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Rethinking Tourism Industry in Pandemic COVID-19 Period

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Abstract: The pandemic caused by the SARS-CoV-2 virus (COVID-19) has significantly affected the tourism industry. Tourist destinations have adopted emergency measures and restrictions that have affected the mobility of individuals around the world. Beaches and resorts were empty, cities were deserted, people's movements were stopped, and travel among different territories was strictly controlled. COVID-19-caused quarantine around the world has harmed people's livelihoods and the world economy. This study aims to analyze the effects of the COVID-19 pandemic on the tourism industry and overall economic performance. Based on the research results and exploratory research of the literature, we listed in a synthesizing manner several measures to ensure the resilience of the tourism sector during the COVID-19 pandemic period.

Keywords: tourism; Covid-19 pandemic; recovery measures; resilience measures; sustainability

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1. Introduction

The health and economic crisis generated by the COVID-19 pandemic in early 2020 posed significant challenges to the tourism industry due to domestic and international traffic restrictions, which substantially impacted the evolution of tourism demand. The protracted crisis, which still dominates international tourism despite immunization campaigns, has sparked a debate on the effects of such a crisis on tourism sustainability. Like any crisis, this can be an opportunity for the tourism industry to become more sustainable. Muller [1] suggests that the SARS-CoV-2 pandemic could be a "once-in-a-lifetime opportunity". At the same time, Sustainability Leaders Project [2] argues that a crisis is a much-needed shock for the tourism industry, with a view to greater sustainability. Given openness to organizational change, tourism managers can take advantage of the deep crisis and turn crisis learning into strategies and actions to build more resilient and sustainable businesses. At the governmental level, the crisis is an opportunity to design specific policies that support and stimulate sustainable behavior in tourism.

The nature of the health and economic crisis generated by COVID-19 brings several unprecedented challenges for the tourism industry, both in terms of the conduct of activities and ensuring sustainability. While the research to implement a sustainable vision has often focused on operations and individual activities specific to the tourism industry, the health and economic crisis generated by COVID-19 affects all activities and processes with profound implications for analyzing sustainability in tourism. The tourism industry has always been affected by natural disasters or health crises, but the effects were local and could be combated. The global nature of the COVID-19 crisis has caused a domino effect that has profoundly affected the entire industry at the systemic level. Combating these effects can no longer be done through individual, local measures; a systemic approach is needed to manage the crisis better. There are also positive implications of the COVID-19 crisis on tourism in developed countries that have better addressed the health crisis. Given

the traffic restrictions across borders, tourists will choose local facilities that will positively affect national tourism. Less developed countries, which are severely affected by the health crisis and have relied heavily on international tourism, are experiencing a sharp decline in the tourism industry. Only a systemic, global approach to crisis management can ensure the survival of as many tourism operators as possible.

In this paper, we aim to investigate the effects of the COVID-19 crisis on the tourism industry and overall economic performance. We synthesize, in addition, the measures that tourism operators can take to cope with the sharp decline in activity and consumers of tourism services and the opportunity for sustainable tourism offered by the COVID-19 crises. The paper also highlights the substantial role of the tourism industry in economic development, given that tourism is the economic sector most affected by the COVID-19 pandemic. The structure of the paper is composed of seven sections. After the introduction and literature review, we describe the research design. The succeeding three sections show the research results, the discussions, and specific measures for the tourism industry. The last section proposes the conclusions.

2. Literature Review

2.1. Crisis and Tourism

Crisis research that has affected the tourism industry is segmented and lacks holistic approaches due to the variety of crises and practices adopted to deal with them [3] and has led to a knowledge gap on the intensity of the impact of problems on the tourism industry [3]. Crisis management in tourism has been treated mainly in a national or regional context, the triggering element having a varied nature such as natural disasters [4], epidemics [5–8], or social disorders [9]. If the response to the crisis was reactive in the past, research has expanded in recent years, which proposes a proactive response based on communication, information, and confidence in crisis management [3,8].

Over time, tourism has experienced a multitude of challenges that have endangered its sustainability, such as mass tourism [10], overload of tourist destinations [11], external control [12], and affecting local communities [13]. Moreover, because in some well-known destinations, the number of tourists often exceeds the population, tourism produces strong effects on society [12–14].

The effects of a highly contagious virus-generated pandemic have been the subject of much research over time. Hung et al. [15] investigated the impact of SARS in 2003 and H1N1 in 2009 on the tourism industry in Hong Kong. Hung et al. [15] appreciated that the operators in the tourism industry retreated very quickly and adopted a recovery plan to cause as minor damage as possible. Other authors [16] have analyzed the impact of the 2003 SARS epidemic on Hong Kong hotels and airlines and stressed the importance of establishing contingency plans for a speedy recovery after the epidemiological outbreak. However, this kind of research is limited at the national level, given the small extent of SARS disease in 2003. Kim et al. [6] emphasized the importance of contingency plans in the effective management of the SARS crisis in South Korea in 2003, calling for the establishment of a crisis management system and training of decision-makers and the general population on how to deal with the sanitary crisis. South Korea was one of the countries that best managed the situation caused by COVID-19, given its previous experience and lessons learned.

2.2. COVID-19 Pandemic and Tourism

Research on the impact of the COVID-19 pandemic on tourism, tourism resilience, and recovery policies and strategies are in progress, being both conceptual [17–20] and empirical [20] but rare due to scarcity of data. Although vaccination campaigns are remarkably successful, the pandemic is not yet under control. In addition, mutations in the SARS-CoV-2 virus (South African, Brazilian, Indian) increase the unpredictability of the pandemic, making research crucial to facilitate the recovery of tourism and its associated industries [21].

According to Gössling [22], the pandemic caused by COVID-19 is a significant challenge for the whole world. Due to the lack of a vaccine and the limited medical possibilities to treat this disease throughout 2020, hygiene measures, social distancing, quarantine, and traffic restrictions have been the primary strategy to combat the pandemic. Unprecedented global travel and lockdown limits have had the worst adverse effects on the global economy since World War II. As a result of social distancing measures and regulations on domestic and international traffic, tourism has been virtually stopped for a few months from March 2020 worldwide. Data on flights, cruises, and accommodation was catastrophic. Tourism was the economic branch that proved most vulnerable to measures to combat the pandemic.

Higgins-Desbioles [23] believes that the pandemic generated by COVID-19 will change the tourism industry and the environment in which it operates. This global crisis may be a source of opportunity to identify new possibilities, and the problematic situation is an additional argument for accepting changes in tourism business models towards sustainability. One of the critical effects that the COVID-19 pandemic had on tourism was accelerating the digitization of processes in the tourism industry, as stated by some authors [24]. Another spillover effect of the pandemic crisis on the global economy and environment was reducing GHG emissions caused by decreasing travel [25]. This side effect can be, at the same time, an opportunity to rethink sustainable tourism models. However, a more responsible and sustainable approach to tourism will not be enough to provide the opportunities that make such a reset of tourism possible. Tourism needs to be redefined and redirected, taking into account the rights and interests of communities and national interests.

According to Niewiadomski [26], the COVID-19 pandemic has stopped the entire tourism sector for several months. Its full resumption after the end of the pandemic will not be the same as in the pre-pandemic period. Niewiadomski [26] and Mangra et al. [27] consider that temporary deglobalization offers tourism an unprecedented opportunity to develop respecting the principles of sustainable development by combating over-tourism that generates extremely adverse effects such as environmental destruction, economic exploitation, or overpopulation.

From an economic and social point of view, the tourism industry is an extensive employer. Still, accurate estimates are difficult due to the seasonality of many tourism activities and the high percentage of undeclared work. Nevertheless, there are estimates that the hotel industry worldwide has about 212 million people, of whom about 50 million have lost their jobs due to the COVID-19 crisis [28]. In the European Union, almost 13.6 million people are employed in the tourism industry [29], while in the US, about 14 million [30]. Furthermore, in these regions, the percentage of job losses was about 25%. In addition to the social effects, the share in GDP of the tourist activity mediates substantial economic effects [31]. In the European Union, 10 of the 27 countries register shares in GDP of the tourist activity higher than 10%.

Several authors [1,2,23] believe that the lessons learned from the crisis can put tourism on a more sustainable footing, addressing sensitive issues such as over-tourism, climate change, and the systemic approach to development models on which the tourism industry is based [22,30,32]. However, there are rumors that tourism operators will start a substantial recovery program when most restrictions are removed [33], being less concerned about social and environmental issues but economic ones, ensuring their survival. Small tourism companies, which are usually susceptible to actions in the direction of sustainability, will not have the capacity to support the change of business models in a more sustainable approach without incentives from government authorities.

There have been early approaches on the COVID-19 crisis effects [22], which highlighted the challenge of transition to a sustainable way. Authors such as Di Marco et al. [34] have suggested serious links between the changes that man causes in the environment and the emergence of infectious diseases. It is necessary to take these links into account in sustainable development planning both in tourism and in general, economic and social.

2.3. The Opportunity for Sustainable Tourism

Implementing a vision of sustainable development in tourism has aroused great interest, especially in recent years [29,35]. However, Ertuna et al. [36] point out that research on the implementation of a sustainable vision in the field of tourism is not very extensive, emphasizing the need for such research. The studies focused on distinct areas of the tourism industry: the hotel sector [37], the organization of cruises [38], the activity of restaurants [39], theme parks [40], the organization of events [41], and less on the entire tourist activity [11]. However, several papers study how sustainability has been addressed in the hospitality industry, papers that propose research topics or frameworks to underpin sustainability in tourism [41–45]. Gössling and Hall [42] show that tourism has a significant contribution to global climate change, although, through ecotourism, tourism can also positively change the environment on a small scale.

Within the tourism sector, the effects of natural disasters or other fortuitous cases bring up to date sustainability issues [46–48]. However, all these works adopted a local, regional, or national research level, given the magnitude of emergencies affecting tourism. Although these works have studied the effects of pandemics on tourism, they have focused on the impact of pandemics on tourism in different countries and have not provided a systemic view [22]. There are fears that the crisis generated by COVID-19 will lead to a shift in efforts, including financial ones, from supporting sustainability to ensuring resilience, especially economic ones. However, some authors [29] show that sustainability can be about restoring and consolidating the tourism industry by providing a cleaner natural environment that offers more tourism opportunities and uses human capital throughout its value.

Although there have been opinions that tourism has excellent resilience and ability to adapt to catastrophic or unexpected events and to recover quickly, the economic and health crisis caused by the COVID-19 pandemic has put the tourism industry under a severe stress test [49]. Several views warn of the unsustainability of the sector (lack of a long-term vision that considers social and environmental vectors), leading to an increase in recurrent risks of climate change and global health problems [50]. Under the current conditions in which the sector needs to be reset, substantial structural changes are required for the tourism sector based on sustainable development models. The industry's sustainability will also ensure its resilience in the face of crises of such magnitude as the pandemic caused by COVID-19 [51–53]. Gössling et al. [54] showed that the COVID-19 pandemic had generated a vulnerability of jobs in tourism, especially in small, low-income countries [54]. In terms of global changes, the global pandemic offered a lesson to the tourism industry, politicians, and researchers, but at the same time paved the way for new opportunities. The challenge facing tourism is to turn the crisis into an opportunity to accelerate sustainable tourism transformation.

Fletcher et al. [55] suggest that even after the declaration of the end of the pandemic caused by COVID-19, the world does not allow itself to return to previous levels and tourism patterns. Excessive mass tourism causes damage to the environment (including pollution and resource depletion) due to unsustainable tourism. Despite the uncertainties that the health and economic crisis has induced in the tourism industry, one of the essential consequences has been the consolidation of local tourism, especially domestic tourism [56].

3. Research Design and Methodology

In the paper, we opted for quantitative research methods to validate the hypotheses formulated starting from the literature review and our observations on the field of tourism. Furthermore, because the data illustrate the situation of tourism, the economy, and related COVID-19 indicators, at one point, we chose a quantitative transversal analysis. The methods used in the research were: analysis of artificial neural networks (ANN) and structural equations modelling (SEM) (to identify the effects and influences of various variables), and cluster analysis (to identify differences among countries and group them

into homogeneous clusters). In addition, we used the exploratory research of the literature for the paper section on measures to ensure the tourism sector's resilience.

3.1. Sample and Variables

To investigate the effects of the economic and health crisis caused by COVID-19 on the tourism industry, we used data regarding tourism evolutions and COVID-19 cases and deaths, collected from the following sources: Eurostat [57,58] and Worldometer [59].

The variables used in our research are the following: percentage change in nights spent at tourist accommodation establishments (reporting country, foreign country, and total), total cases of COVID, total deaths of COVID, the percentage change of GDP per capita compared to the previous year (PC_GDP).

Percentage change (compared to the corresponding month of the previous year) in nights spent at tourist accommodation establishments is calculated monthly by Eurostat, both for residents, non-residents, and total. Our research has been collecting data since March 2020, when most countries went into lockdown and imposed social distancing restrictions that drastically affected tourism. Therefore, we aggregated the data collected between March 2020 and January 2021 in an average percentage of changes in tourism recorded in the eleven months of the pandemic (PPMean_T—the total percentage change, PPMean_RC—the percentage change of resident tourists, and PPMean_FC—the percentage change of resident tourists).

Total cases of COVID (T.cases) and total deaths of COVID (T.deaths) include data collected in December 2020 from the Worldometer website and showing the situation of cases and deaths due to the COVID-19 panic from February 2020 to December 2020. We use these two variables to research the intensity of the impact of COVID-19 on tourism depending on the countries studied. In addition, we also use variables regarding the number of cases and deaths reported per 1 million inhabitants: total cases of COVID at 1 million population (TC1MP) and total deaths of COVID at 1 million people (TD1MP).

Percentage change in GDP per capita compared to the previous year (PC_GDP) is the percentage by which GDP per capita changes from one year to another. GDP per capita is calculated as the ratio of real GDP to the average population of a specific year. For our research, we collected data for 2020 where GDP per capita was affected by the eleven months of the COVID-19 pandemic.

In our research, we selected 24 EU countries as a sample. Of the 28 EU countries, we excluded the United Kingdom, which left the European Union, and three other countries that did not provide sufficient Eurostat statistics in this area during the pandemic (Ireland, France, and Cyprus).

3.2. Hypothesis and Methods

To achieve the purpose of the research, we set two research objectives:

RO1. Identification of the effects of the health and economic crisis caused by the COVID-19 pandemic on the tourism industry;

RO2. Exploring the measures to ensure the resilience of the tourism sector during the COVID-19 pandemic period.

To achieve the RO1 research objective, we conducted a quantitative transversal study, while to reach the RO2 research objective, we conducted qualitative, exploratory research.

Based on the literature and our observations, and empirical analyses, we have formulated three hypotheses concerning the impact of COVID-19 on economic activity in tourism.

Hypothesis 1 (H1). The two variables, total cases of COVID (T.cases) and total deaths of COVID (T.deaths), have a significant influence on the variable that illustrates the average percentage of changes in tourism recorded in the eleven months of pandemic (PPMean_T), with substantial differences between resident and non-resident customers (PPMean_RC and PPMean_FC, respectively). Restrictions on travel and social distancing have generally been more drastic in countries with reported several cases of illness and death caused

by COVID-19. In addition to these restrictions (there have also cases where government authorities have not imposed severe limits, such as Sweden's example in the first part of the pandemic), the fears of both domestic and foreign tourists have been a significant inhibitor for tourism activities.

Hypothesis 2 (H2). There are differences in the variables PPMean_T, PPMean_RC, and PPMean_FC that allow grouping European Union countries into clusters depending on the effects of the economic and health crisis caused by COVID-19 on the tourism industry.

Hypothesis 3 (H3). The inclination of tourists to travel during the COVID-19 pandemic (Incl) acts as a moderator between the evolution of the variables total cases of COVID at 1 million population (TC1MP) and total deaths of COVID at 1 million people (TD1MP), on the one hand, and the evolution of the average percentages of changes in tourism registered in the eleven months of pandemic (PPMean_T) and the percentage change of GDP per capita compared to the previous year (PC_GDP), on the other hand.

For the research of H1 hypothesis, we use a multilayer perceptron (MLP) from the Artificial Neural Network analysis, which involves establishing a relationship between the layer of input variables and the layer of output variables using a hidden layer. The formula of MLP is (1):

$$y = \left(\sum_{i=1}^{n} w_i x_i + b) = \varphi(W^T X + b \right) \quad (1)$$

where

b—bias,
w, x,—vectors of weights and inputs,
φ—activation function.

As an activation function of the hidden or output layers can be used hyperbolic tangent function (2) or a sigmoid function (3):

$$f(n) = \frac{e^n - e^{-n}}{e^n + e^{-n}} = \frac{e^{2n} - 1}{e^{2n} + 1} \quad (2)$$

$$f(n) = \frac{1}{1 + e^{-n}} = \frac{e^n}{e^n + 1} \quad (3)$$

where:

n—input variable,
$f(n)$—output variable.

MLP uses a backpropagation algorithm that enables perceptron saturation [60].

For the research of the H2 hypothesis, we use cluster analysis. After we tested several clustering methods [61], the optimal method was the average linkage. For the distance between clusters, we chose squared Euclidian distance, using the formula (4) [62]:

$$d(X_1, X_2) = \sqrt{\sum_{i=1}^{p} (x_{1,i} - x_{2,i})^2} \quad (4)$$

The standard deviation of a parameter P_i (for any $i = 1, 2, \ldots, p$) whose values are $x_{1,i}, x_{2,i}, \ldots, x_{m,i}$ is defined as (5):

$$S_i = \sqrt{\frac{1}{m-1} \sum_{j=1}^{m} (x_{j,i} - \mu_i)^2} \quad (5)$$

where the mean value of the parameter is (6):

$$\mu_i = \frac{1}{m}\sum_{j=1}^{m} x_{j,i} \quad (6)$$

We apply structural equation modelling for the H3 hypothesis research [63]. The model of the structural equation is as follows (7):

$$\eta = B\eta + \Gamma\xi + \zeta \quad (7)$$

where

η, ξ—endogenous and exogenous latent variables,
B—matrix of regression coefficients relating the latent endogenous variables to each other,
Γ—matrix of regression coefficients relating the endogenous variables to exogenous variables,
ζ—disturbance.

The latent variables are linked to observable variables as follows functions (8) and (9):

$$y = \Lambda_y \eta + \varepsilon \quad (8)$$

$$x = \Lambda_x \xi + \delta \quad (9)$$

where

Λ_y,Λ_x—matrices of factor loadings,
ε,δ—vectors of uniqueness.

4. Empirical Results

To achieve research objective RO1 (identification of the effects of the health and economic crisis caused by the COVID-19 pandemic on the tourism industry), we have tested the three hypotheses concerning quantitative research.

For the H1 hypothesis's validity investigation, we have used multilayer perceptron (MLP) from the Artificial Neural Network analysis. The two variables, total cases of COVID-19 (T.cases) and total deaths of COVID-19 (T.deaths), are defined as input variables, exerting an influence on the hidden layer representing tourists' inclination to travel during the pandemic. The hidden layer, in turn, exerts a significant impact on the output variables that illustrate the average percentage of changes in tourism recorded in the eleven months of the pandemic (PPMean_T, PPMean_RC, respectively PPMean_FC). Biases in the case of the model are exogenous factors, such as political decisions on travel restrictions and social distance, that have effects on tourism. Figure 1 shows the synaptic connections that are established between the analyzed variables.

The activation function used for both the hidden layer and the output layer was sigmoid, considering that the variables can also have negative values. The rescaling method used for the dependent and independent variables was data standardization. Table 1 presents the predicted values of the model.

The data analysis shows a significant influence of the two variables that describe the COVID-19 pandemic (T.cases and T.deaths) on the tourism activity exerted through the hidden layer represented by the inclination of tourists to travel during the COVID-19 pandemic. Lower levels or a decrease in COVID-19 cases or deaths caused by pandemic lead to a positive change in tourism activity and vice versa. The external influences represented by bias are consistent enough, as political decisions on travel restrictions and social distancing have had consistent adverse effects on tourism activity. Following the research of the H1 hypothesis, we found it is valid, which indicates the significant influence of the two variables illustrating the COVID-19 pandemic (T.cases and T.deaths) on the variables representing the average percentage of changes in tourism registered in the 11 months of the pandemic, both in total and among residents and non-residents (PPMean_T, PPMean_RC, respectively PPMean_FC), results being in line with other research [64].

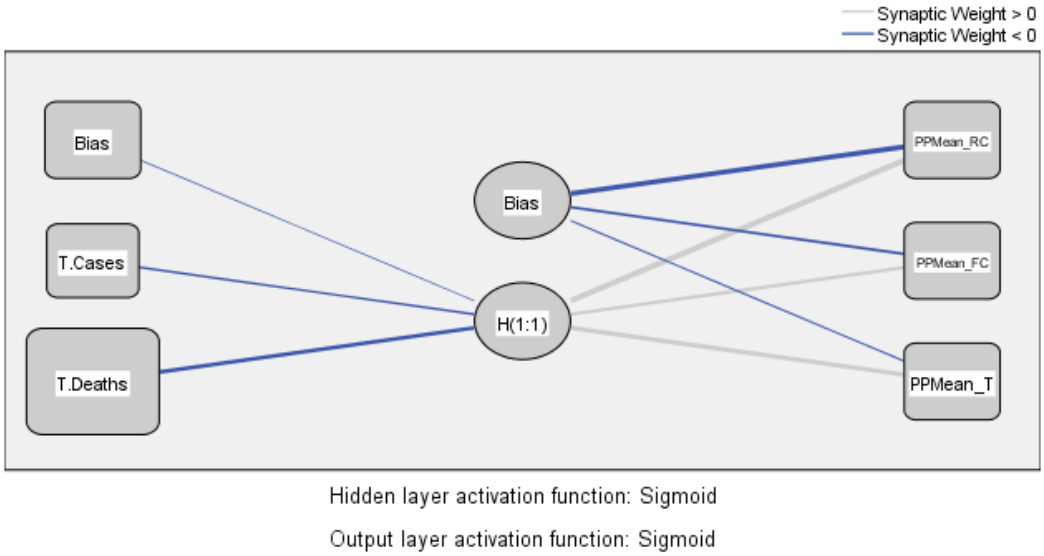

Figure 1. MLP for identifying the influences of COVID-19 variables on tourism activity change. Source: Developed using SPSS v.20.

Table 1. The predictors of the multilayer perceptron model on tourism activity change.

Predictor		Predicted					
		Hidden Layer 1	Output Layer				
		H(1:1)	PPMean_RC	PPMean_FC	PPMean_T	Importance	Normalized Importance
Input Layer	(Bias)	−0.213					
	T.Cases	−0.410				0.310	44.9%
	T.Deaths	−1.083				0.690	100.0%
Hidden Layer 1	(Bias)		−1.323	−0.510	−0.321		
	H(1:1)		1.824	1.009	1.181		

Source: Developed using SPSS v.20.

For the H2 hypothesis investigation, we used a hierarchical cluster analysis that allows the grouping of the studied countries into homogeneous clusters. Therefore, we conduct a hierarchic cluster analysis with the data collected for the variables PPMean_T, PPMean_RC, and PPMean_FC, and the results are shown in Table 2.

Within the dendrogram (Figure 2), two clusters can be observed depending on the percentage changes registered by the tourist activity. In addition to the two clusters, two countries made a discordant note (Malta and Slovakia). The evolutions in the percentage changes registered by the tourist activity of these countries do not fit within any cluster patterns.

The grouping of the 24 countries included in the research on homogeneous clusters is presented in Table 3.

The analysis of clusters shows that the percentage changes registered by the tourism activity of non-residents have been accentuated in all European countries due to travel restrictions. Minor differences can be observed between clusters, with Cluster 1 comprising countries that registered an average percentage decrease in the tourist activity of non-residents of −75.06. In contrast, Cluster 2 includes countries that reported an average percentage decrease of the tourist activity of non-residents of −80.92. The significant differentiation between the two clusters appears in terms of the percentage changes registered by the residents' tourist activity. The countries in Cluster 1 reported an average percentage decrease of the tourist activity of the residents of only −25.99.

Table 2. Agglomeration Schedule.

Stage	Cluster Combined		Coefficients	Appears		Next Stage
	Cluster 1	Cluster 2		Cluster 1	Cluster 2	
1	3	13	11.384	0	0	9
2	2	19	23.077	0	0	7
3	18	21	23.872	0	0	11
4	8	14	44.052	0	0	16
5	6	17	49.461	0	0	12
6	11	12	51.034	0	0	10
7	2	5	59.424	2	0	14
8	1	4	79.831	0	0	15
9	3	7	82.640	1	0	16
10	10	11	94.239	0	6	13
11	9	18	111.567	0	3	14
12	6	24	116.277	5	0	17
13	10	23	133.562	10	0	18
14	2	9	145.395	7	11	15
15	1	2	183.000	8	14	20
16	3	8	194.270	9	4	17
17	3	6	240.916	16	12	21
18	10	20	252.691	13	0	20
19	16	22	265.859	0	0	23
20	1	10	345.041	15	18	22
21	3	15	732.161	17	0	22
22	1	3	1151.768	20	21	23
23	1	16	2948.535	22	19	0

Source: Developed using SPSS v.20.

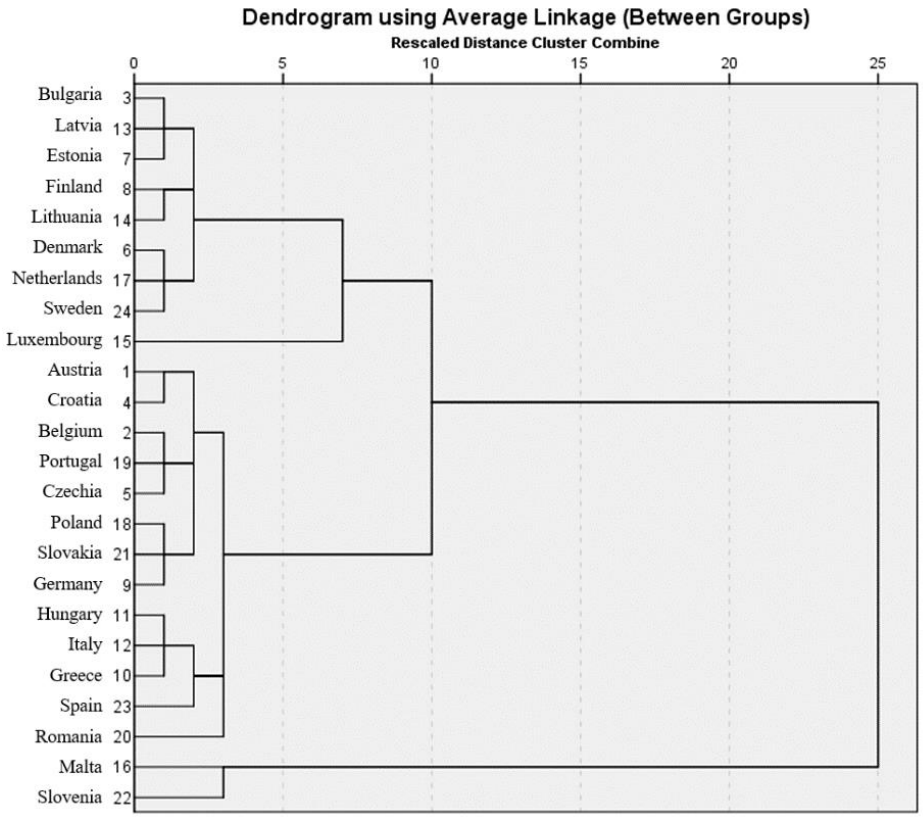

Figure 2. Dendrogram of clusters using as variables PPMean_T, PPMean_RC, and PPMean_FC. Source: Developed using SPSS.

Table 3. Clusters using percentage change in nights spent at tourist accommodation establishments.

	Country	No	PPMean_T	PPMean_RC	PPMean_FC
Cluster 1	Bulgaria	3	−70.59	−26.66	−77.47
	Latvia	13	−59.98	−24.87	−74.83
	Estonia	7	−56.85	−17.73	−79.36
	Finland	8	−50.00	−34.25	−84.62
	Lithuania	14	−55.41	−32.70	−81.26
	Denmark	6	−45.66	−28.05	−74.84
	Netherlands	17	−43.13	−23.00	−71.18
	Sweden	24	−45.27	−35.57	−73.89
	Luxembourg	15	−52.03	−11.04	−58.04
		Mean	−53.21	−25.99	−75.06
Cluster 2	Austria	1	−61.47	−41.51	−70.63
	Croatia	4	−69.74	−43.78	−74.87
	Belgium	2	−64.16	−48.34	−80.23
	Portugal	19	−70.65	−48.82	−82.00
	Czechia	5	−63.33	−43.86	−86.05
	Poland	18	−61.07	−57.30	−76.32
	Slovakia	21	−62.88	−53.79	−79.36
	Germany	9	−53.92	−48.50	−76.16
	Hungary	11	−72.32	−57.80	−88.27
	Italy	12	−68.59	−54.58	−82.27
	Greece	10	−75.89	−61.34	−78.14
	Spain	23	−79.19	−63.69	−87.95
	Romania	20	−63.40	−58.20	−89.73
		Mean	−66.66	−52.42	−80.92
Outside clusters	Malta	16	−79.62	10.87	−84.23
	Slovenia	22	−62.29	4.12	−83.25
		Mean	−70.96	7.50	−83.74

Source: Own calculation based on Eurostat data.

In contrast, the countries in Cluster 2 registered an average percentage decrease of the residents' tourist activity of −52.42. These developments in domestic tourism have influenced tourism as a whole, supporting the countries that have registered less pronounced decreases in domestic tourism. In conclusion, Cluster 1 includes countries that have successfully managed the effects of the COVID-19 pandemic on tourism (in all three aspects: resident tourism, non-resident tourism, and total tourism activity). Among the countries least affected in terms of tourism are the Scandinavian countries: Denmark, Sweden, the Netherlands, and Finland. Cluster 2 includes the countries most affected by the pandemic and which have suffered drastic declines in tourism. Among the countries most affected by the pandemic are countries with a significant share of tourism in GDP: Spain, Italy, Greece, Hungary, and Portugal. Malta and Slovakia are outside the two clusters because they have shown contradictory developments. Although there was a slight increase in the tourist activity of residents in the eleven months of the pandemic, the tourist activity of residents recorded a significant decrease.

The conclusion drawn from the cluster analysis is that the restrictive measures and the inclination of tourists to travel during the pandemic have led to much lower levels of tourism. There are differences in the variables PPMean_T, PPMean_RC, and PPMean_FC that allow grouping the European Union countries into clusters according to the effects of the economic and health crisis caused by COVID-19 on the tourism industry. This leads us to state that the H2 hypothesis is validated.

For the research of hypothesis H.3.G., we used structural equation modeling (SEM) to determine direct and indirect effects of total cases of COVID at 1 million population (TC1MP) and total deaths of COVID at 1 million people (TD1MP) on the evolution of average percentages of changes in tourism recorded in the eleven months of pandemic

(PPMean_T) and the percentage change of GDP per capita compared to the previous year (PC_GDP), using the inclination of tourists to travel during the COVID-19 pandemic (Incl) as a moderator. Figure 3 illustrates the relationships (standardized estimates) between the model variables to determine the moderation effect.

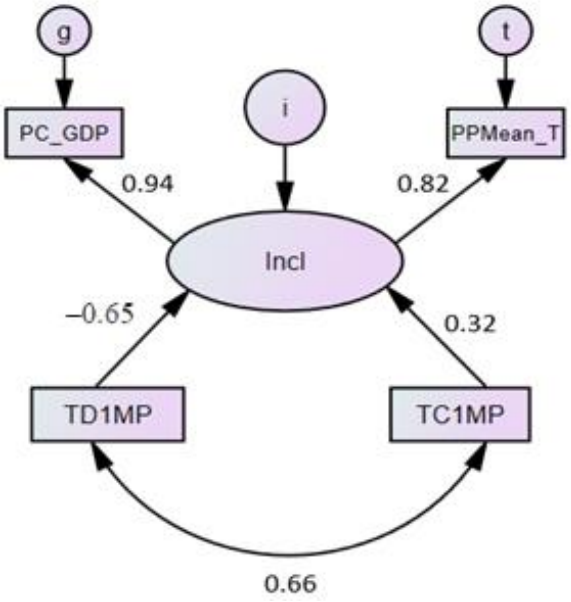

Figure 3. Diagram of SEM for variables that show the COVID-19 pandemic and variables that describe the evolution of tourism and the economy. Source: Developed using AMOS for SPSS v20.

In the model, we used methods for estimating the maximum probability. As a result, the non-standardized adjustment index (NNFI) and the comparative adjustment index (IFC) registered the values of 0.994 and 1000, respectively, which reveals a good significance (values higher than 0.9). Thus, the root mean square error of approximation (RMSEA) recorded by the model is 0.00. Table 4 shows the direct, indirect, and total standardized effects established between the model variables.

Table 4. Direct and indirect standardized effects.

Total Standardized Effects				Indirect Standardized Effects				Direct Standardized Effects			
	TC1MP	**TD1MP**	**Incl**		**TC1MP**	**TD1MP**	**Incl**		**TC1MP**	**TD1MP**	**Incl**
Incl	0.318	−0.649	0.000	Incl	0.318	−0.649	0.000	Incl	0.000	0.000	0.000
PPMean_T	0.261	−0.533	0.820	PPMean_T	0.000	0.000	0.820	PPMean_T	0.261	−0.533	0.000
PC_GDP	0.300	−0.613	0.945	PC_GDP	0.000	0.000	0.945	PC_GDP	0.300	−0.613	0.000

Source: Developed using AMOS for SPSS v20.

Figure 3 indicates that an increased inclination of tourists to travel during the COVID-19 pandemic (Incl) has strong positive effects on tourism and economic growth. Table 4 shows a significant moderating effect on the inclination of tourists to travel during the COVID-19 pandemic (Incl), especially regarding the impact of the variable on deaths caused by COVID-19 (TD1MP) on the two indicators describing the evolution of tourism and economy in general. An increase in deaths causes a decrease in economic activity (−0.613), and especially in tourism (−0.533) because it is affected by the inclination of tourists to travel during the COVID-19 pandemic (−0.649). The effects of the variable on deaths caused by COVID-19 are lower and have positive values. Data on cases of illness caused by COVID-19 have been questioned in many countries regarding registration and reporting. We can see that this variable (TC1MP) did not strongly influence the evolution of tourism and the economy in general, as it emerged from the normalized level of importance (44.9%) calculated for this variable in the analysis of artificial neural network MLP.

Research into the validity of the H3hypothesis has led us to conclude that the inclination of tourists to travel during the COVID-19 pandemic (Incl) acts as a solid moderating factor between the evolution of the total variable deaths of COVID at 1 million population (TD1MP), on the one hand, and the development of the average percentages of changes in tourism (PPMean_T) and the percentage change in GDP per capita (PC_GDP), on the other hand. Thus, the H3.G hypothesis is, in conclusion, partially validated.

5. Discussions

In the quantitative empirical research, we investigated the effects of the health and economic crisis caused by the COVID-19 pandemic on the tourism industry. The first research direction focused on the influence of two indicators illustrating the COVID-19 pandemic (number of cases and number of deaths) on tourist, domestic, international, and total services (H1 hypothesis). The research results indicate a significant influence, tourism being the most affected in which COVID-19 has evolved rapidly and extensively. The results obtained align with other research on the relationship between the COVID-19 pandemic and tourism [64,65]. Farzanegan et al. [64] analyzed the link between international tourism, COVID-19 cases, and deaths in over 90 countries using mathematical regression. These authors identified a positive correlation between the intensity and level of international tourism and cases and deaths of COVID-19. Countries exposed to large global tourism flows are most vulnerable to infections and deaths caused by the COVID-19 outbreak. Based on their estimates, increase in tourist arrivals and departures by 1% is linked to the rise in the level of cases confirmed by COVID-19 and deaths by 1.2% and 1.4%, respectively, taking into account other factors related to the specifics of tourism and the region [64]. Further, Duro et al. [65], in a study on the areas of Spain, noted the existence of a relationship between the intensity of the COVID-19 pandemic and tourism activity, which ultimately affects the GDP, especially of regions with a high percentage of tourism activity.

The second research direction was a cluster analysis based on nights spent at tourist accommodation establishments that allowed grouping the European Union countries into clusters according to the effects of the economic and health crisis caused by COVID-19 on the tourism industry (H2 hypothesis). The conclusion drawn from the cluster analysis is that the restrictive measures and the inclination of tourists to travel during the pandemic have led to much lower levels of tourism, especially in the countries most affected by the COVID-19 pandemic. Like Jones and Comfort [29] or Gössling and Hall [42], we consider that the health and economic crisis generated by COVID-19 is unprecedented, at least in the last 100 years, which has left tourism operators wholly unprepared. There was no research on the effects of such a global pandemic on tourism until the spread of COVID-19.

The third research direction aimed to identify the moderating effect of the inclination of tourists to travel, during the COVID-19 pandemic, between total deaths of COVID-19 variable, on the one hand, and the development of tourism and GDP per capita variables, on the other hand (H3hypothesis). Like other authors [66,67], we consider that the inclination of tourists to travel during the COVID-19 pandemic has changed for a long time, influencing long-term tourism patterns. Carr [66] shows that the consequences of the pandemic caused by the SARS-CoV-2 virus have a long time horizon with an intergenerational influence. On the other hand, Prideaux et al. [67] consider that the return to pre-pandemic growth patterns will be long and cumbersome. The duration will depend on the depth and extent of the economic recession. In their view, the tourism industry needs to move beyond previous models based on the pre-pandemic and move towards models that consider social responsibility and the sustainability of tourism. Yin and Ni [68] also studied the mediation effects of two categories of factors (fear of external threat and psychological safety) that influenced the evolution of tourism during the COVID-19 crisis. They believe that the emotional factors that determine the inclination of tourists to travel during the COVID-19 are essential in deciding to travel.

The declaration of the COVID-19 pandemic in 2020 has led to an unprecedented crisis due to the contagiousness of the SARS-CoV-2 virus and the high mortality rate. Travel

restrictions and stopping activities in hotels and restaurants to obey social distancing rules have generated the worst global crisis in tourism since World War II. Countries that had a significant contribution of tourism to GDP suffered the most from measures to combat the effects of the pandemic. These effects are still substantial despite vaccination campaigns in many countries. Until herd immunity is reached in most countries, tourism will be subject to multiple restrictions, especially internationally. In addition, the mutations that the virus can undergo can make current vaccination campaigns ineffective, requiring other types of vaccines. Thus, COVID-19 is a reality with which tourism must coexist even after declaring the end of the pandemic.

6. Main Resilience Measures in the Tourism Sector during the COVID-19 Pandemic

To achieve research objective RO2 (exploring the resilience measures to limit the impact of the COVID-19 pandemic on the tourism industry), we have conducted exploratory qualitative research on literature review, resulting in a synthesis of resilience measures and tourism policy objectives.

The health and economic crisis caused by the COVID-19 pandemic has produced profound changes that will have a permanent effect, influencing multiple aspects of social and economic life on our planet. In terms of tourism, the COVID-19 pandemic has profoundly affected international travel, led to a dramatic drop in demand in the tourism market, and led to structural unemployment in the tourism labor market, with the tourism industry being one of the largest employers of the world [21].

In a crisis, tourism operators are forced to change their operating strategies to survive on the market. Such events generate increased levels of uncertainty and involve precise and rapid responses to effectively combat adverse effects [69]. However, previous research highlights the existence of a low level of preparedness in the event of a crisis in the tourism industry [70] due to the precariousness of allocated resources [71] and the gap of knowledge and skills on the reaction to a significant crisis situation [72,73].

Rodríguez-Antón and Alonso-Almeida [74] have investigated responses and recovery strategies that can be adopted both at the level of the tourism operator and government authorities, and international institutions. Summarizing Rodríguez-Antón and Alonso-Almeida's conclusions [74], the primary response strategies are focused on reducing costs, promoting local and regional tourism markets, reducing prices by offering more good packages, and developing emergency plans and minimum policies.

Natural disasters and various pandemics have caused long periods of crises, but they have never been so long and have not affected tourism globally [74]. To remove the effects of these emergencies, more time is needed for recovery than in economic crises [75]. Campiranon and Scott [76] showed that the critical factors for crisis management in such situations are a well-developed resilience and contingency plan, market segmentation to mitigate losses in specific sectors not so severely affected by the crisis, promotion of recovery measures, and efficient human resources management. Published empirical researches on the impact of COVID-19 have reported severe declines in hotel revenue and occupancy capacity [18]. The most dangerous aspects for the tourism sector are the financial problems generated by the economic crisis and the declining propensity to consume, the uncertainty related to the duration of the pandemic, and tourists' fears to get sick in a severe form of the disease. Therefore, some authors [77,78] recommend changes in the business model, planning actions for the period during which the restrictions will be gradually lifted, and ensuring health protection measures that give tourists confidence. In this regard, Hu et al. recommend that all measures be taken to enhance the health and safety of employees (preventive measures, vaccination, periodic testing) so that they do not cause a new outbreak of COVID-19.

Based on the research results of Rodríguez-Antón and Alonso-Almeida [74], Hu et al. [20], and our own observations, we synthesize the main measures taken by the type of measures (financial, economic, sanitary, and labor) on three levels (international, national, and industry) to ensure the tourism sector's resilience (Table 5).

Table 5. The main measures to ensure the resilience of the tourism sector.

	International Level	National Level	Industry-Level
Financial measures	- financial assistance to countries with a significant tourism sector to fund plans to avoid mass redundancies due to the COVID-19 pandemic	- financial aid, by granting bank loans with public guarantees; - deferral of debts, business taxes, and self-employment for a certain period; - short-term liquidity support; - facilities for loans to tourism operators	- financial aid granted inside the industry to the most affected tour operators; - modification of the termination clauses; - negotiations with the banking system for credit restructuring
Economic measures	- ensuring economic growth that maintains the purchasing power of potential tourists, as well as encouraging tourism by promoting safe destinations	- assistance for the provision of digitized equipment and services and the implementation of telework solutions; - granting state guarantees; - coverage of a percentage of the registered losses	- adapting services to the needs of customers facing COVID-19 pandemic fears and choosing to travel; - providing innovative experiences through the use of digital media and augmented reality
Sanitary measures	- developing protocols to ensure safer international tourism in the wake of the COVID-19 pandemic	- initiatives to convey to the domestic and foreign tourist the feeling of health security: testing tourism employees, limiting capacities, ensuring distance, regular disinfection of all surfaces, monitoring traceability in case of outbreaks, development of guides, regulations, recommendations	- implementing strict hygiene standards, promoting social distancing, and avoiding, as far as possible, direct contact between employees and customers by encouraging digitalization
Labor measures		- making the labor market more flexible in tourism, through the possibility of temporary, part-time work, teleworking in more relaxed conditions; - coverage of the technical unemployment benefit from government funds	- training and awareness of employees on the importance of hygiene measures and social distancing

Source: Based on Rodríguez-Antón and Alonso-Almeida [74], Hu et al. [20], and own observations.

The role of economic and financial measures is a crucial aspect in combating the COVID-19 pandemic, especially in the field of tourism, where the following objectives must be taken into account [76]:

- Ensuring the functionality of tour operators by supporting regular testing and prioritizing vaccination of the tourism workforce;
- Providing financial aid, fiscal and economic facilities for tourism operators to help them survive in the market;
- Ensuring sufficient financial resources for people affected by the crisis (extended unemployment benefits) not to affect the population's living standard and determine the change in consumer behavior;
- Supporting private companies by granting subsidies, credit facilities, giving state guarantees;
- Supporting domestic tourism by encouraging citizens to plan their holidays within the country.

In a statement of Lund University, Gössling highlights the approaches to tourism resilience and environmental protection at the same time [79]: increasing travel time and maintaining local profits, targeting tourists from closer countries to encourage shorter distances, high-value travel services, offering bio or organic food to tourists, and direct targeting of tourists.

The pandemic generated by COVID-19 has led to significant changes in human mobility patterns, work patterns, and leisure patterns [80]. Furthermore, research by Venter et al. [81] shows that the COVID-19 pandemic underlined the importance of access to open spaces, which are interspersed with built-up areas, which leads city mayors to reconsider the value of green spaces and rethink the design of urban infrastructure to be resistant to such crises in the future.

An estimate of the return to regular tourism activity is challenging to approximate both in terms of time horizon and intensity of economic recovery. There are currently no indications of a rapid recovery in the tourism industry, as reported by Pine and McKercher [16] following the 2003 SARS outbreak in Hong Kong, despite the multiple vaccines that have been approved for use by health facilities around the world. The effects of the pandemic will be visible after the declaration of its termination, given the epidemiological outbreaks that will be active in various regions of the world. Therefore, the tourism industry needs to establish a plan of individual and systemic measures to help tourism operators manage the situation in the future, both in the pandemic and in the post-pandemic period. Under any new normality, environmental gains from the COVID-19 crisis may be lost, social and economic recovery may be slow if companies end corporate sustainability programs in the hospitality industry. Although the problem generated by COVID-19 has drawn attention to the changes needed to implement a more sustainable way of doing things, the slow social and economic recovery may affect the focus on the sustainability of tourism operators. As Cohen [82], Gossling, et al. [54], and Jones and Comfort [29] point out, the main challenge is the orientation towards social and environmental aspects, rather than economic ones and the transition from an individualistic to a collective, systemic, holistic thinking, which will allow better management of future crises generated by other pandemics. A change to sustainable tourism that no longer puts economic issues can affect many individuals and communities, especially in less developed countries, which depend on the tourism industry to ensure livelihoods.

7. Conclusions

A few months after the declaration of the COVID-19 pandemic in 2020, tourism entered a global impasse, giving rise to a series of debates on the need to change tourism business models to become more sustainable. To achieve the first research objective (RO1) on the effects of the health and economic crisis caused by the COVID-19 pandemic on the tourism industry, we conducted a quantitative, transversal empirical analysis using data on tourism activity, the medical situation regarding COVID-19, change of GDP per capita and the inclination of tourists to travel during the COVID-19 pandemic (as a moderator), within 24 EU countries. To achieve the second research objective (RO2) on the measures to limit the effects of the COVID-19 pandemic on the tourism industry, we conducted qualitative research of an exploratory nature on the most effective actions based on a literature review.

Regarding the sustainability perspective, it benefits from several factors that underlie the pandemic generated by COVID-19: reduced tourist demand, in the short term, due to traffic restrictions and those regarding social distancing; the tourism model is oriented towards smaller groups, more extended stays, and the preference for domestic tourism; and better reactivity and adaptability of tourism operators to the precarious demand on the market. However, if tourism returns to previous values, the same sustainability problems will affect the tourism industry. Therefore, government authorities and international tourism institutions must have a prompt response and intervene with regulations, but at the same time with incentives for tourism operators to adopt sustainable business models. Furthermore, such rules and measures must address the tourism infrastructure and how to

use it, destination marketing, geographical decentralization of tourism that is not related to historical objectives, and ensuring the tourists' safety.

The pandemic caused by COVID-19 is the largest pandemic that has affected the entire globe in the last hundred years, generating a substantial impact on the world economy and even devastating the tourism industry. These harmful effects have been caused by restrictions on movement and social distancing rules, fears of illness in an environment other than that provided by one's own home, and a temporary reduction in household income allocated to tourism. The response of international and supranational institutions, especially the European Union, has been swift and, to some extent, has halted the collapse of the tourism industry. The European Union has been involved as never before in reviving economic activity, establishing a resilience and recovery plan in its sphere of action. All EU member states have tried to adopt the best health measures, labor market measures, financial measures, and fiscal measures to combat the effects of the crisis. When vaccination campaigns are in full swing and are beginning to prove their effects, the tourism industry should focus on building confidence among tourists, strengthening their brand, and adapting operations to the current situation, still characterized by many restrictions. The strategies adopted could be valuable for other tourism operators, even in the conditions in which the pandemic will end, because new epidemiological outbreaks will remain or break out in different world regions.

There are currently considerable concerns about destinations and tourism operators (in terms of their survival). The challenge for sustainable global tourism is to identify a balance between maintaining tourism revenues in developed countries by increasing quality and avoiding over-tourism and targeting international tourism to less developed countries. All stakeholders must contribute to the reconceptualization and restructuring of tourism to the redirection of tourism to orient it towards a sustainable and resilient model, which is optimal in a constantly changing future and characterized by challenges.

A limitation of the research is the scarcity of macro data that determined us to perform a transversal and only partial quantitative analysis of the effects of the COVID-19 pandemic on tourism activity in the European Union. In addition, the scarcity of research papers on truly effective measures because the pandemic has not yet passed, has been an obstacle for the second part of the research. Future research requires a longitudinal approach to the impact of the COVID-19 pandemic on the tourism industry. In a forthcoming paper, we propose to research a micro-level (using primary sources) to obtain a triangulation of the results at the macro level. More research is needed on the reactive measures, but primarily proactive measures, that need to be taken to manage crises of this magnitude and to steer tourism towards more sustainable business models.

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