transition), was quite big in the 1920s and continued that way even in the first post-war decades. The rate of natural increase (the difference between CBR and CDR) was more than 10‰ in the early

1950s and stopped being positive in the 1970s. What inhibited the real increase of population from the 1920s until the early 1970s, was out-migration from the islands. In the 1930s, outmigration was still in relatively low levels (approximately 5 out of 1000 inhabitants left Ionian islands annually). Yet, after WWII out-migration increased spectacularly, accumulating to NMR of 20‰ annually in the end of the 1960s. Had this rate of out-migration been continued in the 1970s, the islands would have been led to a depopulation of unprecedented rate. However, out-migration stopped and, instead, a wave of in-migration started when natural increase became stably negative (more deaths than births). Crude rates of births and deaths met each other for the first time in the mid-1970s (at around 12‰) and from thereon, the excess of deaths over births became a permanent characteristic of the Ionian islands. Net migration becomes positive in the 1980s and peaks in the 1990s, when in-migration reaches 10‰ of the population annually. Since 2000 in-migration loses its former momentum. In the decade 2011-2021 net migration is slightly positive (0.5‰) but it is unable to outbalance the negative natural increase (which oscillates at -4.5‰)

Figure 2: Net migration (NMR), births (CBR), and deaths (CDR) per 1000 population in annual basis (moving 5-year average). District of Zante 1920-1940, 1951-2021.

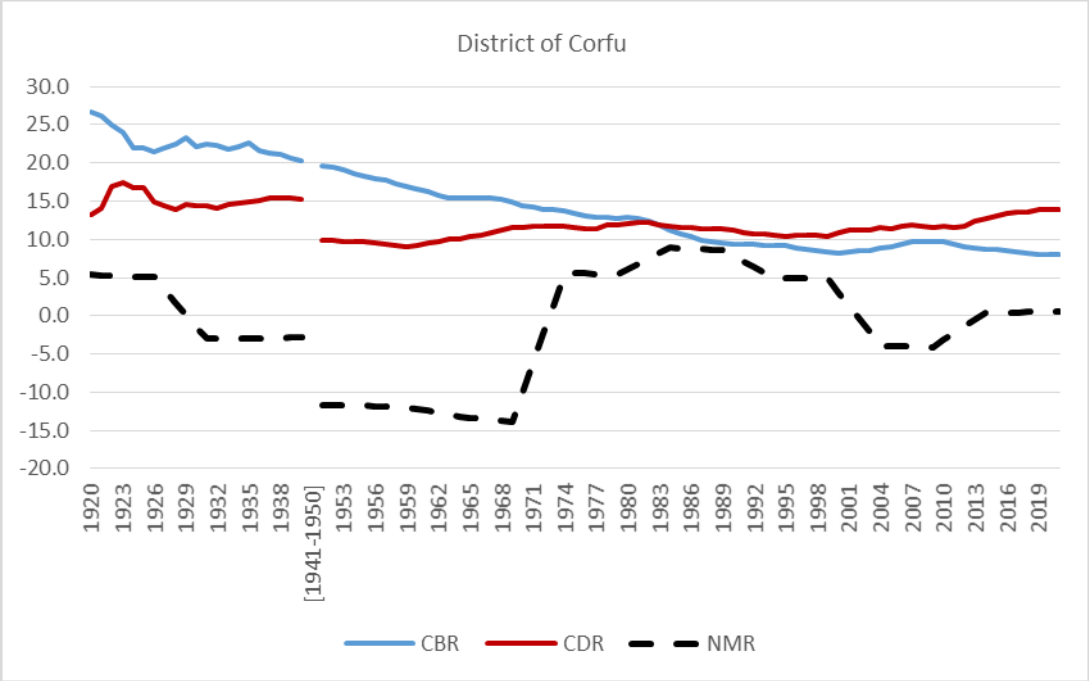


Source: calculations based on vital statistics and census returns (see appendix A).

As far as the island of Zante is concerned the trends in its demographic equilibrium during the 100 years of the examined period (1920-2021), are similar to the Ionian islands as a whole, but with one exception: a) fertililty was at higher levels from the rest of the Ionian islads, both in pre-war and in post war years (figure 2). Even in the 21st century the Crude Birth Rate in Zante has not fallen lower than 10‰, while the average for the Ionian islands was 8‰ (it is even lower in certain islands). b) In-migration rate in the 1990s was 20‰, while the maximum in-migration rate in the Ionian islands (as a whole) was 10‰ (recorded again in the 1990s. These two factors (higher CBR coupled with a higher positive NMR may explain why Zante is

the only District of the Ionian that enumerates more population in the end of the examined period (2021) than in the beginning of it (1920).

Figure 3: Net migration (NMR), births (CBR), and deaths (CDR) per 1000 population in annual basis (moving 5-year average). District of Corfu 1920-1940, 1951-2021



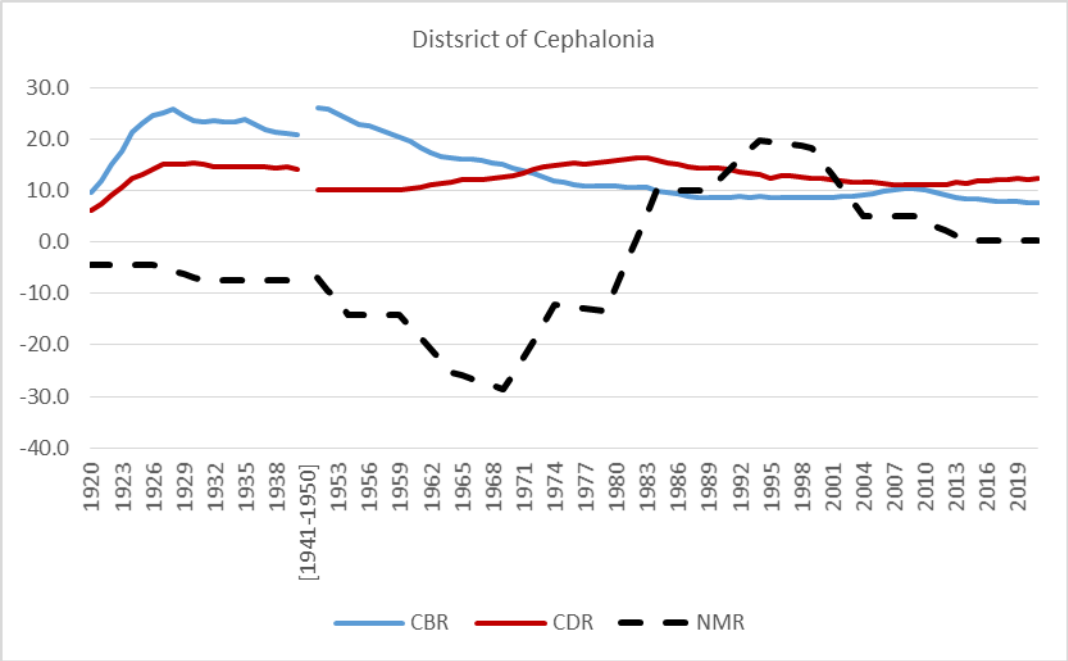
Source: calculations based on vital statistics and census returns (see appendix A).

Corfu most probably experienced the demographic transition earlier than the rest of the Ionian islands. In the 1920s CBR was already smaller than 25‰ and it was fast descending (figure 3). Another characteristic of Corfu is that it has not experienced population mobility with the same intensity as the rest of the Ionian islands. Out-migration assumed its greatest rate in the end of the 1960s, as in the rest of the islands, but in Corfu never exceeded 14‰ annually, while in most of the islands exceeded 20‰ and even in some of them even (Cephalonia and Ithaka) 30‰. A proposed explanation is that the city of Corfu, being the largest urban center in the Ionian see, managed to restrain the population on the island and therefore the out-migration rate was lower than in the rest of the islands. Out-migration in Corfu was converted to in-migration as early as 1974. Nevertheless, in-migration in Corfu never exceeded 9‰, which is less than that of the rest of the Ionian islands. It peaked in the mid-1980s (a decade earlier than in the rest of the islands) and, paradoxically, it became again out-migration in the 2000s. In the 2010s a slight in-migration rate was recorded (0.5‰)

Net migration rate in the District of Cephalonia assumed a greater range during the examined period: it oscillated between -30‰ and 20‰, while in the Ionian islands (as a whole) it ranged from -20‰ to 10‰. It seems that Cephalonia and Ithaka (the two main islands that constitute the District of Cephalonia) were hit by the out-migration stronger than the rest of the Ionian. The extreme values are situated at specific periods: in the end of the 1960s the greatest out-migration rates were recorded both in Cephalonia and in the rest of the islands, and in the 1990s the greatest in-migration rates are recorded in every island as well. Even though in-migration was

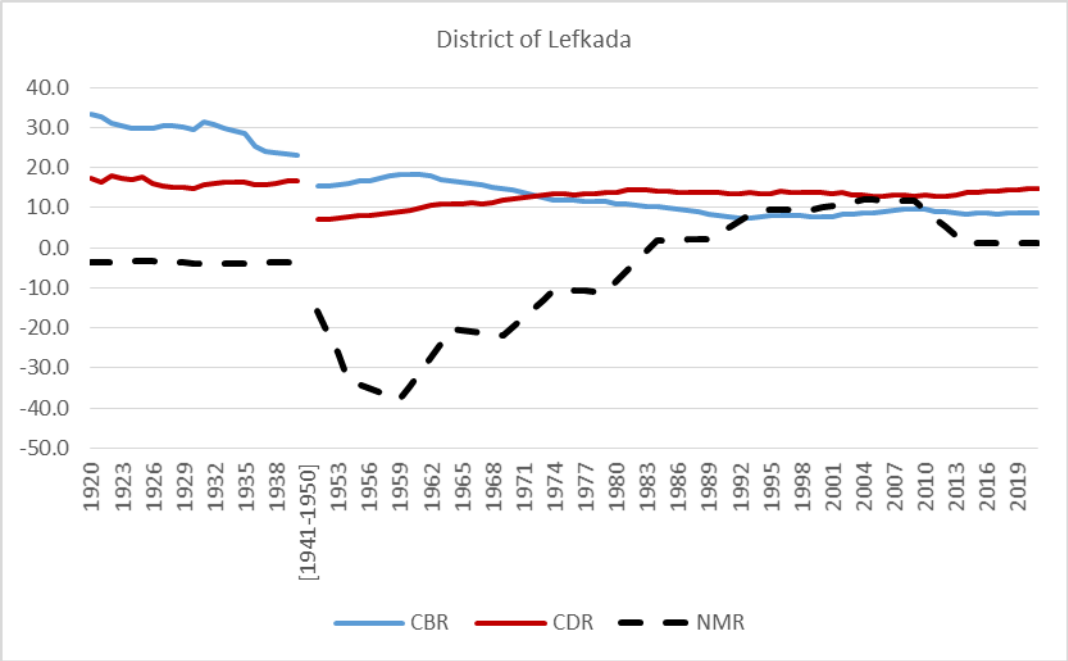
recorded with high rates in the 1980s and the 1990s in the District of Cephalonia, the negative natural balance has not let the population recover to the pre-1960s levels.

Figure 4: Net migration (NMR), births (CBR), and deaths (CDR) per 1000 population in annual basis (moving 5-year average). District of Cephalonia 1920-1940, 1951-2021.



Source: calculations based on vital statistics and census returns (see appendix A).

Figure 5: Net migration (NMR), births (CBR), and deaths (CDR) per 1000 population in annual basis (moving 5-year average). District of Lefkada 1920-1940, 1951-2021.



Source: calculations based on vital statistics and census returns (see appendix A).

Lefkada seems to have been the outlier as far as demographic transition in the Ionian islands is concerned. In the 1920s crude fertility rates did not fall lower than 30‰, implying that birth control was not practiced by the majority of the Lefkadians. On the other hand, mortality had already dropped to low levels for that era (CDR did not exceeded 18‰), but it was still high compared with the rest of the Ionian islands, which recorded a CDR of 15‰ on average in the 1920s. A far as population mobility is concerned, Lefkada was losing population since the 1920s, but out-migration became very intense in the 1950s. In 1959, 38 out of 1000 Lefkadians left their island. It is noteworthy that, while in the rest of the Ionian islands the peak of out-migration was recorded in the late 1960s, in Lefkada this happened a decade earlier. This does not mean that in the 1960s Lefkada had lower rates of out-migration than the rest of the islands. Out-migration from Lefkada continued to be in high levels in the 1960s (-20‰) and even in the 1970s (-10‰). Fortunately for the island, the migration current is reversed in the 1980s and population is coming to Lefkada. The in-migration rate peaked in the 2000s (a decade later than in the rest of the islands) and dropped in the 2010s from 12 ‰ to 1.2‰ annually.

5. Discussion

Trying to discover any relationship between the stages of demographic transition and the fluctuations of migration, it was found that Zelinsky's theory does not completely apply to our population, although some aspects of the theory are valid. The available data for the Ionian islands show a population that in the 1920s was already well ahead in the second stage of demographic transition; that is the stage where mortality had declined considerably from pre-transitional levels and fertility had also started declining but it was still high leading to a positive natural increase. This natural increase would have led to a population surplus unbearable for the limited resources of the islands, had it not been for the out-migration. Yet, in those early years (the 1920s) net migration was slightly negative (more people were leaving the Ionian islands than coming to them) in all but one island: that of Corfu, where net in-migration is recorded in the 1920s. In the 1930s population net out-migration was recorded in every island (including Corfu) and people were leaving the islands in increasing waves up to the early 1970s. Population started declining from the late 1940s onwards, and more so when out-migration was coupled with a deficit of births (negative natural balance) from the mid-1970s onwards. This would have led to massive de-population of the islands, had it not been for migration, in the form of in-migration this time. Since the 1980s (since the 1970s for Corfu), net in-migration put a brake on the population decrease and, in some cases, it gave the islands a demographic revival.

Conclusively, migration is the key factor in understanding the demographic regime of these islands. Either negative or positive (emigration or immigration), population mobility has always been and still is the factor that regulates natural increase and determines the real increase of the population. Whenever rates of natural increase were too high, emigration acted as a counterbalancing factor by taking population away from the islands, while when rates of natural increase reached very low levels from the 1970s onwards due to low fertility, immigration came as a substitute.

APPENDIX A
Population estimates for intercensal periods: an example.

Several methods can be applied to produce population estimates for intercensal periods. The most common is the one that calculates population estimates based on natural increase. To apply that method the population enumerated at a census is used as base population, say that of 1920. However, Greek censuses did not take place at the same date of the year. Thus, the assumption will be made that all censuses have taken place on December 31 of the relevant year and consequently, population estimates refer to the end of the year in question. This is a compromise, which is not expected to bias population estimates seriously since the population size does not change substantially within a calendar year unless extraordinary events happen.

To estimate the population of the next year, that is, 1921, one adds the natural increase of 1921 to the base population. The product is the estimated population at end-1921, which becomes in its turn the base population for the estimation of the 1923 population. The same calculation is repeated for each year of the intercensal period. This procedure can be expressed with the following formula: $P_t=P_{t-1}+(B_t-D_t)$ where P represents population at end-year, t denotes the year, B the births and D the deaths. This procedure will be called here "the forward method" for population estimates. The disadvantage of this method is that it does not allow for net migration. Yet, as shown in the main text of the paper, a great volume of migration characterized the Ionian islands all over the study period, thus making population estimates based only on natural increase a misstatement of the real population.

To take into account net migration a modified method has been employed for the estimation of the population. This method consists of three stages: a) One computes the population of, say, 1928 (which a census year) based only on the natural increase that took place throughout the intercensal period 1920-1928, using as base population that at the 1920 census. At the same time, one produces annual population estimates by the "forward method" as described in the previous paragraph. b) One takes the differences between the estimated population of 1928 and the actual population of 1928 to obtain the net migration that occurred in the intercensal period 1920-1928. c) The assumption is then made that net migration has been evenly spread throughout the intercensal period and the annual population found with the "forward method" is corrected to reflect this. The results of this procedure, together with a more schematic explanation of the method, are presented in tables A.1. For the purposes of this study this computational procedure can be called "the method of evenly spread migration".

This method has been used for the estimation of the population in all four Districts of the Ionian islands (Zante, Corfu, Cephalonia, Lefkada). However, in table A.1 only the estimates for the Ionian islands as a whole are shown as an example. Actual population figures (as enumerated by censuses) are presented in bold characters and are used as base populations for the calculation of the intercensal figures. For years that vital events are missing, that is, for the years 1939-1940 and 1951-1955, births and deaths have been estimated by extrapolation, as detailed in notes attached to table A.1.

Before looking at the following tables one should bear in mind the subsequent points. The method of "evenly spread migration" attributes every difference between the expected population and the enumerated one to migration. This would have been the case, had the registration of vital events and the enumeration of censuses been a hundred percent complete. However, even overlooking the deficiencies of the censuses, one of the main problems with Greek data for the period prior to the mid-

1950s is the under-registration of births, which was more acute in the early years of the 1920s (Valaoras, 1960:135). That is why the number of births for the years 1920-23 has been corrected upwards, as detailed in the section "Data and methods".

Nevertheless, even if under-registration of births does not bias highly the estimates of natural increase, one still would have to bear in mind the deficiencies of the censuses. Greek censuses prior to 1928 have been found to under-state the actual population (especially so far as infants and females are concerned). Moreover, the degree of under-enumeration differs from one census to another (Valaoras, 1960:116-118; Gavalas and Baltas, 2021). In general, the deficiencies of the population statistics, as assessed in the previous paragraphs, are expected to produce population estimates that are biased downwards. In turn, estimates of net migration will be biased downwards in the case of net emigration (i.e. they will show less people leaving) and upwards in the case of net in-migration i.e. (they will show more people coming). In any case the estimated populations presented in the following tables are a gross approximation of the actual ones because their purpose is not to be taken as population estimates per se, but as material from which one can calculate series of crude birth and death rates. Estimates of annual net migration are also an approximation to the issue, a necessary compromise in lack of good quality population statistics. Imperfect as this set of population estimates may be, it nevertheless provides some insight into the dynamics and the mobility of the examined populations.

Table A.1: Population estimates at end-year for the Ionian islands by using the method of evenly spread migration; 1920-1940 and 1951-2021.

Year t	Births B	Deaths D	Forward method $P_t=P_{t-1}+(B_t-D_t)$	Annual net migration M_t	Estimated population $P_t=P_{t-1}+(B_t-D_t)+M_t$
1920	5220	2677	**224189**		**224189**
1921	5220	2677	226732	56	226788
1922	5481	3096	229117	56	229230
1923	5448	4394	230171	56	230339
1924	5341	3667	231845	56	232070
1925	5453	3464	233834	56	234115
1926	5490	2942	236382	56	236719
1927	6116	3747	238751	56	239145
1928	5910	3623	**(241488)** 241038	56	**241488**
1929	6053	3854	243687	-1284	242403
1930	6308	3311	246684	-1284	244117
1931	5654	3546	248792	-1284	244941
1932	5228	3743	250277	-1284	245142
1933	6453	3730	253000	-1284	246582
1934	6248	3605	255643	-1284	247941
1935	5733	3754	257622	-1284	248637
1936	5885	3718	259789	-1284	249520
1937	5658	3971	261476	-1284	249923
1938	5090	3721	262845	-1284	250009

1939	5473[4]	3835[2]	264483	-1284	250363
1940	5407[2]	3860[2]	**(250626)** 266030	-1284	**250626**
1951	4939[5]	2089[3]	**228597**		**228597**
1952	4820[3]	2076[3]	231341	-3865	227476
1953	4701[3]	2064[3]	233978	-3865	226248
1954	4582[3]	2051[3]	236509	-3865	224914
1955	4463[3]	2039[3]	238933	-3865	223474
1956	4240	2112	241061	-3865	221737
1957	4180	2017	243224	-3865	220035
1958	4158	1911	245471	-3865	218417
1959	4260	1938	247793	-3865	216875
1960	3876	1905	249764	-3865	214981
1961	3570	2086	**(212600)** 251248	-3865	**212600**
1962	3604	2108	214096	-3721	210376
1963	3357	2249	215204	-3721	207763
1964	3288	2104	216388	-3721	205227
1965	3119	2129	217378	-3721	202496
1966	3150	2092	218436	-3721	199834
1967	3233	2215	219454	-3721	197131
1968	3046	2292	220208	-3721	194165
1969	2905	2153	220960	-3721	191196
1970	2583	2234	221309	-3721	187825
1971	2605	2266	**(184443)** 221648	-3721	**184443**
1972	2502	2266	184679	-229	184451
1973	2508	2366	184821	-229	184364
1974	2488	2279	185030	-229	184345
1975	2292	2278	185044	-229	184130
1976	2357	2317	185084	-229	183942
1977	2218	2239	185063	-229	183692
1978	2238	2226	185075	-229	183476
1979	2296	2306	185065	-229	183237
1980	2274	2518	184821	-229	182765
1981	2232	2435	**(182333)** 184618	-229	**182333**
1982	2252	2377	182208	1569	183777
1983	2131	2456	181883	1569	185021
1984	2096	2406	181573	1569	186280
1985	1943	2378	181138	1569	187414
1986	1855	2311	180682	1569	188527
1987	1897	2379	180200	1569	189613
1988	1838	2314	179724	1569	190706
1989	1793	2318	179199	1569	191750
1990	1816	2371	178644	1569	192764
1991	1787	2386	**(193734)** 178045	1569	**193734**
1992	1807	2322	193219	1962	195181
1993	1865	2104	192980	1962	196903

[4] Figures are estimates based on linear regression (time series 1929-1938).
[5] Figures are estimates based on linear regression (time series 1956-1961).

1994	1808	2244	192544	1962	198429
1995	1922	2400	192066	1962	199913
1996	1841	2243	191664	1962	201473
1997	1852	2089	191427	1962	203197
1998	1741	2315	190853	1962	204585
1999	2271	3258	189866	1962	205560
2000	2407	2502	189771	1962	207426
2001	2319	2099	**(209608)** 189991	1962	**209608**
2002	2343	3446	202200	306	208811
2003	2367	3368	201626	306	208116
2004	2413	3308	201225	306	207528
2005	2014	2285	200954	306	207563
2006	2076	2410	200620	306	207535
2007	2009	2347	200282	306	207503
2008	2341	2506	200117	306	207644
2009	2134	2393	199858	306	207692
2010	2105	2243	199720	306	207860
2011	1955	2266	**(207855)** 199409	306	**207855**
2012	1825	2498	207182	95	207277
2013	1872	2379	206675	95	206866
2014	1820	2426	206069	95	206355
2015	1793	2700	205162	95	205544
2016	1807	2565	204404	95	204881
2017	1747	2700	203451	95	204024
2018	1818	2611	202658	95	203326
2019	1716	2658	201716	95	202480
2020	1721	2651	200786	95	201645
2021	1713	2728	**(200762)** 199771	95	**200726**

Source: Births and deaths have been taken from annual official publications. Population figures in bold characters have been taken from census returns. The number of births for the years 1920-1923 has been adjusted to take into account under-registration (see section *Data and Methods).*

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DEA on Enterprise Resource Efficiency: Theory and Estimation

Abstract:
As productive efficiency enhancement becomes an increasingly important issue within modern economics, research also draws attention towards efficiency of enterprise resources. Within this framework, this paper focuses on the efficient enterprise resource management, benchmarking the estimated efficiency, through deterministic analysis. The objective of this paper is to estimate inefficiency effects in production frontiers, providing translog effects, as well as industry effects, applying the deterministic nonparametric approach Data Envelopment Analysis (DEA), proposing a slack-based DEA which allows a full evaluation of inefficiency in an industry's performance.

Keywords: Data Envelopment Analysis (DEA), Productive Efficiency, Resource Management, Resource Efficiency

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1. Introduction

Efficiency frontier analysis in theory of industrial production does not assume that every industry is fully efficient. Consequently, one of the main goals of frontier analysis is the estimation of inefficiency and a major question is whether inefficiency occurs randomly across enterprise resources management, or whether some enterprise resources have predictably higher levels of inefficiency than others. If the occurrence of inefficiency is not totally random, then it should be possible to identify factors that contribute to the existence of inefficiency (Reifschneider and Stevenson, 1991).

As broadly described, the model chosen for this approach is the Data Envelopment Analysis (DEA) variant called slack-based measure, which deals directly with the input excesses and the output shortfalls of the industry under evaluation (Tone, 2001). Slack-based measure is invariant to the units of measurement and is monotone decreasing with respect to each input and output slack. By using slack-based efficiency measure, we obtain different frontier levels and more appropriate performance benchmarks for inefficient enterprise resources (Kokkinou, 2010).

The nonparametric approach relies on a production frontier which is defined as the geometrical locus of optimal production plans (Simar and Wilson, 2007). The individual efficiencies of the firms relative to this production frontier are calculated by means of distance functions employing DEA and involving the use of linear programming methods to construct a piecewise linear surface or frontier over the data and measures the efficiency for a given unit relative to the boundary of the convex hull of the input-output vectors.

2. Data Envelopment Analysis (DEA)

Data Envelopment Analysis (DEA) involve the use of linear programming methods to construct a piecewise linear surface or frontier over a data set and measures the efficiency for a given unit relative to the boundary of the convex hull of the input-output vectors. The individual efficiencies of the firms relative to this production frontier are then calculated by means of distance functions and they can be interpreted as the proportional reduction of the inputs to become technically efficient by a projection onto the efficient boundary, the production frontier. The efficiency score is the point on the frontier characterized by the level of inputs that should be reached to be efficient (Simar and Wilson, 2007).

The main merit of these approaches is that it can deal with the case of multiple input and outputs as well as factors outside the control of individual managements, treating them as fixed inputs. There is also no need to make restrictive assumptions about either the technology representing the production process or the distribution of the component of the residuals which represent inefficiency, since they place no restrictions on the functional form of the production relationship and makes no a priori distinction between the relative importance of any combination of outputs or inputs.

Data envelopment analysis does not require imposition of any distributional assumption of producer – specific effects. Supplementary, DEA can accommodate multiple inputs and multiple outputs simultaneously. DEA permits the use of multiple inputs and outputs but does not impose any functional form on the data, nor does it make distributional assumptions for the inefficiency term DEA overcomes some of the specific weaknesses of the other methods, such as a particular functional form for technology, particular assumptions on market structure, and the hypothesis that markets are perfect. DEA is usually handled with linear programming techniques. The analysis assumes that there is a frontier technology (in the same spirit as the stochastic frontier production model) that can be described by a piecewise linear hull that envelopes the observed outcomes. Some (efficient) observations will be on the frontier while other (inefficient) individuals will be inside. The technique produces a deterministic frontier that is generated by the observed data, so by construction, some individuals are efficient. Data Envelopment Analysis (DEA) is, in fact, a mathematical

programming approach for the construction of production frontiers and the measurement of efficiency relative to the constructed frontiers. The basic idea of this approach consists of enveloping the data (the observed input-output combinations) in order to obtain an approximation of the production frontier (best-practice frontier) and using this to identify the contribution of technological change, technological catch-up, and inputs accumulation to productivity growth.

As in Wang et al. (2010), DEA can be roughly defined as a nonparametric method of measuring the efficiency of a Decision-Making Unit (DMU) with multiple inputs and/or multiple outputs. DEA is concerned with the efficiency of the individual unit, which can be defined as the Decision-Making Unit (DMU) that is responsible for controlling the process of production and making decisions at various levels including daily operation, short-term tactics and long-term strategy. DEA is used to measure the relative productivity of a DMU by comparing it with other homogeneous units transforming the same group of measurable positive inputs into the same types of measurable positive outputs. The nonparametric approach relies on a production frontier defined as the geometrical locus of optimal production plans (Simar and Wilson, 2007). The production frontier can be estimated non parametrically from a set of observed production units, based on different envelopment techniques.

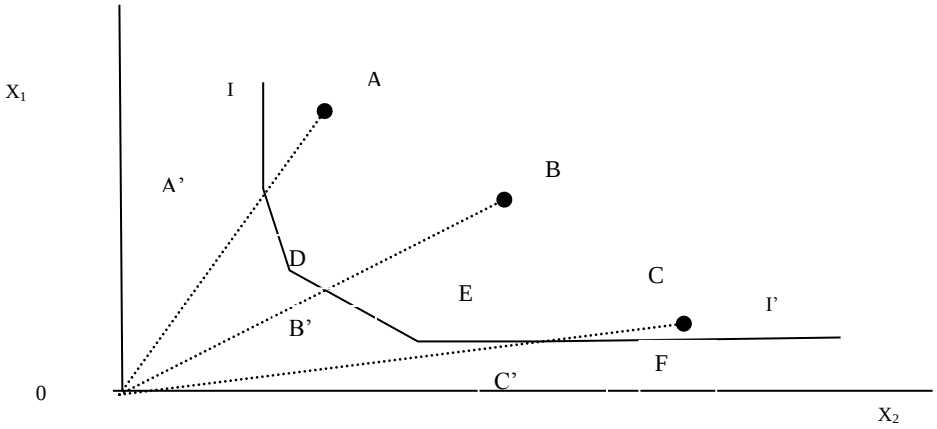
In DEA the inefficiency is defined as the distance from the frontier of a convex envelope of the data; therefore, due to the convexity assumption, a company might be compared to an unobservable and fictitious linear combination of efficient observations (Coelli et al., 2005). Thus, the efficiency score is the point on the frontier characterized by the level of inputs that should be reached to be efficient (Simar and Wilson, 2007).

On the other hand, DEA is based on a concept of efficiency very similar to the microeconomic one; the main difference is that the DEA production frontier is not determined by some specific functional form, but it is generated from the actual data for the evaluated producers. As a consequence, the DEA efficiency score for a specific productive unit is not defined by an absolute standard, but it is defined relative to the other units in the specific data set under consideration. This feature differentiates DEA from the parametric approaches, which require a specific pre-specified functional form of the modelled production or cost function (Cooper, Seiford & Tone 2000, Cooper, Seiford & Zhu 2004). This could be a limitation in some contexts because it is possible that all producers in a sample may be technically inefficient to some extent when compared with a conceptual frontier, and even the best practice producers in a sample may still be some distance from being 'fully efficient'.

It should be noted, however, that DEA identifies two or more producers that represent the best practice of a set of entities. This means that it will always choose a couple or more producers as being 100 per cent technically efficient. This could be a limitation in some contexts because it is possible that all producers in a sample may be technically inefficient to some extent when compared with a conceptual frontier, and even the best practice producers in a sample may still be some distance from being 'fully efficient'. With DEA, the best practice producers are defined only relative to other producers in the given dataset, and do not necessarily produce output at the potential production frontier.

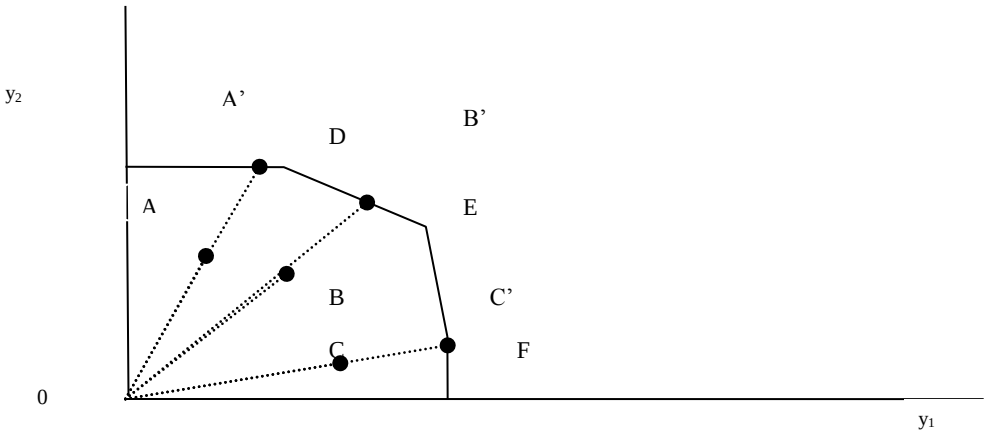
One important feature related to DEA, is slack variables. DEA method, projects the points of inefficient production units to the production frontiers and by doing so, it suggests a combination of inputs that maximize the technical efficiency of the specific producer. Looking at the following figures, producer *F*, can decrease input x_2 keeping output level constant:

Figure 1: Input Efficiency Slacks



Source: Based on Coelli et al. (2005), p. 165

Figure 2: Output Efficiency slacks



Source: Based on Coelli et al. (2005), p. 181

Producers *A* and *C*, could equiproportionately decrease their inputs until they reach points *A'* and *C'* respectively. But again, it is possible to reduce inputs x_1 and x_2 respectively, keeping output level constant. So, only the equiproportionate reduction of producer B inputs (reaching point *B'*) is enough to satisfy both the Farrell and Pareto criteria. Equiproportionate reduction of inputs in the case of producers *A, C* and *F* can satisfy only the Farrell criterion. In those cases, slack variables are called input slacks.

DEA is used to obtain efficiency measures based on the aggregated, or 'virtual', inputs and outputs. As described in McMillan and Chan (2006), let there be *n* producers using varying amounts of inputs to produce outputs. There are *s* inputs *xi* ($i = 1, \ldots, s$) and *m* outputs *yr* ($r = 1, \ldots, m$). For each producer, such as producer $_j$ ($j = 1, \ldots, k, \ldots, n$), the problem is to:

$$\max_{u,v} h_j = \frac{\sum_r u_{rj} y_{rj}}{\sum_i v_{ij} x_{ij}} \quad (1)$$

subject to

$$\frac{\sum_r u_{rj} y_{rj}}{\sum_i v_{ij} x_{ij}} \leq 1 \quad for \quad j = 1,\ldots,n \quad (2)$$

$$u_r, v_i \geq 0$$

where u_{rj} is the weight assigned each unit of output r from producer $_j$ and v_{ij} is the weight assigned each unit of input i used by producer$_j$. That is, solutions are sought to maximize the ratio of weighted output to weighted input for each producer (the ratio of virtual output to virtual input). By normalization, the efficiency scores range from zero to one. The same weights (virtual multipliers) that maximize h_j for producer $_j$ are applied to the inputs and outputs of all producers in the solution to the problem for producer $_j$. This solution process is repeated for each producer. Hence, because the weights can vary for each solution, the efficiency scores determined are those most favourable to each producer.

As far as the DEA characteristics are concerned, DEA can be specified as either an output-maximizing problem or an input-minimizing problem. Input models measure efficiency in terms of the potential (proportional) reduction in input use while output models measure efficiency in term of the potential (proportional) output increase. While the efficient and inefficient units do not change, the efficiency scores can differ between the two orientations in the variable returns to scale case:

Table 1: The basic DEA models

Orientation	Constant Returns to Scale	Variable Returns to Scale
Input Oriented	$\min \theta, v\lambda\theta$ $s.t. - yi + Y\lambda \geq 0$ $\theta xi - X\lambda, v \geq 0$ $\lambda \geq 0$	$\min \theta\lambda, \theta$ $s.t. - yi + Y\lambda \geq 0$ $\theta xi - X\lambda \geq 0,$ $N_1'\lambda = 1$ $\lambda \geq 0$
Output Oriented	$\max \phi\lambda, \phi$ $s.t. - \phi yi + Y\lambda \geq 0$ $xi - X\lambda, v \geq 0,$ $\lambda \geq 0$	$\max \phi\lambda, \phi$ $s.t. - \phi yi + Y\lambda \geq 0$ $xi - X\lambda \geq 0,$ $N_1'\lambda = 1$ $\lambda \geq 0$

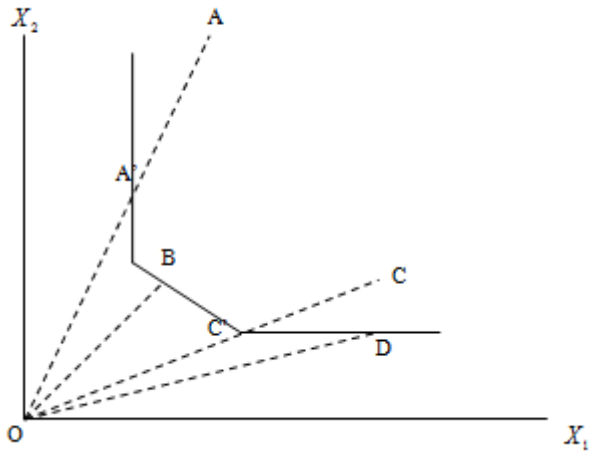
Source: Own elaboration

The input-based measure considers how inputs may be reduced relative to a desired output level. The output-based measure indicates how output could be expanded given the input levels. There is also a non-orienting DEA measure in which the frontier output and various concepts of technical and economic efficiency may be determined without being conditional on input or output levels being held constant.

The variable returns to scale (VRS) approach assumes that scale inefficiencies in the industry are present (Banker et al., 1984 first allow for VRS). Within the VRS assumption we can distinguish between decreasing returns to scale (DRS), increasing returns to scale (IRS), non-increasing returns to scale (NIRS), and non-decreasing returns to scale (NDRS), modifying the restrictions in the linear optimization problem (see Cooper et al., 2006, for a summary of assumptions). All calculations can also be done using an output-orientation (Simar and Wilson, 2007).

Before assessing each industry's efficiency, DEA compares the relative efficiency among enterprise resources. Since efficiency evaluation in DEA is based on the concept of Pareto optima, there may be more than one industry judged as efficient. In DEA, efficiency is computed on the basis of the envelope or efficient frontier, formed by all values near the original point *0*:

Figure 3: DEA efficiency values



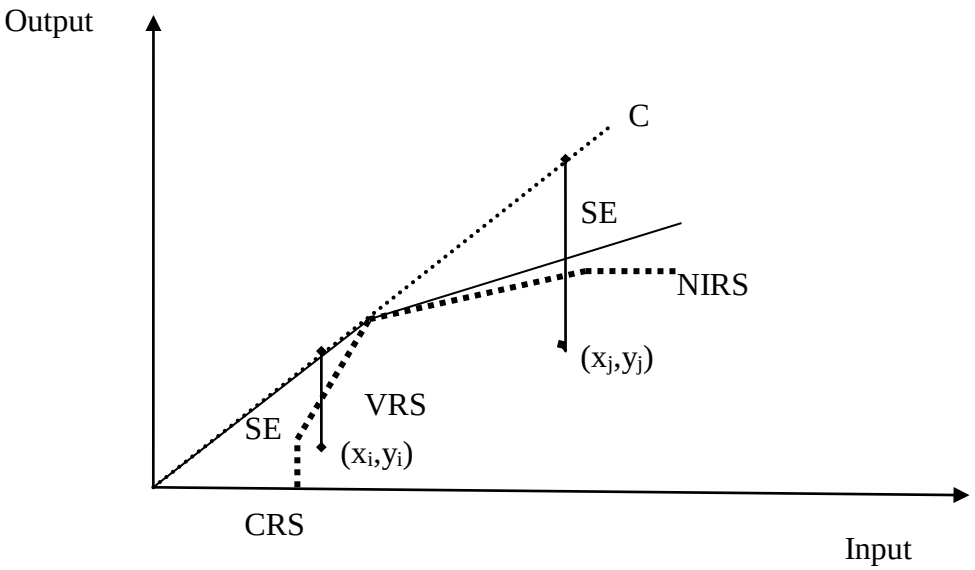
Source: Chen (2011)

DEA involves the use of linear programming methods to construct a non – parametric piece – wise frontier over the data, so as to be able to calculate efficiencies relative to this surface. The two principal model options are:

1. Standard CRS and VRS DEA model which involve the calculation of technical and scale efficiencies (where applicable) (Färe et al., 1994).
2. Panel data DEA model which refers to calculating indices of TFP change: technological change, technical efficiency change, and scale efficiency change (Färe, Grosskopf, Norris and Zhang, 1994).

DEA is based on either constant returns to scale (CRS), also called CCR for Charnes, Cooper, and Rhodes (1978), or variable returns to scale (VRS), also called BCC for Banker, Charnes, and Cooper (1984). Charnes, Cooper and Rhodes (1978) proposed a model which had an input orientation and assumed CRS. Banker, Charnes and Cooper proposed a VRS model. In each case a linear programming problem is solved to envelop the data in a convex area bounded by straight lines. Under CRS, only as many DMUs as outputs can be efficient. Under VRS, many DMUs can be efficient. Under VRS, scale efficiency refers to operating at the scale of operation, or linear sum of outputs, which maximizes the ratio the linear sum of outputs to the linear sum of inputs. An economically efficient business is both technically efficient and scale efficient. Under CRS, output-oriented technical efficiency and input-oriented technical efficiency are the same, but under VRS, they are different, because the efficient frontier is not just one line (or hyperplane) emanating from the origin.

Figure 4: Output – oriented technical and scale efficiency



Notes: CRS: Constant returns to scale
NIRS: Nonincreasing returns to scale
VRS: Variable returns to scale
SE: Scale efficiency

The above figure presents hypothetical one-input one-output production processes with three different technologies: Constant returns to scale (CRS), Variable returns to scale (VRS) and Nonincreasing returns to scale (NIRS). The vertical distance from an observation (either (x_i, y_i) or (x_j, y_j) to the CRS/VRS/NIRS best-practice frontier stands for output-oriented technical efficiency under CRS/VRS/NIRS assumptions, respectively.

The methods are available in either an input or an output orientation. Efficiency in DEA is generally defined as the weighted sum of outputs divided by the weighted sum of inputs. The set of weights for a DMU is computed in DEA with the objective to give the highest possible relative efficiency score for the DMU, while keeping the efficiency scores of other DMUs in the range of 0 to 1 under the same set of weights. Efficient DMUs have the score of 1; the other DMUs which score less than 1 are considered as inefficient. Graphically, efficiency is obtained from the ratio between the distance from the original point to the relative point of the envelope and the distance from the original point to the observation point (optimal value=1).

Coelli et al. (2005) declare that input- and output-oriented DEA models estimate exactly the same frontier and identify the same set of producers as being efficient. It is only the efficiency measures associated with the inefficient producers that many differ between the two methods. In applied research, the choice of input or output orientation has both theoretical and practical implications. Generally, input-orientated DEA models are commonly used. This is because many producers have particular orders to fill, so it seems that the input quantities are of main importance. However, a producer's objective may be the maximization of output subject to a fixed level of inputs. In such cases, output-orientated DEA models would be more appropriate. Essentially, one should select the orientation according to which quantities (inputs or outputs) the managers have most control over. An important point to mention is that the output- and input-orientated models will estimate exactly the same frontier and therefore by definition, will identify the same set of producers as efficient. It is only the efficiency

measures associated with the inefficient producers that may differ between those two methods.

The estimated model accommodates not only heteroscedasticity but also allows the possibility that an industry may not always produce the maximum possible output, given the inputs available.

3. Concluding remarks

Explaining the course of technical efficiency and determining factors which might affect it, have been for a long time, and continue to be, one of the most important topics of economic literature. The work of Farell (1957) first attempted to answer questions about the sources of differences in technical efficiency across producers and after six decades, this enquiry into the sources of differences in efficiency levels across enterprise resources management or over time, is still as important as used to be. In response to this most important question, and with the increase in data availability, economic literature has shown a resurgence of interest in testing and quantifying various theories of economic growth and explaining technical efficiency growth.

However, there is an on-going debate among researchers about the applicability and usefulness of the DEA approach vs. the stochastic frontier approach. Data Envelopment Analysis (DEA) methodology offers major advantages, since the non-parametric nature of the technique avoids the need to specify beforehand any particular functional form for the technology. Furthermore, this approach does not require any assumption about market structure or about the absence of market imperfections. Unlike stochastic production frontier, however, it does not require imposing any particular functional form of the production frontier on the data, and it is able to analyse both single and multiple outputs.

A recognized limitation of using the DEA to assess technical efficiency is that recommendations for decreasing input usage or expanding output levels are in terms of scalar valued ratios which are held constant (i.e., recommendations are in terms of fixed proportions). This limitation, however, is partially mitigated by considering changes in terms of slack variables. In this case, it is possible to determine decreases in inputs or increases in outputs relative to the slack variables; changes are not restricted to constancy of the input or output mixes. Another option to avoid the problem of constant mix ratios is to consider either an economic cost approach or an economic revenue approach. With the economic DEA approaches, prices on inputs or on outputs are all that are required. Changes to achieve technically and allocatively efficient levels are determined and are not restricted to constant input or output mixes.

The related challenge is to define robust and reliable models for empirical implementation. confronting with the academic diversity of approaches and defining the most adequate and reliable methods to put into practice. Within this framework, we summarized and applied deterministic nonparametric approach like the Data Envelopment Analysis (DEA), as well as stochastic frontier methods (SFA).

This issue is of particular importance because empirical evidence shows mainly that even enterprise resources are widely analyzed with respect to productivity, yet little focus has been put on efficiency analysis. Explaining the course of technical efficiency and determining factors which might affect it, have been for a long time, and continue to be, one of the most important topics of economic literature.

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Portrait of a Gujarati woman. Gender-based violence and public health

Abstract:
According to the Constitution of India, women are legal citizens of the country and have equal rights as men. Because of a lack of acceptance from the male dominant society, Indian women suffer immensely. Women are responsible for bearing children, yet they are malnourished and in poor health. Women are also overworked in the field and complete all of the domestic work. The social conditioning of how men should behave and how women should behave has made the society mold men and women in a different manner. While men can behave improperly with women while in a group, we rarely see the women behave in the same manner. The purpose of this study is to investigate the prevalence of various forms of gender-based domestic violence against women and to address various related issues in the western part of India, as well as the treatment practices by the state and in particular by public hospitals. The sample of the research is adult women living in the city of Ahmadabad in western India. The qualitative method will be used, specifically the field ethnographic research. The tool that has been used to collect the research data is the participatory observation in structures that support and empower women and the focus groups. The results of the research show that each culture gives its members a specific way of life, including language, behavior, material culture, ideas, and beliefs, which they pass on to the next generation.

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1. Introduction

In most societies, the basic division of gendered behaviors concerns men and women (Carlson & Heth, 2010). It is a gender dipole, which imposes compliance with the perceptions of masculinity or femininity, in all forms of gender: sex, gender identity and gender expression (Eller, 2015). Perceptions, which contain gender stereotypes, are reproduced, legitimized and "naturalized" daily– in the context of numerous discussions, value judgments and practices, conveying dominant discourses and images and are difficult to recognize and deconstruct (Panagiotopoulos, 2007). Indeed, gender stereotypes, as well as hegemonic "truth regimes" have failed to be deconstructed and continue, even today, to make many times the woman in a subordinate position to that of men (Mendick, 2006).

The gender issue was first studied in the early 20th century when the social sciences flourished and the interest of scientific research focused on the study of human behavior. The issues of gender identity are very complex and that is why a number of theories have been formulated from the beginning of the 20th century until today where every theory approaches the issue from a different perspective and as a result, a whole new context and meaning has been given to the word gender. The "gender" theory takes into account different factors, as depending on the time period and the prevailing socio-political conditions (Silva & Alves, 2020).

Gender-based domestic violence is a common problem in the lives of women visiting doctors (Sandker et al, 2010) and is an important public health issue, which can have serious consequences on women's health. A very "small percentage" of abused women is recognized as an incident of violence by doctors, but also the same women who have suffered violence, many times do not recognize the violence they suffer (Bouna, 2017). Violence against women appears and is "legalized" in almost all countries as the given behavior is "forgiven" with silence. Public health must be governed by the principles of justice, solidarity, transparency and democracy. Access to health facilities must be ensured for all individuals, without exceptions, with priority given to the weakest, excluded and vulnerable groups (Gonzalez et al, 2011).

2. Research area review

Violence against women is widely recognized as an important public health problem, due to its essential consequences for women's physical, mental and reproductive health (Garcia-Moreno et al, 2005). The problem was highlighted after the legislation against gender-based domestic violence was enacted in 2005, known as "Protection of Women from Domestic Violence Act"the law on the protection of women from gender-based domestic violence (Kaur & Garg, 2008).

India has held many communities distinguished in their geography, language, and culture. Due to its diversed and large population, many domestic violence incidents go unreported. Many of such cases are not even mentioned in newspapers, instead of the newspapers report that young women are burned alive or die due to unnatural causes in unnatural circumstances (Visaria, 2000). Estimates of the prevalence of gender-based domestic violence vary widely (from 18% to 70%, with differences in study methodology) (Verma & Collumbien, 2003) and it is realized that the magnitude of the problem has not been taken "well" into account by various parts of India. There are very few studies covering the population in the whole country (Hassan et al, 2004).

Domestic violence adversely affects women and results in negative health outcomes in India, such as gynecological morbidity (Sudha et al, 2007), contraceptive use (Stephenson et al, 2006), asthma, tobacco use, and attempted suicide; domestic violence also increases psychological anxiety among Indian women (Kumar et al, 2005) and increases the risk of poor dietary outcomes through environmental conditions, such as withholding of food by abusive family members (Raj et al, 2006). In a relevant survey, data from 69,072 women aged 15-49 years and 14,552 children aged 12–35 months were analyzed in the National Survey on Family Health of India's 1998-1999. The victimization of physical violence at home was reported by women. Aspects of nutritional status included in this study were anemia and degraded weight. Anemia was measured by a blood test for hemoglobin. Possible "mechanisms" for this relationship include withholding food as a form of abuse and influence of the stress of domestic violence on nutritional results. These findings show that the reduction of domestic violence is significant "not only from a "moral" and inherent "perspective", but also due to the organic benefits that may arise for health.

Each culture gives its members a specific way of life, including language, behavior, material culture, ideas and beliefs, which they pass on to the next generation. But when members of different cultural groups come into contact, they often discover that their expectations differ greatly. In the case of intercultural communication, the partners of the communication process by definition move to different horizons, and rely on different backgrounds. The importance of this situation is highlighted if we invoke the axiom of Habermas, according to which there are three structural elements of communication: culture, society and personality (Segall et al, 1996). The effective intercultural communication of the researcher with the field has as its starting point the awareness that the one opposite us belongs to a different cultural reality (Kesidou, 2007). Knowledge and even more so awareness about the existence of cultural differences is important for the process of intercultural communication and finding new research questions to explore.

3. Research methodology

According to the bibliography (Nikolaidis & Petroulaki, 2008), there is something problematic in the way in which contemporary public debate either at the scientific level or at the level of polity. It addresses the issue of violence, and raises the question of the definition of violence. What is violence? and what is it that makes a problem on violence interesting today or at least in the post-war developed world?

The contribution of the social sciences to the field of Public Health is based on the view that health and illness are social and historical concepts as much as they are founded. The purpose of this study is to investigate the prevalence of various forms of gender-based domestic violence against women and to examine various related issues from the West zone of India, as well as what are the practices of treatment by the state and specifically by public hospitals. It is important to recognize the influence of the cultural context in which a conflict is placed. Here, from the point of view of the researcher, the question of intercultural communication with the research environment arises, its analysis requires the knowledge of lifestyle, habits, living conditions, and sensitivity towards them, which is why it was decided to carry out on-site ethnographic research.

The sample of the survey consisted of fifty (50) adult women residing in the city of Ahmedabad, Gujarat, India and participating in the abused women's empowerment program

of the NGO Jeevantirth situated in Ahmedabad, Gujarat, India. The age of the girls ranged from 18 to 22 years old. Ahmedabad is the largest city and former capital of Gujarat state, India. It is the administrative seat of the Ahmedabad district and the judicial seat of the state. During convenience sampling, the said convenience sample was derived and utilized, which consisted of people who were available or easily accessible (Darviris , 2009).

The qualitative method was used, specifically the ethnographic research, and the tool used to collect the elements of the research was the participatory observation in structures that support and empower women, focus groups with young women, and some individual interviews. Given the aim of the research, it was considered appropriate to use the technique of the narrative interview, asking open questions regarding the main research questions of the research (Kyriazis, 1998).

It is pertinent to note that the interviews with the women were conducted in a private, safe room within the space where the women of the NGO Jeevantirth were hosted, in the women Empowerment Program (Sambhod), in the language of the participants' choice (ie. Hindi). All interviews were followed by an information session in which the audio recorders were turned off and participants had the option to ask questions about the study, to speak freely about their experiences. Interviews lasted about 45–60 minutes and were recorded, transcribed and translated into English. The transcripts were examined by a second member of the study for accuracy and necessary corrections.

4. Discussion of the results - Conclusions

According to the results of the research, it was observed that when we examine aspects of human experiences, such as health, and the body, we observe that the social relationships and behaviors of individuals who act and interact as gendered beings are extremely complex. According to the survey sample, the recipients of gender-based violence were women. Men and women perform and, by extension, reproduce the gender identity and the discrimination associated with it, with the manifestation of various behaviors/practices in everyday life. The variety of violence exhibited by men is different from the variety of behaviors exhibited by women. It is socially constructed and is established in a performance (Butler, 1990 & 1993) every day through various practices, including the manifestation of violence, for example, the man can. The performance of gender "presupposes" but at the same time "involves" his performance in the Butler (1990) or the gendered sex according to Bourdieu (2007), depending on the social context (family, school, etc.) in which the individual forms the Masculine identity is characterized by the concepts of conquest, domination, and imposition that often also reaches violence, in contrast, female identity is characterized by obedience, submissiveness, and submission to the opposite sex (Badinter, 1994).

The prevailing perceptions of gender identity contain gender stereotypes, are reproduced, legitimized, and "naturalized" daily in the context of numerous discussions, value judgments, and practices conveying dominant discourses and images and are difficult to recognize and deconstruct (Panagiotopoulos, 2007). Stereotypes, as well as hegemonic "truth regimes", have not been able to be deconstructed and continue, even today, to often make women in a subordinate position to that of men (Mendick, 2006). Gender discrimination is reproduced daily, through informal and formal behaviors, within the framework of social institutions, such as the family and the school.

The perceptions of the women of the sample are already formed under a regime of male domination objective conditions- structures, in which they grow up and gain experience, that is, Both women and men are socialized (Butler, 2006). society (Bourdieu & Passeron, 2014).

According to Connell & Messerschmidt (2005), masculinity is a "place" in gender relationships and social practices where men and women are involved and interact. It includes the effect of these practices on the physical experiences and not only on the subjects involved (Pachtelidis, 2012).

The research focused on the specific sociocultural environment and its findings could be generalized, neither universal nor definitive, as the reproduction of gender discrimination is a fluid concept and depends on the subjects themselves (Thanos & Buna, 2016). (2008), "gender" is not a static state of the body or a simple event, but a "normative cultural ideal", the realization of which is realized or failed to be realized through performative practices, practices through which gendered physical patterns are implemented (Athanasiou, 2006).

- Incidents of violence resulting from the different somatization and performance of their social gender were recorded by the gendered social subjects of West India and specifically by Ahmedabad.
- Honor and shame are factors in the reproduction of the dominant heteronormative conceptions in the Ahmedabad region.
- Physical violence appears to be a "male" privilege par excellence
- The perceptions of girls are already formed under a regime of male domination and are the result of the experiences they have in their society
- Masculinity is a form of performativity that is realized through everyday practices.
- The theories of the male dominance of P. Bourdieu (2008) and the performance of J.'s gender. Butler (1990), serve the purpose of this work. Specifically, the interpretation of the results of the research was based on the theory of male dominance which considers "male" dominance and the way in which it is imposed on the subjects, as a result of symbolic violence, which is practiced through purely "symbolic paths" of communication but also in the theory of the performance of gender, according to which performativity is based on the "normative" power of repetition through everyday practices, the imposition of belonging to one of the two social sexes.

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City branding and small Greek cities

Abstract:
Small Greek cities are a key part of the urban system. It is de facto imperative for semi-urban centers to assert their position in the market. Branding as part of marketing is an important means for doing so. Cities take measures to manipulate the image of the city. With the aim of creating a successful city branding, this research concludes the design of a framework of regulation, a grid of selection tools that will be able to codify step by step the process in a clear and valid way utilizing the components of the requirements of the city concerned, its potential and the needs of the buying public.

Keywords: Small Greek cities, Semi-urban centers. Branding, Place branding, City branding

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1. Introduction

Branding is part of marketing. City branding is one of the marketing processes that has been extended to cities. Globalization has made cities a competitive product that needs to be promoted and survive in the marketplace. The paper examines the phenomenon from the point of view of urban geography, focusing on the small Greek city of today. The questions that are addressed are focused on the classification of the Greek cities according to their development needs and the technical framework is explored which will allow them to make the most appropriate choices for the creation of a successful and effective city brand. Initially the paper approaches basic concepts, versions, and scales of branding in general, focusing on city branding, and remarkable examples of the application of city branding are presented. Subsequently, the small Greek urban centers are approached featuring the peculiarities and needs of the Greek region and the basic principles of creating branding videos as part of the marketing are analyzed. Lastly a methodological grid is configured combining the basic technical requirements of the video and the requirements for the promotion of products on the market, specifically the product concerned that in our case is the small Greek city.

Branding is a field of marketing that concerns the creation and management of the brand name. More specifically, **city branding** is the activity that aims to transform a city from an anonymous geographical location to a desired destination. Place branding is a process of searching for a design to rediscover the identity of a place, defining new features, and seeking to build a new sense for it.

2. The Branding

Place branding has been established as a valid space management function, complementary to the planning. In the framework of place marketing, which has broader site management goals, regions around the world are shifting their focus to branding, introducing more and more the meaning and techniques of branding products and companies. The emergence of the brand-design relationship is an effort that contributes to the introduction of a new factor, that of branding, in urban design.

This is a trend that has flourished in recent years, under the influence of the growing role of image-based strategies and the growing importance of the cultural and entertainment industries in the modern economy, both for visitors and the local population. Certainly, the research on city branding is still at an early stage, therefore there is a lot of room for further research in this field (Kasapi and Cela, 2017).

Branding

Branding is a field of marketing that aims to create and manage the brand name of a product, a company, or a place. In marketing, brand management consists of analyzing and designing how this brand is perceived in the market. The development of an appropriate relationship with the target-market is necessary for the management of the brand. The visible elements of the management of the brand include the product itself, its appearance, its "packaging" etc.

Brand definition is the necessary and essential condition that serves as a tool to evaluate all the material for the marketing strategy. Branding is a strategy and marketing is a regular goal. For example, under a brand like “Apple”, a few different digital products are embedded: computers of different types (series of models of laptops, desktops, etc.), technology products (telephones, watches, etc.), software, services (academic audiovisual production laboratories, etc.).

Place branding

Initially branding was related to products, but gradually the concept of branding was expanded to cover issues of geographical space, namely place branding. Place branding is a

new general term that now includes the branding of a state or country, the branding of a region, the branding of a city. Branding is inextricably linked to the economy as it is the process of communicating the image of a place to a buying public. It is related to the perception that regions compete, in terms of human resources, material resources and companies.

Place branding is applied in different geographical scales: neighborhood, municipality, region, rural and urban areas, countries. The approach is relatively similar in all cases, but the techniques and tools vary. The operational implementation of branding is based on specialized factors as the economic development organizations, tourism agencies, audiovisual production companies, urban planners, etc. (Bouron, 2017)

Place branding is part of the agenda of many public authorities, as it is a tool for the administration of the areas. States, regions, cities, and interregional networks take development initiatives to attract and conserve resources. The "I love NY" brand since 1975 is still one of the strongest place brands today. It is a tool for differentiating and confirming the identity of New York. Destinations that want to be recognizable by everyone and to be distinguished suggest a brand of a unique image. It is obvious that place branding and its management consist of an extension of marketing in non-conventional sectors, beyond trade (Pike, 2005).

City Branding

In the context of globalization, cities are trying to attract tourism and investments, making the strategy of city branding an increasingly necessary logic. This logic applies to activities that aim to transform a city from a common location into a potential destination. A successful brand makes the city desirable, so that others want to live in it and others want to visit it. Successful branding helps the city become desirable. Examples such as those of New York or Paris are well known. A successful brand promotes the quality of the place, its way of life, its history, its culture and at the same time creates collaborations between local and government agencies to further strengthen their infrastructure. In this context, it should be clear that city branding is different from city marketing. Marketing targets the needs and desires of the consumer while branding aims to create a vision for the city.

The city branding is planning, that aims to improve the image of the city and enhance its attractiveness and visibility. In practice, brandings include factors such as economy, attractiveness, spatial planning, security, etc. For this process to be successful, the cooperation of stakeholders is needed to serve the factors that contribute to the success of the brand. The active involvement of the stakeholders is an indication that the brand strategy is commonly accepted. Experimentation in resolving issues that may arise is an important component, as well as tolerance for unfortunate choices (Van Gelder, 2005).

2.1 Cities with a successful brand

Bilbao. In the late 19th and early 20th century, the city of **Bilbao** in Spain experienced a significant decline due to the abandonment of shipbuilding and mining. The decline had a significant social and urban impact. The city of Bilbao tried to reverse the situation through major strategic projects. One of the great urban works was the creation of a museum of contemporary art jointly with the Guggenheim Museum in New York. The severe impact of the crisis in Bilbao resulted in the need to restore the image of the city with the aim of reviving its economy, especially for the port area.

The Guggenheim Museum in Bilbao is a real architectural success. It has become the trademark of the city, thanks to its innovative structure and its special shape with its size and curves. This architectural success resulted in the renewal of the city and the acquirement of a significant reputation. The Guggenheim Museum in Bilbao opened in 1997. It took two years of studies and four years to build, given the complexity of the project. The project cost €

132,220 but was quickly depreciated creating profits of € 500,000 just three years after its public inauguration. By achieving beyond the expected goals, the city created a new trademark, with a strong visual presence and attractiveness.

Ideally a film festival increases the liveliness and enhances the image of the host city. An established and famous film festival, such as the film festivals of Cannes, Venice, or Sundance, enhances the profile of the city or region through media coverage. In 1969, actor Robert Redford bought an area of 24,000 m^2 in the Wasatch Mountains of Utah in the USA. He gave the area the name "Sundance" after the title of the movie starring Paul Newman "Butch Cassidy and the Sundance Kid". His vision was to develop a community that would move in balance between art and nature. Investors found great interest and the founder kept his original idea for a special natural location for artistic experimentation. A lot of experimentation and a series of improvements led to what the name "Sundance" means.

Sundance. The Sundance Film Festival was originally a small film festival promoted by actor Robert Redford, creating the branding of the largest independent film festival in the United States. Today, it is a highly respected brand for the Utah area, while the name "Sundance" is the most important name of independent cinema and its brand has been expanded to many cities in the world (London, Hong Kong, Brooklyn, etc).

Behind the glow of this festival are three important brands that effectively promote the event and contribute to its success[2]: the company's brand, the brand of the festival and the personal branding (Kelly, 2019). First, of course, the strong personal brand of the founder. Although Redford retired in 2019, his personal brand is an undisputed part of the festival's heritage. Equally important is the personal brand of the participants in the film competition. All the participants in the awards program potentially represent the brand of the festival - a logic that is known in all major film festivals. This successful background resulted in the spread of the festival's brand in other countries besides the USA. In 2012 the first "Sundance Film Festival: London" takes place and in 2014 the "Sundance Film Festival: Hong Kong" is launched.

Davos. The city of **Davos** has a very strong city brand due to the international meeting of powerful leaders and economic agents that it hosts every January, that is the annual meeting of the World Economic Forum (WEF). "Davos" is simply the name of the Swiss mountain resort where the summit takes place.

The city is in the heart of the Swiss Alps, in the east of Switzerland, located at an altitude of 1,560 meters. Its population exceeds 11,000 people, most of whom are employed in the tertiary sector in the public services. Davos is a regional center and a strong tourist community. In 2015 the hotels of the city hosted a total of 797,348 people, of which 46.9% were international visitors (OFS, 2019).

Every year for 47 years, the city's approximately 11,000 residents welcome world leaders in a forum that consists the appointment of the political and economic elite. About 3,000 top government officials and business and NGOs leaders converse; these meetings are attended by some of the most important business leaders, politicians, policymakers, academics, philanthropists, trade unionists and representatives of NGOs. In 2018, the 48th meeting was attended by 70 heads of state, leaders of the 1,000 largest companies and NGOs in the world, in a four-day conference on "creating a common future in a fragmented world".

[2] The 2019 Festival was attended by 122,000 people, created 3,052 local jobs, generated $182.5 million of economic activity and $18.7 million in state and local tax revenue (Monson et al., 2019).

2.2 The Case Study of Small Greek Cities

The importance of internationalization of the cities emerged in the 1980s. The city now acquires the character of a **global city**, namely it has strategic functions on a global scale, it wants to be a center that organizes flows and be part of networks, to be a pole of management in the context of globalization. This global environment is intertwined with the city's entrepreneurship. The **entrepreneurial city** is related to the mindset of competitiveness and the entrepreneurship spirit and operates with a business agent logic (Goldsmith, 1999). The city is no longer seen as a social construction and a formation that aims to serve its inhabitants, but as a business unit that aims to attract capital in the context of global competition; that is, the urban space is organized mainly from a visual economic point of view.

In this context, small cities or semi-urban centers have their own role. They are an important but often neglected element of the urban system. They perform various basic functions, for example as hubs for producers and processors of food products, for providers of goods and services, for non-agricultural professionals, for their own population but also for that of their surrounding rural area. Small cities host about half of the planet's urban population and absorb much of its growth. In many countries, a significant and often growing percentage of the urban population lives in urban areas outside of large cities. The semi-urban centers are the main reservoir and backbone of the urban fabric. Small and medium-sized cities are essentially regional centers, namely poles of the housing network, and are in fact strategic elements in the process of balancing the economic inequalities of the European area. In Greece, before the crisis, the dynamics of the economy created conditions giving an important development role to medium-sized housing centers. Today it seems that they are the same small centers that can be a starting point of the economy, because they are the ones that are not affected to the same degree by the crisis and maintain proportionally greater economic dynamics (Asprogerakas, 2003).

But this new role of urban planning as a factor of development is not the same for all categories and groups of cities within the urban system: metropolises, large cities, and small cities. The different categories of cities are characterized by different socio-political and spatial properties and they both treat and are treated in the competitive environment from different bases. Thus, the role and degree of importance of urban planning as a factor of development differs in relation to the characteristics of each group of cities (Gospodini, 2005).

In addition to the general characteristics, individual groupings related to the competition in the wider system of the cities they belong to are highlighted (Gospodini, 2005).

The small and medium-sized cities of early industrialized countries, being close to large cities and **benefiting from their transport and communications network**, can meet the challenges. Small cities located on major thoroughfares are favored by the development of distribution companies, businesses, and the consequent residential development.

Medium-sized and small cities with **highly representative features** such as cities with special natural environment, cities with characteristic cultural heritage (archaeological, architectural) and cities with developed special urban functions, such as those with academic institutions, consist of a category that favors development.

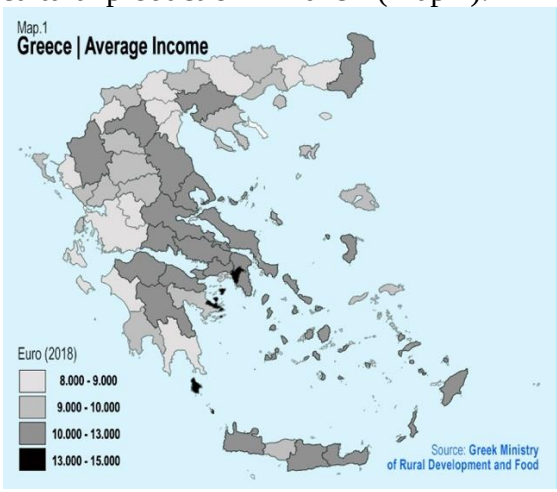
Medium-sized and small cities located **in the periphery without cultural and natural resources**, away from metropolitan centers and large cities, consist of a category that is vulnerable to competition. These cities are characterized by lack of infrastructure and weakness in the productive structure, namely lack of physical infrastructure, low digital support, high employment rate in the primary sector, etc. Some of these cities are either located in purely rural areas or rely on activities that are in recession or decline –e.g., abandoned industries or degraded spas– and have very low growth prospects. In this category,

a fundamental upgrade of the urban landscape is required so that the structured urban space can be transformed itself into a resource for development (Gospodini, 2005).

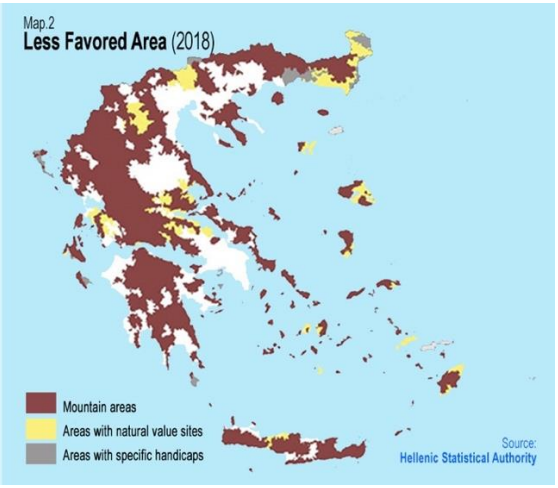
3. The logic of designing city branding

The creation of strong branding for small cities is a result of the right choice of the **product** (video production) in relation to the features regarding the **customer** (small cities). With reference to the characteristics of small cities (customer), it is generally highlighted that they belong to two groups, those with particularly representative features and those that are in the periphery and do not have cultural and natural resources[3].

More specifically, in the context of the study, firstly characteristics of the representative directions were investigated: population, economy, geographical location. Among those, the following characteristics were selected: the index of percentage change of the population from 1951 to 2011, the income identity of their prefecture for 2018[4] (Map 1) and their position on the map of less favored areas, which concerns the dynamics of their agricultural production in 2018[5] (Map 2).



Map. 1. Average income map (2018)



Map. 2 Les Favored Area (2018)

After identifying the characteristics, it is investigated whether these characteristics give to the small cities a competitive advantage, and if so, it is identified which.

The identification of characteristics makes clear and specific the goal to be achieved in the marketing process and ultimately allows the selection of the form and type of audiovisual production to be chosen to promote a strong brand.

According to the above, the following grouping is formed.

Cities with no previous market presence (Map 3). These are cities that do not stand out for any geographical feature (e.g., coastal areas, areas with special natural beauty, archaeological sites, cultural events, etc.). Usually, this category has low population and income characteristics. These cities are defined in a zone that starts from the islands of the North Aegean, continues in the prefectures of Eastern Evros, Halkidiki, Northern Macedonia and descends along the whole of Western Greece and its central part includes of the Pindos

[3] Small cities are also found on large traffic lanes (Egnatia, Ionian Road, etc.), but this category of cities is not representative of the Greek reality.

[4] Data collection for each Municipality has been an arduous project for the Hellenic Statistical Authority (ELSTAT).

[5] The selection could be made between a wider range of developmental characteristics (e.g. quality of life, index of housing degradation, etc.) or more focused (archaeological sites, important cultural events, etc.). The specific features are based on data available at ELSTAT.

Mountain range. The same zone includes much of Evia and the islands of the Northern Cyclades.

In this case it is necessary to **create an advantage**. To achieve the above goal, two actions are desirable:

- The focus should be set at the **pre-purchase** phase of the purchasing cycle. In the pre-purchase phase of the product (place branding), the city must be able to gain an advantage that will enable it to enter the market. This can be achieved through three possible video production options: the **informational** videos, which aim to attract attention through providing updates; the videos that create customer **desire** for the product (city or region); and the videos that give **prestige** to the area or city.
- Most of the cities in this zone can be included in a "landscaping" design aimed at the brand, but not all. The Ionian Islands, Halkidiki, the islands of the Northern Cyclades may not have the popularity of the Cyclades, but they are not areas that are newly introduced to the market. Due to the level of their income and their population development, they are included in the lower zones compared to the rest of Greece, but they have the advantage of branding and their presence in the market is well known. Cities in these areas should be selectively integrated into pre-purchase strategies that require **maintenance** video production or **support** video production.

Cities with a market presence (Map 4). These cities stand out for a special feature. They are cities with an obvious advantage that is being exploited. This zone includes the classic island destinations, the traditional settlements, the cities that have archeological sites, which are religious destinations, including the areas with natural beauty, etc. This category presents high growth rates in terms of population and income.

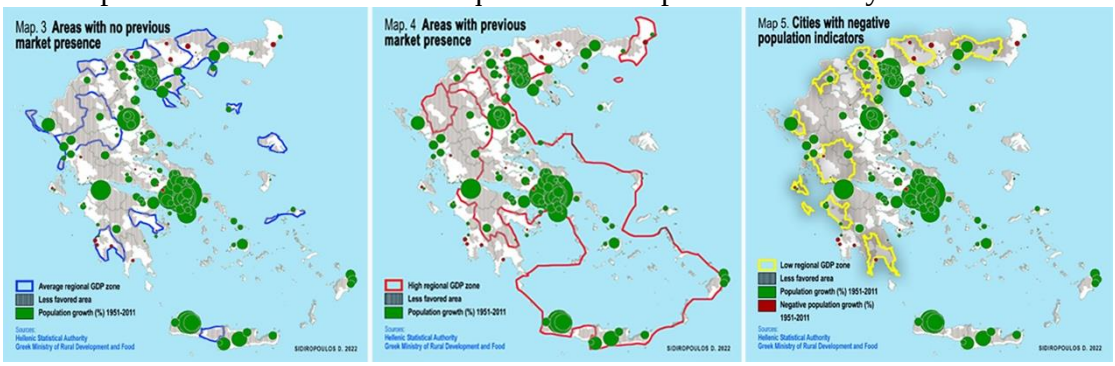
In this case, it is appropriate to plan for the **maintenance and preservation of the advantage**. To achieve the above goals, it is desirable to produce video variations with the following targeting:

- The focus should be set at **post-purchase** phase of the purchasing cycle, in which cities have already acquired a brand. In these cases, **maintenance** video production of the existing brand is required –as it is necessary to produce video to preserve the brand– or **support** video production for the continuation of the promotion and dissemination of the acquired brand.
- A special option for the cities of this zone is the **masterplanning experience**. The production of video that aims at masterplanning experience concerns the design of a specific participation program, in an organized urban experience. It aims to promote an "introduction-navigation" plan in the brand. This can be based on the history of the place, the experience offered by the area. But the main feature is that the video production must meet the design premise and be consistent with the strategy, vision, and management of the brand.
- One last focus on video production is **rebranding**. This is a process of changing the market strategy of a city, which gives a new name, symbol, and vision to an established brand. The video seeks to form a different brand identity in the market. The **rebranding** is often considered necessary because it evolves the existing brand and ensures that it is in line with consumer preferences, making the city competitive in the market.

Cities with negative growth indicators (Map 5). Numerically these cities consist of a small group, but their negative performance makes them an interesting case study[6]. Cities in this category were competitive in the past but are not today. They had a brand that, for various

[6] Out of a total of approximately 151 cities of 3,000-10,000 inhabitants, only 25 show a negative population change between 1951-2011, with a maximum of -47% (Soufli), e.g. Krinides, Kalambakion, Aiginion, Orchomenos, Eleftheroupolis, Velventos, Deskati, Kranidia, Amfiklia, Poros, Lixourion, Amfilochia, Goumenissa, Messina, Erythrai, Gythion, Sidirokastro, Gargalianoi, Filiatra, Nigrita, Prosotsani, Souflion (Sidiropoulos, 2017).

reasons, has now been lost, being in a recession. Their declining population growth and low-income profile are their main characteristics. Their location on the map of less favored areas does not necessarily place them all in the areas with the most degraded characteristics (mountainous areas, with natural limitations, with special disadvantages). It seems that the loss of competitiveness of their brand requires a more specific sub-analysis.



Map 3. No previous market presence Map 4. With previous market presence Map 5. Negative population indexes

In this case, the goal of video production concerns the entire purchasing-cycle (pre- and post-purchase) aiming –through information and the creation of desire and prestige– their re-entry into the market, as well as the maintenance and support of the old strong brand. The following guidelines can be followed to achieve the above objectives:

- Video production for **rebranding** is one of the options here as well. This is with the main difference that the rebranding can be at the same time a new introduction of the brand in the **pre-purchase** phase of the purchasing cycle (information, desire, prestige), if it has lost its place and does not exist in the market. The production will aim either to differentiate it from its previous brand or to re-introduce it to gain the older acquired advantages.
- The selection may also relate to the **after-purchase** phase of the purchasing cycle. Given that these cities had once acquired a strong brand, the city's strategy could be to restore the brand as it was, so that it could regain its place in the market with the same features. That is, the production could take the form of a classic **maintenance** video or **support** video for the continuation of the pre-existing brand.

4. Brand Development Framework

Place branding has been established as a valid space management function, complementary to the planning. Regions around the world are shifting their focus to branding. The trend has accelerated in recent years, due to the growing role of image-based strategies. Our scope is the Greek small and medium city that has not received adequate attention despite its role as the main reservoir of processes of development of national urban systems and an important factor for the development dynamics of the urban network (Kasapi and Cela, 2017). It is now de facto necessary for the semi-urban centers to claim a share and a place in the urban network. The semi-urban centers, while lagging in the development of economies of scale, mainly aim at the specialization and distribution of products and services at the production level. This is the "entry point" of branding, which can contribute to regional development, identity upgrading and sustainable development (Hemelryk-Donald and Gammack, 2007).

The boundary between place promotion and production in terms of design is decreasing more and more (Porter, 2016). Audiovisual production is emerging as dominant and image techniques and especially the audiovisual arts are trying to replace a function that until now was held by the text. It is a cultural revolution that goes by the name of the "age of the image", during which there is a clear tendency to displace the text, resulting in a large percentage of today's society evaluating the world differently than before (Flusser, 2008).

Developing a strong brand, therefore, can be a critical success factor for a destination. The aim of the branding video is to upgrade the brand's position and increase its competitiveness in the domestic market. The image that is displayed and perceived by potential visitors is very important and therefore special attention should be paid to the management planning of the destinations. This can be achieved by careful market research by combining and adapting what is offered to what the target markets want. To facilitate the development of a recognized brand, a collective understanding and awareness of the brand by the target audience is required. The huge increase in both TV channels and internet usage on the one hand facilitates and on the other hand makes it difficult to develop brands based on movies/TV experiences, due to the diversity of the audience. Brands promoted in films are likely to become niche products, but not globally recognized. The brand must reflect the destination, otherwise it will be weakened, and this will have a negative impact on footfall.

Tourism professionals want images created by sectors such as the film industry to reflect and support the brand rather than weaken it. To maximize effectiveness, the strong image of the destination should be aligned with specific standards so that they can be maximized in free advertising. However, this is not always the case, as it is never known how powerful the video, movie or TV series will be until it is released or whether the images projected will reflect the destination. Production companies often do not treat production as destination marketing when making movies or TV series. They are looking for locations that respond to a script and the director's logic and how the continuation of the story will be portrayed. For this reason, the images may be strong, but the destination may not be brand compliant.

5. Conclusions

Small Greek cities are a key part of the urban system. It is de facto imperative in semi-urban centers, claiming share and a position in the market. Branding as part of marketing is an important tool for this. Cities take concrete steps to manipulate the image of the city. Developing a strong brand can be a critical success factor for a destination.

To create a successful city brand, the present research concludes with the design of a framework of regulation. The result is a grid of selection of tools that, after searching and analyzing relevant data, will be able to codify the process step by step in a clear and valid way utilizing the component of the requirements of the city concerned, its capabilities and the needs of the buying public.

The grid highlights four steps: featuring the **developmental characteristics** of small cities, so that their **competitive advantages** emerge, which allows the brand to be **targeted**, whether it is to create an advantage, maintain it or even re-introduce itself; by specifying the goals, it is possible to **select the character** of the branding video, choosing among video productions for providing information, creating desire, maintaining a brand or re-branding in the appropriate purchasing-cycle.

Through this study, it is also understood that creating a successful brand is not the end of the road. Subsequent implementing practices in urban planning play an important role, which in turn is a field for further study and investigation.

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