The current issue and full text archive of this journal is available on Emerald Insight at:
https://www.emerald.com/insight/2444-8494.htm

Explanatory power of the tourist destination competitiveness index on the control of the first wave of COVID-19

Juan Dempere and Kennedy Modugu
Higher Colleges of Technology, Ras Al Khaimah, United Arab Emirates

Received 27 July 2021
Revised 13 November 2021
24 March 2022
15 June 2022
6 August 2022
Accepted 17 August 2022

Abstract

Purpose – This article intends to analyse the explanatory power of the Travel and Tourism Competitiveness Index (TTCI) and some of its constituent factors on national success metrics in managing the initial surge of the COVID-19 pandemic.

Design/methodology/approach – The authors study the outbreak control effectiveness of 132 countries during the first semester of 2020. The authors apply generalized linear regression models and weighted least squares models using 6 COVID-19-related dependent variables, 9 TTCI-related independent variables and 12 control variables.

Findings – The results suggest that countries with superior TTCI values and selected constituent factors have the highest daily averages of coronavirus infections and fatalities per million and the highest speed rates of COVID-19 spread. The authors also find that these countries have the shortest government response time, the lowest daily average of the social restrictions index and the shortest time from the first case reported in China to the first case reported nationally.

Originality/value – To the best of the authors' awareness, no previous study exists analysing the statistical relationship between the TTCIB and some of its constituent factors with the selected metrics of national success at managing the initial surge of the COVID-19 pandemic. This fact represents the primary evidence of this article's unique contribution.

Keywords Destination competitiveness, Competitiveness index, Travel and tourism competitiveness index, Preventive healthcare, COVID-19

Paper type Research paper

1. Introduction

This article aims to provide statistical evidence about the Travel and Tourism Competitiveness Index's (TTCI) explanatory power on some countries' success metrics in managing the initial surge of the COVID-19 pandemic. Calderwood and Soshkin (2019), working at the World Economic Forum, compiled the TTCI. The Forum calculates the TTCI biannually in the context of their Industry Program for Aviation, Travel and Tourism. The TTCI compares the Travel and Tourism (T&T) competitiveness of 140 countries and assesses those national strategies and policies that allow sustainable growth for the T&T industry sector, promoting a country's development and competitiveness. The TTCI is a strategic benchmarking tool that enables the analysis of the strengths and weaknesses of each country's T&T sector to assess its competitiveness. The index constitutes a quantitative representation of the attractiveness of the national T&T business development rather than a

---

JEL Classification — I10, I15, Z30, Z38

European Journal of Management and Business Economics
Vol. 32 No. 3, 2023
pp. 296-319
Emerald Publishing Limited
e-ISSN: 2444-8494
p-ISSN: 2444-8451
DOI 10.1108/EJMBE-07-2021-0215

country's attractiveness as a T&T destination. The index informs about factors that drive domestic T&T competitiveness based on appropriate national policies, strategies, management systems and infrastructure aimed at attracting the T&T demand while preserving the local natural and cultural assets that support the domestic T&T industry.

The pandemic crisis' severe impact on the T&T industry sector has forced the creation of new industry standards and benchmarks. For example, in May 2021, the International Organization for Standardization published the ISO/PAS 5643 titled "Tourism and related services – Requirements and guidelines to reduce the spread of Covid-19 in the tourism industry" (International Organization for Standardization, 2021). Similarly, the World Travel and Tourism Council (2020) launched the global safety stamp to identify governments and businesses implementing global standardized health and hygiene protocols to provide a safe travel experience. Likewise, the UK-based consulting company Skytrax responsible for the prestigious international benchmark of airline excellence (the five-Star airline and airport ranking of quality achievement) launched the COVID-19 Safety Ratings covering airlines and airports across the world in 2020 (Skytrax, 2022).

Equally, the International Labour Organization (2020) suggested new standards called the prevention and control checklist for COVID-19 and accommodation and food service activities. In the same way, the World Health Organization (2020) informed about some guidelines for the COVID-19 management in hotels and other entities of the accommodation sector. Because of these new T&T standards and benchmarks, some T&T industry leaders have started to suggest the need to modify the TTCI's sub-indexes, pillars, and indicators. Indeed, Vinod Zutshi (2020), former Secretary at the Ministry of Tourism of India (2020), suggests that a review of the TTCI Health Safety pillar should include new national health protocols and safety standards for travellers.

The severe impact of the COVID-19 crisis on the T&T industry is responsible for the surge of new T&T industry standards and benchmarks listed above. Indeed, the outbreak has produced significant devastation in many economies worldwide, with those depending on T&T being the most affected. Before the COVID-19 crisis, T&T was considered a strategic industry sector for most economies. Indeed, the World Travel and Tourism Council (2019) estimated that T&T contributed 10.3% of the global gross domestic product (GDP), supporting around 330 million jobs worldwide. They also estimated that one out of ten jobs in 2019 was supported by the T&T industry globally and that one out of four new jobs created in 2019 came from the T&T sector. Similarly, the United Nations (UN, 2020) highlights that the T&T sector constitutes the livelihood of millions, representing over 20% of the GDP for some countries. The United Nations (UN) asserts that T&T was the third-largest export sector of the global economy before the pandemic and the most impacted by the COVID-19.

Some multilateral organizations have documented the significant impact of the COVID-19 crisis in the T&T sector. The UN Conference on Trade and Development (UNCTAD, 2021a), jointly with the United Nations World Tourism Organization (UNWTO), informs that the economic impact of the COVID-19 crisis was estimated to represent a loss of more than US$ 4 tn of the world's GDP for the period 2020–2021. In that report, the T&T sector alone was estimated to suffer a loss of US$ 2.4 tn worldwide, which would result in an average increase of 5.5% in global unemployment. They also inform about a reduction of one billion tourist arrivals in 2020, a decline of 74%, including many developing nations with a reduction of 80–90% and another reduction of 84% for the first quarter of 2021. According to Richter (2021a), this decline brought the T&T industry back to the late 1980s' levels.

In the same way, the World Travel and Tourism Council (2021a) informs that the T&T sector worldwide had shrunk 49.1% from 2019 to 2020. The T&T sector has declined from 10.4% of the global GDP (US$ 9.2 tn) in 2019 to 5.5% (US$ 4.7 tn) in 2020, representing a decrease of 49.1%. Similarly, the T&T jobs decreased from 334 million in 2019 to 272 million in 2020, constituting an 18.5% annual decline or 62 million lost jobs due to the pandemic crisis. Likewise, the Council also informs that in 2020, the average domestic visitor spending declined by 45%, while international visitors experienced an unprecedented 69.4% decrease. Richter (2021b) qualifies 2020 as the worst year in the T&T industry, with losses estimated at $1.3 tn in export revenue. Škare *et al.* (2021) estimate that the T&T industry's contribution to the world's GDP may decline from −4.1 US$ tn to −12.8 US$ tn by the end of the COVID-19 crisis. The UNCTAD (2021b) also informs about the UNWTO Panel of Tourism Experts survey, suggesting that T&T experts do not anticipate returning to pre-COVID arrival figures until 2023 or later. Another UNCTAD (2021c) report informs that almost 50% of the surveyed T&T experts suggest a return to 2019 levels in 2024 or later.

In the middle of the COVID-19 crisis, the World Bank (2020) provided some figures on the impact of the pandemic on individual T&T industry sub-sectors. According to the World Bank (2020), scheduled flights declined by 63% on a year-on-year basis during the first half of 2020. Similarly, in the accommodation and lodging sub-sector, Marriott, one of the world's leading hotel companies with 1.4m rooms worldwide, experienced a quarterly revenue contraction of 75%, a loss worse than that experienced during the 9/11 and the 2008 global financial crises combined. The World Bank also provides data from the American Hotel and Lodging Association regarding a decline of 80% of hotel rooms by April 15, 2020, with hotel occupancy rates below 20%. Equally, the World Bank's report on the Cruise Lines International Association informs a temporary suspension of all cruise operations starting in the first semester of 2020. This suspension represented a significant economic impact for most leading cruise companies worldwide, with Carnival Corporate as the most emblematic example experiencing a $500 m cash burn just in March 2020. In the same way, the World Bank informs about restaurants suffering a record decline in reservations worldwide in late February 2020, plummeting to zero by mid-March, representing the business death of thousands of independent entrepreneurs in this T&T sub-sector.

In this article, we study the influence of the TTCI and some of its constituent factors on some national success metrics in controlling the first wave of the COVID-19. To achieve this goal, we analysed a sample of 132 countries using generalized linear regression models and weighted least squares models to provide an insight into the impact of national T&T policies and strategies measured by the TTCI's sub-indexes and pillars at managing the initial surge of the COVID-19 pandemic. Our central hypothesis is that the TTCI and some of its constituent sub-indexes and pillars represent dimensions of national T&T policies, which may directly affect some selected metrics of effectiveness at controlling the first wave of COVID-19. No previous study exists to measure the efficacy of such national T&T policies in controlling the pandemic. Our exploratory study aims to identify whether such national T&T policies have been beneficial or detrimental in managing the outbreak. Our results may also shed light on some additional relevant factors to include in the TTCI sub-indexes and pillars for a post-COVID-19 world.

2. Literature review

There is a nascent and growing literature on the influence of COVID-19 in the T&T sector, but no previous article has addressed the relationship between TTCI and COVID-19. Balasundharam (2021) studies the impact of previous external shocks in the T&T sector of countries in the Asia and Pacific region. They find that the Pacific Island Countries have remained insulated from external shocks like the 9/11 attacks, the severe acute respiratory system (SARS) epidemic, etc. For this reason, these countries could benefit from temporary diversion gains from tourism competitor countries on visitor inflows. Similarly, Lai and Wong (2020) compare the hotel industry's performance at the beginning and during the COVID-19 crisis. They find that the strategies applied in the initial stage of the outbreak included price reductions and epidemic prevention practices. The lack of demand increases triggered the abandonment of price-based marketing tactics at later stages of the pandemic. However, epidemic prevention practices, including cutting labour and maintenance costs, remained in place.

Likewise, Knight *et al.* (2020) perform a vulnerability assessment of cruise lines, hotels, travel agencies and touristic attractions in the Wuhan and Hubei province. They find that most industry leaders in these sectors experienced economic losses due to the pandemic, with an immediate focus on cost control strategies and search for government subsidies. Respondents also informed about their plans for product adjustment and organizational business transformation strategies to be applied at later stages of the outbreak. Correspondingly, Jones and Comfort (2020) study the impact of the COVID-19 crisis on the sustainability of the hospitality industry sector. They identify a high risk of corporate sustainability programs being placed on hold due to the pandemic. Equally, Zhang *et al.* (2020) study hotel safety leadership's impact on labour safety behaviour during the COVID-19 crisis by applying a survey in four Chinese star-rated hotels in early February 2020. They find that safety leadership positively affects employee compliance, maintenance and improvement of hotel safety performance.

Some previous academic articles have partially addressed the relationship between government policies and the COVID-19 pandemic. Herren *et al.* (2020) study several dimensions influencing non-pharmaceutical interventions. These interventions were defined as the attempts to reduce social mobility to minimize the spread of the COVID-19. They find that GDP per capita, nation-individual pandemic trajectory and democracy index are significant variables in verifying peoples' acceptance of non-pharmaceutical interventions.

2.1 Travel and tourism competitiveness index

The TTCI is defined as a benchmarking metric that provides a unique insight into the strengths and weaknesses of each nation regarding its national T&T industry sector. As such, TTCI allows identifying emerging trends and risks related to the T&T industry, allowing governments to design their T&T policies and strategies better. Our exploratory study uses the TTCI and some of its constituent sub-indexes and pillars to determine the impact of national T&T policies' dimensions on selected variables measuring the effectiveness of controlling the first wave of COVID-19. No previous study exists analysing the impact of such national T&T policies on controlling the pandemic. The TTCI has been used in previous academic articles to compare the competitive factors identified by the T&T sector among different countries (Montanari and Girald, 2013; Javed and Tučková, 2019; Montero-Muradas and Oreja-Rodríguez, 2017; Kovalov *et al.*, 2017). The TTCI sub-indexes, pillars and indicators can also provide valuable information about different national policies to foster the T&T industry. For example, Ferreira and Castro (2020) make a TTCI factor analysis of 46 European countries and find that three TTCI factors explain 76.54% of the entire variation affecting tourism competitiveness.

Using a similar analysis, Kayar and Kozak (2010) apply a cluster analysis and multidimensional scaling techniques to study 13 TTCI factors of 28 European countries, including Turkey. They find that the most significant TTCI factors affecting their sample of countries' T&T competitiveness are air transport infrastructure, natural and cultural resources, ground transport infrastructure and health and hygiene. Similarly, Popescu *et al.* (2018) study 16 Central and Eastern Europe counties participating in the 16 + 1 platform initiated by China in 2011. By applying a multidimensional analysis of the tourism industry in their sample of countries, they find that tourism infrastructure is one of the main determinants of tourism competitiveness. In the same way, Nazmfar *et al.* (2019) study the tourism competitiveness index in a sample of Middle East countries by analysing the TTCI with a PROMETHEE model comparative analysis using data from 2015 to 2017. They find that the United Arab Emirates (UAE), Turkey and Saudi Arabia have the most robust T&T competitive performance.

Like in the present article, the TTCI sub-indexes, pillars and indicators have been used as independent variables for analytical purposes in previous academic articles. Indeed, Terzić (2018) studies the impact of the TTCI on the GDP growth rate among certain European countries. Using correlation analysis, he finds that GDP growth relies on a superior T&T environment, higher tourism destination competitiveness, new business opportunities and government backing. Equally, Petrova *et al.* (2018) study some leading macroeconomic indicators of the T&T industry for all the countries included in the TTCI. They select macroeconomic factors, including the TTCI general and intermediary scores, GDP and unemployment figures, income and expenditures for national markets' T&T services and foreign commerce. They find a lack of significant relationship between a national policy supporting the local T&T industry and the efficiency of the domestic T&T market. Likewise, Webster and Ivanov (2014) study the relationship between TTCI and economic growth, applying a cross-sectional analysis to a sample of 132 countries. They find that TTCI has no statistically significant relationship with tourism's support for economic growth.

The TTCI has been criticized as a valid measure of T&T's competitiveness. Indeed, Salinas *et al.* (2020) propose a synthetic index based on the 2017 TTCI's variables but using a different methodology. They aim to fix the TTCI's aggregation of calculated factors using different scales, subjective weighting, and information duplicity. They find that the most significant factors in tourism competitiveness are air transport infrastructures, cultural resources and information and communication technology readiness.

Previous academic articles have scarcely addressed the causal relationship between the T&T industry and the COVID-19 crisis. Only König and Adalbert (2020) find that national GDP growth projections made by multilateral agencies like the International Monetary Fund, the World Bank and the Organization for Economic Co-operation and Development are driven by the effectiveness of the government response to the outbreak and by the countries' exposure to the coronavirus transmission notably via tourism. According to the authors' knowledge, no previous research exists about the explanatory power of the TTCI and some of its constituent factors over applied metrics of national success at managing the initial surge of the COVID-19 pandemic. This fact constitutes the principal evidence of our study's original contribution.

According to the authors' knowledge, no previous research exists about the explanatory power of the TTCI and some of its constituent factors over applied metrics of national success at managing the initial surge of the COVID-19 pandemic. This fact constitutes the principal evidence of our study's original contribution. Additionally, our results can provide valuable statistical evidence that the TTCI and some of its metrics reflect national policies for pandemic control, which can help policymakers in evaluating the required time to adopt national government restriction policies and international coordination for minimize the outbreak T&T-based spread. Our results can also support the design of government information and communication technology policies aimed at minimizing the infodemic risk documented in previous research works (Dempere, 2021b).

3. Methodology

Our sample includes 132 countries with available data for our dependent and independent variables. We excluded countries with less than 250 K people to avoid outliers in our dependent variables. We also excluded countries with domestic conflicts (Libya, Yemen and Syria) and countries with external political confrontations affecting their capacity to manage the COVID-19 pandemic (Iran and Venezuela). Our dependent variables include the government's daily average of social restrictions index (DV1), the response time for outbreak control (DV2), the daily average of coronavirus infections (DV3) and deaths (DV4) per million, the COVID-19 speed of contagion/spread (DV5) and the time from the first case reported in China to the first case reported nationally (DV6). Similar to Erdem (2020) and Herren *et al.* (2020), we retrieved our dependent variables' data from the website Our World in Data, which was compiled by Hannah *et al.* (2020). The beginning outbreak date differs for every country; however, no country has data from a date before December 31, 2019. Correspondingly, the ending date for all countries in our sample is the same: July 10, 2020.

The government's daily average social restrictions index is a variable based on nine response scores, including school closings, workplace closures, travel forbids, etc. This index is quantified on a scale from 0 to 100, where 100 represents the strictest government social restrictions to contain the COVID-19. The daily average of this index for each country in our sample is determined from the first reported case's date until July 10, 2020. The government response time for outbreak control is defined as the number of days between the first reported COVID-19 infection's date and the date of the first maximum of the curve resulting from the five-day moving average of the daily new coronavirus infections.

Our methodology is similar to that of Bjørnskov (2016), who finds a negative association between the recovery time measured by the peak-to-trough ratio of real GDP per capita and the initial economic freedom. However, he studies crises of economic nature. The daily averages of coronavirus infections and deaths per million were calculated by dividing the total number of infections and deaths per million by July 10, 2020, over the number of days since the first COVID-19 infection date. The speed of contagion/spread of the coronavirus is defined as the approximation of the first derivative of the new cases per million curve. This approximation was determined by calculating the average daily change of new coronavirus infections per million from the first reported case until July 10, 2020. The outbreak arrival time is defined as the time from the first case reported in China to the first case reported nationally, which intends to measure how fast the coronavirus was brought to a particular country in our sample.

Our primary independent variables include the 2019 TTCI (IVAR1) and some of its constituent variables. The TTCI comprises 4 sub-indexes, 14 pillars and 90 independent metrics. The TTCI sub-indexes and pillars selected as relevant independent variables include the T&T policy and enabling conditions (IVAR2), infrastructure (IVAR3), health and hygiene (IVAR4), information and communication technology readiness (IVAR5), T&T prioritization (IVAR6), international openness (IVAR7), air transportation infrastructure (IVAR8) and ground and port infrastructure (IVAR9).

The enabling environment sub-index measures the overall national requirements for running a business and comprises five pillars. These pillars are a country's business environment, safety and security, health and hygiene, human resources and labour market, and information and communication technology readiness. Only the health and hygiene and information and communication technology readiness pillars are included in our analysis since the other pillars include metrics that have no explanatory power over our COVID-19 dependent variables (e.g. property rights, cost and time to start a business, total tax rate, time and cost of construction permits, hiring and firing practices, reliability of police services, homicide rates, business costs of crime, violence, terrorism, etc).

The T&T policy and enabling conditions sub-index considers the national policies and strategies directly influencing the T&T industry sector. This sub-index includes four pillars: the prioritization of travel and tourism, international openness, price competitiveness, and environmental sustainability. Only the first two pillars listed before are included in our analysis since the excluded pillars' estimations require metrics that have no explanatory power over our COVID-19 dependent variables (e.g. hotel price index, purchasing power parity, fuel price levels, stringency and enforcement of environmental regulations, number of environmental treaty ratifications, etcetera).

The infrastructure sub-index measures the quality and availability of each country's physical infrastructure and includes three pillars: air transportation infrastructure, ground and port infrastructure, and tourism service infrastructure. This last pillar was excluded because it includes dimensions with no explanatory power over our pandemic-related variables (e.g. hotel rooms, presence of major car rental companies, automated teller machines per adult population, etc). The natural and cultural resource sub-index measures the main motivations to travel and includes two pillars: natural resources and cultural resources and business travel. Our analysis excludes this last sub-index and its two constituent pillars because they include metrics with no explanatory power over our outbreak-related variables (e.g. number of World Heritage natural sites, total know species, the attractiveness of natural assets, number of oral and intangible cultural heritage expressions, etc).

The health and hygiene pillar includes but is not limited to measuring access to potable drinking water and sanitation, the accessibility of hospital beds and medical doctors, prevalence of human immunodeficiency virus, malaria, etc. The information and communication technology readiness pillar captures the nature of modern hard infrastructure (e.g. mobile network coverage and reliability of power supply) and the capacity of businesses and people to provide and receive benefits from online services. The prioritization of the T&T pillar measures the degree to which a country prioritizes the T&T sector by channelling project development funds and resources necessary to develop this industry. The pillar includes, but is not limited to, the effectiveness of national T&T marketing promotions and country brand, government spending, the comprehensiveness and timeliness of T&T national data supply to global organizations, etcetera.

The international openness pillar assesses the degree of a country's openness and T&T facilitation. It includes but is not limited to a government's openness to joint national air service arrangements, number of regional subscribed trade agreements, visa requirements, etc. The air transportation infrastructure pillar calculates the air transportation applying variables such as available seat kilometres, total departures, airport density and quantity of operational airlines. It also measures the air transportation's infrastructure quality for local and transnational flights. The ground and port infrastructure pillar considers road and railroad network readiness, determined by the densities of domestic roads and railroads.

Lastly, we chose some control variables that have shown a significant relationship with our dependent variables (Dempere, 2021a). These control variables comprise the population density (CV1) compiled by Hannah *et al.* (2020) and the percentage of urban population (CV2) gathered by the World Bank (2020). We also include the freedom of foreign movement (CV3) compiled by the V-Dem Institute (2020). This variable is defined as the degree of freedom of a country's people to travel freely to and from their country and emigrate without government restrictions. Similarly, we use the estimated 2019 body mass index trends (CV4) among adults, age-standardized (kg/m2) compiled by the World Health Organization (2020), as a measure of national obesity. We also use the 2019-forecasted average body mass data for men (CV5) and women (CV6) retrieved from the same source. Likewise, we use the population's median age (CV7) and proportion of 65 years old or older (CV8); the death rate from cardiovascular illness, cancer, diabetes or recurring lung diseases (CV9) and the GDP per capita (CV10) all recorded by Hannah *et al.* (2020).

We apply the same methodology as König and Winkler (2020). They find that cross-country heterogeneity based on the T&T exposure has a significant relationship with the economic impact of the COVID-19 crisis projected by international multilateral agencies. They find that countries with greater economic dependence on T&T exhibit significantly greater negative economic growth corrections than nations where T&T has a less meaningful economic role. Like König and Winkler (2020), we also use the international tourism receipts as a percentage of total exports (CV11). Additionally, we use the number of 2019 T&T

arrivals as a percentage of the total population (CV12). Data for these last two control variables were retrieved from the World Bank's (2021) website.

Generalised linear regression models have been used for analysis purposes in our study. We also apply weighted least squares models to analyse the relationship between our dependent and independent variables. Finally, we use logarithmic transformations to our dependent and independent variables when analysing our regression models.

4. Results

We grouped our sample based on the 2019 TTCI from highest to lowest and determined the first (lowest or Q1) and fourth (highest or Q4) quartiles. The results in Table 1 provide evidence that countries with the highest TTCI (Q4) have the lowest daily average of the social restrictions index (Q4:27.92 vs Q1:53.16), the shortest government response time for outbreak control (Q4:74.3 days vs Q1:99.9 days) and the highest daily average of coronavirus infections per million (Q1:4.56 vs Q4:22.3). Table 1 also shows that these countries have the highest daily average of fatalities per million (Q4:1.63 vs Q1:0.15), the highest speed of coronavirus contagion/spread (Q4:2.12 vs Q1:0.26) and the shortest outbreak arrival time (Q4:39.70 days vs Q1:77.36 days).

The results of Table 1 imply that on average and *ceteris paribus*, nations enjoying the highest TTCI did not impose rigorous social restrictions on their citizens to manage the initial surge of COVID-19. Such restrictions may have been considered initially incompatible with a reputable T&T destination. However, these countries could react faster to manage the initial coronavirus surge. Nevertheless, this faster response did not avoid suffering the highest daily average of coronavirus infections and fatalities per million. Equally, these highly ranked TTCI countries experienced the highest average coronavirus contagion/spread rate and the quickest arrival of the pandemic to their communities. Our results reinforce those of Wang (2021), who finds that nations with strict government policies determine the success of social distancing and the effectiveness of government efforts to mitigate the spread of COVID-19.

Similarly, we grouped our sample according to our dependent variables from highest to lowest and established the first (lowest or Q1) and fourth (highest or Q4) quartiles for each variable. Table 2 contains the independent sample tests' results comparing the first and fourth quartiles based on our dependent variables to analyse our independent variables. The significant results suggest that nations with the lowest daily average of social restrictions index and the shortest outbreak response and arrival times have (*ceteris paribus*) the highest TTCI values, better T&T policies and enabling conditions, superior infrastructure, health and hygiene, information and communication technology readiness, T&T prioritization, international openness, air transport infrastructure, and ground and port infrastructure. Table 2 provides similar results for nations with the lowest government response time, except that the TTCI, T&T prioritization and the air transportation infrastructure are not statistically significant.

Table 1. Results of independent samples tests. Dependent variables contrast of countries grouped by their 2019 TTCI

2019 TTCI (IVAR1)	DV1	DV2	DV3	DV4	DV5	DV6
Q1	53.16	99.88	4.56	0.15	0.26	77.36
Q4	27.92	74.3	22.30	1.63	2.12	39.70
t-sta	4.99	2.74	−5.18	−4.5	−3.83	9.55
p-val	[0.00]****	[0.008]***	[0.00]****	[0.00]****	[0.00]****	[0.00]****

Note(s): ****, *** ** and * indicate statistical significance at the 0.1, 1, 5 and 10% level of confidence, correspondingly

Table 2.
Results of independent samples tests. Independent variables contrast of nations grouped by our dependent variables

	IVAR1	IVAR2	IVAR3	IVAR4	IVAR5	IVAR6	IVAR7	IVAR8	IVAR9
Daily average of social restrictions index (DV1)									
Q1	4.19	4.57	4.13	5.65	5.18	4.98	3.67	3.65	4.01
Q4	3.72	4.29	3.23	4.92	4.31	4.48	3.12	2.87	3.12
t-sta	3.04	2.90	3.68	2.92	3.28	2.48	2.67	2.86	3.63
p-val	[0.003]***	[0.005]***	[0.00]****	[0.005]***	[0.002]***	[0.016]**	[0.01]**	[0.006]***	[0.001]***
Government response time (DV2)									
Q1	4.12	4.59	4.12	5.69	5.26	4.98	3.69	3.48	4.00
Q4	3.87	4.37	3.43	4.93	4.48	4.59	3.20	3.08	3.32
t-sta	1.72	2.51	2.96	2.86	3.09	1.99	2.48	1.54	2.94
p-val	[0.09]*	[0.015]**	[0.004]***	[0.006]***	[0.003]***	[0.05]*	[0.016]**	[0.13]	[0.005]***
Daily average cases per million (DV3)									
Q1	3.41	4.18	2.90	3.86	3.71	4.32	2.83	2.44	2.88
Q4	4.25	4.48	4.27	5.66	5.31	4.80	3.52	3.84	4.03
t-sta	−5.41	−3.33	−5.61	−6.97	−6.32	−2.62	−3.35	−5.33	−4.48
p-val	[0.00]****	[0.001]***	[0.00]****	[0.00]****	[0.00]****	[0.01]**	[0.001]***	[0.00]****	[0.00]****
Daily average deaths per million (DV4)									
Q1	3.49	4.22	3.07	3.96	3.91	4.45	2.97	2.60	3.03
Q4	4.42	4.57	4.31	5.81	5.27	4.76	3.84	3.91	4.03
t-sta	−5.45	−3.96	−4.54	−7.10	−5.17	−1.52	−4.36	−4.24	−3.47
p-val	[0.00]****	[0.00]****	[0.00]****	[0.00]****	[0.00]****	[0.135]	[0.00]****	[0.00]****	[0.001]***
Speed of contagion/Spread of the coronavirus (DV5)									
Q1	3.41	4.17	2.84	3.85	3.56	4.26	2.88	2.54	2.95
Q4	4.30	4.53	4.36	5.82	5.34	4.81	3.67	3.93	4.25
t-sta	−4.89	−3.57	−5.82	−7.28	−6.88	−2.45	−3.66	−5.00	−4.66
p-val	[0.00]****	[0.001]***	[0.00]****	[0.00]****	[0.00]****	[0.017]**	[0.001]***	[0.00]****	[0.00]****
Time from the first case reported in China to the first case reported nationally (DV6)									
Q1	4.43	4.51	4.44	5.59	5.32	4.98	3.54	4.21	4.25
Q4	3.15	4.09	2.52	3.66	3.36	4.05	2.80	2.02	2.58
t-sta	9.63	4.83	9.33	7.51	8.24	5.21	3.86	10.32	7.56
p-val	[0.00]****	[0.00]****	[0.00]****	[0.00]****	[0.00]****	[0.00]****	[0.00]****	[0.00]****	[0.00]****

Note(s): ****, ***, ** and * indicate statistical significance at the 0.1, 1, 5 and 10% level of confidence, correspondingly

Table 2 also has significant outcomes for nations with the highest daily average of coronavirus infections per million and the highest speed of contagion who have (*ceteris paribus*) the lowest TTCI, worse T&T policies and empowering conditions, inadequate infrastructure, health and hygiene, information and communication technology readiness, T&T prioritization, international openness, air transport infrastructure and ground and port infrastructure. Correspondingly, Table 2 shows similar significant results for countries with the highest fatalities per million, except that the T&T prioritization is not statistically significant.

Tables 3–5 show the results of the cross-sectional analysis using our generalized linear models. The significant results provide evidence that the TTCI and all its sub-indexes and pillars considered in this article have a negative and significant relationship with the daily average of the social restrictions index, the government response time for outbreak control and the outbreak arrival time. These results support those in Table 2 since the negative coefficients in Tables 3–5 match the relationships reported in Table 2. These results also indicate that those nations with high TTCI values and selected sub-indexes and pillars enforced the softest social restrictions to manage the initial surge of COVID-19 and experienced the shortest outbreak response and arrival times.

Similarly, Tables 3–5 show that the TTCI and its selected sub-indexes and pillars have a positive and significant association with the coronavirus's speed of contagion/spread, except for the air transportation infrastructure sub-pillar, which has a marginally significant relationship with this variable. The same positive and significant relationship is verified between the daily average of coronavirus infections and fatalities per million and some of the TTCI sub-indexes and pillars considered in this study. Specifically, the daily average of coronavirus infections per million has a positive and significant relationship with the country's health and hygiene, information and communication technology readiness, and the T&T prioritization sub-pillars. Likewise, the daily average of fatalities per million has a statistically significant and positive relationship with the corresponding country's TTCI, its T&T policy and enabling conditions, infrastructure, health and hygiene, T&T prioritization, international openness and air transportation infrastructure. Our results are consistent with those of Nunkoo *et al.* (2021), who find a positive and significant relationship between domestic T&T and the number of COVID-19 cases and deaths for the first six months of 2020.

Similarly, our results regarding a positive and significant relationship between a country's information and communication technology readiness and its daily average of coronavirus infections and deaths per million are consistent with the difficulties posed by fake news during the early pandemic stages. Pandemic fake news and social media deception have challenged countries with superior information and communication technology readiness. Indeed, the World Health Organization (WHO, 2021a) united the UK government in the consciousness campaign named "*Stop The Spread*," which intended to increase awareness about the threats of COVID-19 misinformation.

Tables 3–5 also show that the only control variable with consistent statistically significant results is the percentage of the urban population. This independent variable has a positive and significant association with the daily average of coronavirus infections and fatalities per million. Our results are consistent with Allcott *et al.* (2020), who study partisan differences in the US response to COVID-19 and find significant partisan gaps in pandemic-related beliefs and behaviours. They find that Democrats tend to live in populous urban areas severely impacted by the pandemic and exposed to mobility restrictions and higher motivations for social distance, while Republicans engage in less social distancing. Our results also agree with the study of Ando *et al.* (2021). They study a stochastic model for COVID-19 with variables measuring viral transmission probability, detection probability and individual mobility within a population. They find that lockdown policies should be adjusted according to differences between high versus low-density populated areas.

Table 3.
Cross-sectional analysis

Daily average restrictions index (LOG[DV1])									
C	6.59	10.96	4.06	4.85	5.32	6.80	5.40	4.43	4.89
t-sta	6.48	4.97	4.15	4.68	5.51	4.69	5.14	4.57	5.23
p-val	(0.00)****	(0.00)****	(0.00)****	(0.00)****	(0.00)****	(0.00)****	(0.00)****	(0.00)****	(0.00)****
	IVAR1	*IVAR2*	*IVAR3*	*IVAR4*	*IVAR5*	*IVAR6*	*IVAR7*	*IVAR8*	*IVAR9*
LOG(IVAR)	−2.49	−4.69	−2.40	−1.01	−2.26	−1.69	−1.22	−1.30	−2.05
t-sta	−3.72	−3.92	−6.11	−2.24	−4.15	−2.23	−2.55	−3.64	−5.21
p-val	(0.00)****	(0.00)****	(0.00)****	(0.03)**	(0.00)****	(0.03)**	(0.01)**	(0.00)****	(0.00)****
LOG(CV1)	−0.01	−0.02	0.06	−0.04	−0.01	−0.06	−0.02	−0.01	0.10
t-sta	−0.16	−0.33	1.07	−0.63	−0.25	−1.00	−0.37	−0.26	1.51
p-val	(0.87)	(0.74)	(0.29)	(0.53)	(0.81)	(0.32)	(0.71)	(0.79)	(0.13)
LOG(CV2)	0.40	0.33	0.83	0.31	0.65	0.10	0.11	0.42	0.48
t-sta	1.67	1.47	3.18	1.21	2.29	0.46	0.57	1.65	2.07
p-val	(0.10)	(0.14)	(0.002)***	(0.23)	(0.02)**	(0.65)	(0.57)	(0.10)	(0.04)**
LOG(CV3)	−0.05	−0.14	−0.19	−0.15	0.00	−0.12	0.02	−0.20	−0.07
t-sta	−0.18	−0.48	−0.80	−0.57	0.00	−0.45	0.06	−0.79	−0.26
p-val	(0.86)	(0.63)	(0.43)	(0.57)	(1.00)	(0.65)	(0.95)	(0.43)	(0.80)
LOG(CV11)	−0.03	0.12	0.10	−0.06	−0.01	0.01	−0.04	−0.04	−0.05
t-sta	−0.57	1.32	1.14	−1.29	−0.30	0.14	−0.83	−0.79	−1.07
p-val	(0.57)	(0.19)	(0.26)	(0.20)	(0.77)	(0.89)	(0.41)	(0.43)	(0.29)
Government response time (LOG[DV2])									
C	6.05	9.59	5.08	5.35	5.56	10.84	5.65	4.46	4.64
t-sta	6.69	4.93	6.41	6.11	0.78	6.12	6.28	4.87	4.95
p-val	(0.00)****	(0.00)****	(0.00)****	(0.00)****	(0.00)****	(0.00)****	(0.00)****	(0.00)****	(0.00)****
	IVAR1	*IVAR2*	*IVAR3*	*IVAR4*	*IVAR5*	*IVAR6*	*IVAR7*	*IVAR8*	*IVAR9*
LOG(IVAR)	−1.23	−2.99	−1.33	−0.93	−1.69	−4.67	−0.83	−0.77	−1.40
t-sta	−2.02	−2.68	−3.45	−2.30	0.37	−3.68	−2.01	−2.42	−4.07
p-val	(0.04)**	(0.008)***	(0.00)****	(0.02)**	(0.00)****	(0.00)****	(0.05)**	(0.02)**	(0.00)****
LOG(CV1)	−0.03	−0.02	0.01	−0.03	−0.01	0.43	−0.02	−0.01	0.07
t-sta	−0.54	−0.57	0.24	−0.57	0.04	2.42	−0.48	−0.38	1.53

(*continued*)

Table 3.

Government response time (LOG[DV2])									
p-val	(0.59)	(0.57)	(0.81)	(0.57)	(0.88)	(0.02)**	(0.64)	(0.71)	(0.13)
LOG(CV2)	0.19	0.11	0.39	0.28	0.50	0.14	0.07	0.40	0.51
t-sta	0.98	0.71	1.84	1.39	0.21	0.55	0.45	1.64	2.23
p-val	(0.33)	(0.48)	(0.07)*	(0.17)	(0.90)	(0.59)	(0.65)	(0.10)	(0.03)**
LOG(CV3)	−0.10	−0.02	−0.08	−0.13	−0.02	0.02	−0.03	−0.36	−0.27
t-sta	−0.41	−0.08	−0.34	−0.54	0.24	0.07	−0.10	−1.62	−1.21
p-val	(0.69)	(0.94)	(0.74)	(0.59)	(0.93)	(0.94)	(0.92)	(0.11)	(0.23)
LOG(CV11)	−0.02	0.00	−0.01	−0.02	0.00	−0.03	−0.02	−0.01	−0.01
t-sta	−0.55	−0.01	−0.15	−0.63	0.04	−1.49	−0.56	−0.07	−0.10
p-val	(0.58)	(0.99)	(0.88)	(0.53)	(0.98)	(0.14)	(0.58)	(0.94)	(0.92)

Note(s): ****, ***, ** and * indicate statistical significance at the 0.1, 1, 5 and 10% level of confidence, correspondingly. The table contains t-statistic and their corresponding p-values below in brackets. The independent variables were included separately in the same regression model to avoid problems of multicollinearity. We applied the Breusch–Pagan–Godfrey and the White heteroskedasticity tests. We analysed the same models using the number of 2019 T&T arrivals as a percentage of the total population (CV12) and get similar results in terms of significance and signs. Similarly, we also applied weighted least squares models with the same significant results and signs, but these additional results were omitted due to our article's length restrictions for publication purposes

Table 4.
Cross-sectional analysis

Daily average infections per million (LOG[DV3])									
C	−6.46	−7.95	−4.33	−5.21	−4.81	5.10	−5.20	−4.74	−4.90
t-sta	−3.83	−2.18	−3.31	−4.28	−3.64	2.64	−3.68	−3.76	−3.82
p-val	(0.00)****	(0.02)**	(0.001)***	(0.00)****	(0.00)****	(0.01)**	(0.00)****	(0.00)****	(0.00)****
	IVAR1	*IVAR2*	*IVAR3*	*IVAR4*	*IVAR5*	*IVAR6*	*IVAR7*	*IVAR8*	*IVAR9*
LOG(IVAR)	1.93	1.99	0.98	1.20	1.70	−5.85	0.58	0.66	0.68
t-sta	1.27	0.78	1.28	2.03	1.97	−4.68	0.69	1.05	0.91
p-val	(0.21)	(0.44)	(0.21)	(0.05)**	(0.05)**	(0.00)****	(0.49)	(0.30)	(0.36)
LOG(CV1)	0.06	0.09	−0.01	0.04	−0.02	0.43	0.05	0.05	0.02
t-sta	0.59	0.95	−0.12	0.39	−0.16	2.48	0.55	0.50	0.18
p-val	(0.55)	(0.35)	(0.90)	(0.70)	(0.87)	(0.02)**	(0.59)	(0.62)	(0.86)
LOG(CV2)	1.33	1.58	1.29	1.28	1.07	1.58	1.61	1.45	1.50
t-sta	2.76	4.07	3.24	3.34	2.65	4.74	5.07	4.04	4.34
p-val	(0.007)***	(0.00)****	(0.007)***	(0.001)***	(0.009)***	(0.00)****	(0.00)****	(0.00)****	(0.00)****
LOG(CV3)	−0.10	−0.08	−0.13	−0.09	−0.21	−0.03	−0.14	−0.04	−0.08
t-sta	−0.33	−0.26	−0.53	−0.38	−0.84	−0.14	−0.52	−0.14	−0.32
p-val	(0.74)	(0.79)	(0.60)	(0.70)	(0.40)	(0.89)	(0.61)	(0.89)	(0.75)
LOG(CV11)	−0.07	−0.06	−0.02	−0.02	−0.03	0.01	−0.02	−0.02	−0.01
t-sta	−0.63	−0.49	−0.35	−0.45	−0.57	0.31	−0.33	−0.35	−0.16
p-val	(0.53)	(0.62)	(0.73)	(0.66)	(0.57)	(0.76)	(0.74)	(0.73)	(0.87)
Daily average deaths per million (LOG[DV4])									
C	−1.71	−3.12	−0.97	−1.01	−1.11	0.86	−1.59	−1.13	−0.98
t-sta	−2.98	−3.22	−1.79	−2.07	−1.98	0.76	−2.67	−2.07	−1.99
p-val	(0.00)****	(0.00)****	(0.08)*	(0.04)**	(0.05)**	0.45	(0.009)***	(0.04)**	(0.05)**
	IVAR1	*IVAR2*	*IVAR3*	*IVAR4*	*IVAR5*	*IVAR6*	*IVAR7*	*IVAR8*	*IVAR9*
LOG(IVAR)	0.97	1.33	0.58	0.23	0.27	−0.97	0.61	0.48	0.34
t-sta	3.53	2.48	3.03	1.98	1.25	−2.59	3.69	2.71	1.71
p-val	(0.00)****	(0.02)**	(0.003)***	(0.05)**	(0.21)	(0.01)**	(0.00)****	(0.008)***	(0.09)*
LOG(CV1)	0.01	0.03	0.00	0.02	0.02	0.22	0.02	0.02	0.00
t-sta	0.20	0.92	−0.05	0.72	0.67	2.95	0.85	0.68	0.05

(*continued*)

Daily average deaths per million (LOG[DV4])									
p-val	(0.84)	(0.36)	(0.96)	(0.47)	(0.51)	(0.004)***	(0.40)	(0.50)	(0.96)
LOG(CV2)	0.21	0.37	0.22	0.31	0.32	0.31	0.37	0.27	0.30
t-sta	2.11	3.10	1.86	2.76	2.12	1.94	3.47	2.34	2.92
p-val	(0.04)**	(0.002)***	(0.07)*	(0.007)***	(0.04)**	(0.05)**	(0.00)****	(0.02)**	(0.004)***
LOG(CV3)	0.08	0.08	0.10	0.13	0.14	−0.41	0.04	0.16	0.12
t-sta	1.51	1.31	1.69	2.21	1.93	−1.69	0.66	2.52	2.20
p-val	(0.13)	(0.19)	(0.09)*	(0.03)**	(0.06)*	(0.10)	(0.51)	(0.01)**	(0.03)**
LOG(CV11)	−0.02	−0.06	−0.04	−0.01	−0.02	0.02	−0.06	−0.04	−0.01
t-sta	−0.84	−1.64	−1.27	−0.35	−0.50	1.53	−1.66	−1.21	−0.27
p-val	(0.40)	(0.10)	(0.21)	(0.73)	(0.62)	(0.13)	(0.10)	(0.23)	(0.79)

Note(s): ****, ***, ** and * indicate statistical significance at the 0.1, 1, 5 and 10% level of confidence, correspondingly. The table contains t-statistic and their corresponding *p*-values below in brackets. The independent variables were included separately in the same regression model to avoid problems of multicollinearity. We applied the Breusch–Pagan–Godfrey and the White heteroskedasticity tests. We analysed the same models using the number of 2019 T&T arrivals as a percentage of the total population (CV12) and get similar results in terms of significance and signs. Similarly, we also applied weighted least squares models with the same significant results and signs, but these additional results were omitted due to our article's length restrictions for publication purposes

Table 4.

Table 5. Cross-sectional analysis

Speed of contagion/Spread of the coronavirus (LOG[DV5])									
C	−1.50	−5.14	−0.96	−1.18	−1.17	0.65	−1.51	−0.58	−1.17
t-sta	−2.26	−2.99	−1.54	−2.34	−2.19	0.90	−2.34	−1.11	−2.03
p-val	(0.03)**	(0.003)***	(0.13)	(0.02)**	(0.03)**	0.37	(0.02)**	0.27	(0.05)**
	IVAR1	*IVAR2*	*IVAR3*	*IVAR4*	*IVAR5*	*IVAR6*	*IVAR7*	*IVAR8*	*IVAR9*
LOG(IVAR)	0.95	2.72	0.89	0.61	1.15	−0.77	0.71	0.38	0.99
t-sta	2.12	2.38	2.53	2.24	3.60	−2.13	2.14	1.67	3.46
p-val	(0.04)**	(0.02)**	(0.01)**	(0.03)**	(0.00)****	(0.04)**	(0.03)**	(0.098)*	(0.00)****
LOG(CV1)	0.01	−0.02	−0.05	−0.01	−0.04	0.12	−0.02	0.01	−0.07
t-sta	0.16	−0.35	−0.99	−0.26	−0.88	2.53	−0.46	0.23	−1.46
p-val	(0.87)	(0.73)	(0.32)	(0.80)	(0.38)	(0.01)**	(0.65)	(0.82)	(0.15)
LOG(CV2)	0.21	0.34	0.16	0.25	0.07	0.35	0.37	0.23	0.21
t-sta	1.55	2.33	0.87	1.54	0.47	3.08	3.09	1.76	1.57
p-val	(0.13)	(0.02)**	(0.38)	(0.13)	(0.64)	(0.002)***	(0.002)***	(0.08)*	(0.12)
LOG(CV3)	0.07	0.08	0.15	0.15	0.07	−0.06	0.06	0.10	0.12
t-sta	0.79	0.72	1.26	1.48	0.70	−0.57	0.66	1.15	1.23
p-val	(0.43)	(0.47)	(0.21)	(0.14)	(0.49)	(0.57)	(0.51)	(0.25)	(0.22)
LOG(CV11)	−0.01	−0.08	−0.02	−0.02	−0.03	−0.01	−0.02	−0.01	−0.01
t-sta	−1.15	−1.50	−0.60	−0.79	−1.31	−1.22	−1.16	−1.16	−0.69
p-val	(0.25)	(0.14)	(0.55)	(0.43)	(0.19)	(0.23)	(0.25)	(0.25)	(0.49)
Time from the first case reported in China to the first case reported nationally (LOG[DV6])									
C	7.19	7.54	5.42	5.19	5.86	5.71	5.44	5.12	5.58
t-sta	13.18	7.98	9.27	10.33	10.81	6.39	7.60	7.89	7.51
p-val	(0.00)****	(0.00)****	(0.00)****	(0.00)****	(0.00)****	(0.00)****	(0.00)****	(0.00)****	(0.00)****
	IVAR1	*IVAR2*	*IVAR3*	*IVAR4*	*IVAR5*	*IVAR6*	*IVAR7*	*IVAR8*	*IVAR9*
LOG(IVAR)	−2.15	−1.58	−1.56	−0.73	−1.21	−0.83	−0.83	−0.68	−0.66
t-sta	−6.07	−3.07	−5.94	−4.03	−3.84	−2.11	−3.11	−2.21	−2.15
p-val	(0.00)****	(0.003)***	(0.00)****	(0.00)****	(0.00)****	(0.04)**	(0.002)***	(0.03)**	(0.03)**
LOG(CV1)	−0.05	−0.12	−0.02	−0.36	−0.45	0.12	−0.12	−0.31	−0.47
t-sta	−0.70	−1.63	−0.19	−1.62	−1.64	0.46	−0.45	−0.88	−1.71

(*continued*)

Table 5.

Time from the first case reported in China to the first case reported nationally (LOG[DV6])									
p-val	(0.48)	(0.11)	(0.85)	(0.11)	(0.10)	(0.65)	(0.65)	(0.38)	(0.09)
LOG(CV2)	0.12	−0.14	0.32	0.04	0.25	−0.03	0.01	0.09	0.03
t-sta	1.03	−1.16	1.77	0.24	1.57	−0.23	0.08	0.43	0.22
p-val	(0.30)	(0.25)	(0.08)*	(0.81)	(0.12)	(0.82)	(0.93)	(0.67)	(0.83)
LOG(CV3)	0.15	0.15	0.03	0.49	−0.01	−0.03	0.13	−0.06	−0.02
t-sta	1.36	1.25	0.21	2.72	−0.12	−0.25	0.93	−0.47	−0.20
p-val	(0.18)	(0.21)	(0.84)	(0.008)***	(0.91)	(0.80)	(0.35)	(0.64)	(0.84)
LOG(CV11)	0.01	0.00	−0.01	−0.01	−0.02	−0.02	−0.02	−0.03	−0.03
t-sta	0.86	−0.15	−1.46	−0.54	−1.03	−1.06	−1.65	−1.44	−1.56
p-val	(0.39)	(0.88)	(0.15)	(0.59)	(0.30)	(0.29)	(0.10)	(0.15)	(0.12)

Note(s): ****, ***, ** and * indicate statistical significance at the 0.1, 1, 5 and 10% level of confidence, correspondingly. The table contains t-statistic and their corresponding *p*-values below in brackets. The independent variables were included separately in the same regression model to avoid problems of multicollinearity. We applied the Breusch–Pagan–Godfrey and the White heteroskedasticity tests. We analysed the same models using the number of 2019 T&T arrivals as a percentage of the total population (CV12) and get similar results in terms of significance and signs. Similarly, we also applied weighted least squares models with the same significant results and signs, but these additional results were omitted due to our article's length restrictions for publication purposes

The results of Tables 2–5 suggest that nations with the highest daily average of coronavirus fatalities per million also have the highest values on the health and hygiene pillar. These results are coherent with those of Dempere (2021a), who finds that countries with the lowest V-Dem Institute's (2020) national health quality index also have the lowest average of daily COVID-19 of coronavirus infections and fatalities per million. Using Dempere's (2021a) methodology and control variables, we organized our sample of countries by their health and hygiene pillars from lowest to highest. We then identified the first (top) and fourth (bottom) quartiles. We then performed a statistical analysis of these control variables for each quartile.

The results in Table 6 confirm that countries with high health and hygiene scores enjoy the highest GDP per capita. These results are consistent with previous studies (Dempere, 2021a, Narayan *et al.*, 2011 and Valev, 2020). Nevertheless, affluent nations have unique challenges that may be uncommon in emerging countries, like obesity. Table 3 shows that nations with the highest health and hygiene pillars' values (*ceteris paribus*) also have the maximum average body mass index for men, women and the total population. These nations with the top health and hygiene pillars' values have the highest percentage of people 65 or older, the most considerable death rate from cardiovascular illness, cancer, diabetes or recurring lung diseases, and the sharpest urban population proportion.

According to previous academic works, these control variables significantly correlate with the average of daily coronavirus fatalities per million (Miller and Englund, 2020; Caci *et al.*, 2020; Tahmasebi *et al.*, 2020; Rali and Sauer, 2020; Urashima *et al.*, 2020). Additionally, the urban population proportion directly influences a nation's challenges in imposing social distance-related restrictions, which also affects the speed of contagion/spread of the coronavirus and the average coronavirus infections per million (Ashraf, 2020). Our results are coherent with those of Dempere (2021a) and Valev (2020), who conclude that wealthy nations were the most severely impacted by COVID-19 due to their substantial proportion of ageing population and their population's comorbidity with serious chronic illnesses and obesity.

5. Discussions and conclusions

We analysed a sample of 132 countries with available data for the first half of 2020 to study the explanatory power of the TTCI and some of its constituent factors over national success metrics in managing the initial surge of the COVID-19 pandemic. Our results provide evidence that the daily average of coronavirus infections per million has a positive and significant relationship with the country's infrastructure, health and hygiene, and information and communication technology readiness. Likewise, the daily average of coronavirus deceases per million has a significant and positive association with the country's TTCI, its T&T policy and enabling conditions, infrastructure, health and hygiene, information and communication technology readiness, international openness and air transportation infrastructure. We also find that these countries have the shortest government

Table 6.
Results of independent samples tests. Control variables contrast of nations grouped by their health and hygiene (H&H) Pillar

	CV2	CV4	CV5	CV6	CV7	CV8	CV9	CV10
Q1	72.45	27.36	26.12	27.23	45.36	15.32	312.34	35,532.84
Q4	44.48	25.34	23.68	22.78	25.45	5.23	192,63	4,345.63
t-sta	−7.32	−4.92	−3.42	−8.32	−12.45	−11.56	5.34	−8.93
p-val	[0.00]****	[0.00]****	[0.001]***	[0.00]****	[0.00]****	[0.00]****	[0.00]****	[0.00]****

Note(s): ****, ***, ** and * indicate statistical significance at the 0.1, 1, 5 and 10% level of confidence, correspondingly response time for outbreak control, the lowest daily average of the social restrictions index and the shortest time from the first case reported in China to the first case reported nationally.

These results suggest that these countries enforced the softest social constraints to control the outbreak and experienced the shortest outbreak response and arrival times. The combination of quick coronavirus arrival time and soft social restrictions may have explained their high spread rates and daily averages of infections and deceases. Mobility restrictions are effective government policies at the early stages of the pandemic only if these policies are focalized on specific locations acting as primary contagion sources. In addition, these policies must be accompanied by strict social distance restrictions, hygiene controls, polymerase chain reaction (PCR) test requirements, etc. Kraemer *et al.* (2020) find that focalized travel restrictions are valuable policies only at the early pandemic stages, but they become less effective once the contagion has become widespread.

Similarly, our results suggest that the information and communication technology readiness-related capabilities may constitute a double-edged sword during pandemic times. While countries with superior information and communication technology readiness can provide proper tech-based communicational resources to support their national T&T industry, these resources can also increase the national averages of coronavirus infections and deaths. Our results can help government policymakers to sharpen health communication strategies. Governments must prepare existing information and communication technology capabilities to communicate rapidly, regularly and transparently with their population to enhance the effectiveness of any public health communication policy.

The WHO (2019) has emphasized national risk communication and community engagement as a critical government health policy dimension in all countries. Notably, the WHO has also warned about the risk of infodemic defined as the COVID-19 information overload (some accurate and some fake), making it difficult for people to identify truthful sources of information and dependable guidance when needed. The WHO (2021b) has warned that the spread of COVID-19 misinformation amplified on social media and similar digital platforms constitutes a much more significant threat to global public health than the coronavirus itself. They find that 43.9% of respondents read scientific content on their social media, and 59.1% of Gen Z and Millennials were very aware of fake news regarding COVID-19. Our results reinforce the notion suggested in previous articles about the convenience for T&T industry's participants to take advantage of Gen Z's technology savviness when recruiting staff (Self *et al.*, 2019).

Our results can help support the adoption of new national T&T policies and the change of some existing ones. In a post-COVID-19 world, national policies to foster and support the T&T industry sector must also include the risks of this industry when facing a pandemic crisis. Our results show that nations with the maximum T&T competitive index values also experienced the highest daily averages of coronavirus infections and fatalities per million. Equally, the uppermost speed rate of COVID-19 spreads constitutes clear evidence of a generalized lack of adequate government health policies to control an outbreak in these countries. Similarly, we provide evidence that these nations also have the lowest daily average of social restrictions index values, suggesting that imposing social restrictions constitutes a challenge for top T&T destinations. This result also reinforces the notion that these countries face challenges to restrict some freedom rights during crises. Finally, these countries also experienced the shortest time from the first case reported in China to the first case reported nationally, highlighting the paramount importance of time as the critical success factor in controlling the outbreak among top T&T destinations.

Our results are consistent with those of Bickley *et al.* (2021). They find that more globalized nations experienced a delay in imposing travel restrictions during the COVID-19 crisis compared to less globalized countries. The chronological dimension of our results also suggests a lack of international coordination when implementing policies to control the outbreak. Indeed, Seyfihttps *et al.* (2020) find that many national border controls implemented during the COVID-19 crisis responded to political considerations (e.g. reciprocal restrictions faced by nationals when travelling abroad) than to health advice or scientific data. This result is also consistent with Bickley *et al.* (2021), who find that nations were prone to adopt reciprocal travel restriction policies during the pandemic only if their nearest neighbour did the same.

Our results suggest that national policies for outbreak control should consider a country's outbreak exposure proxied by the TTCI, which seems to have predictive power in measuring the government's effectiveness at pandemic control. In particular, the TTCI and some of its constituent factors may help assess the available time to implement effective government restriction policies and forecast the time framework for pandemic emergence and spread across borders. Our results may also be valuable for policymakers to update their national crisis management strategies and practices.

Our results also show that many T&T destinations are clustered in regions where physical mobility (e.g. European Union) supports both the T&T industry and the COVID-19 spread. Chica *et al.* (2021) highlight that a critical success factor in controlling the outbreak is national government policy coordination among countries in the same region for an optimal outcome of such policies. Similarly, Škare *et al.* (2021) conclude that the T&T industry's recovery worldwide will need cooperation rather than competition among countries to decrease the costs of such recovery. Unfortunately, this has not been the case yet (Seyfihttps *et al.*, 2020; Bickley *et al.*, 2021).

Our results also support the inclusion of the TTCI and some of its constituent pillars into proposed models to support government policies regarding social mobility restrictions. For example, Chang *et al.* (2021) find that limiting maximum occupancy and mobility in a small minority of physical locations identified as points of interest can maximize the effectiveness of government efforts to control an outbreak rather than uniformly reducing mobility. Our results suggest that the TTCI and its constituent factors may be priceless to identifying T&T destinations as points of interest where national governments can impose selective mobility restrictions rather than national lockdowns or total border closures.

The significant influence of COVID-19 in the T&T sector remains a critical factor among T&T private stakeholders. For example, the United Nations World Tourism Organization (2022) informs a 130% increase in global international tourist arrivals in January 2022 compared to 2021 but also warns that this T&T recovery has been affected by the new waves of Omicron virus and their associated travel restrictions in several destinations. T&T companies looking to expand their business operations into new markets must incorporate new COVID-related variables in their decision-making processes. Such variables can include the TTCI sub-indexes, pillars and indicators significantly influencing the pandemic control analysed in our study. For example, the World Travel and Tourism Council (2021b) acknowledges that T&T health and hygiene requirements have changed permanently due to COVID-19 in the same way that global T&T security standards changed because of the US 9/11 attacks.

Likewise, our results suggest that national approaches to implementing information and communication technologies will constitute a critical factor in many T&T private stakeholders' business decisions. Indeed, the World Travel and Tourism Council (2021b) informs of a permanent change in the T&T global landscape by introducing technological innovations ranging from digital COVID certificates to hotel contactless check-ins.

The constraints of our research work comprise a lack of scientific agreement about which variables are the most appropriate to analyse the effectiveness of managing the initial surge of the COVID-19 pandemic. Another limitation is the sensitivity of our dependent variables to the selected cut-off date, namely July 10, 2020. Finally, Morris and Reuben (2020) also mention some limitations when comparing the coronavirus crisis among countries. They inform about a lack of consistency when recording COVID-19 deaths, disparities in testing efforts, differences in health care services, etc. Another limitation of our study is the TTCI's weakness identified by Salinas *et al.* (2020). These weaknesses include the TTCI's aggregation of calculated factors using different scales, subjective weighting and information duplicity.

An appealing extension of our study includes an analysis of the COVID-19 impact on the TTCI ranking of each country in our sample after the publication of the 2021 TTCI. The magnitude of the change in the TTCI value and ranking of 2019 versus 2021 TTCI would constitute the primary dependent variables of such study, while the dependent variables considered in this study may be used as explanatory variables.

References

Allcott, H., Boxell, L., Conway, J., Gentzkow, M., Thaler, M. and Yang, D. (2020), "Polarization and public health: partisan differences in social distancing during the coronavirus pandemic", *Journal of Public Economies*, Vol. 191 No. 1, pp. 1-11, doi: 10.1016/j.jpubeco.2020.104254.

Ando, S., Matsuzawa, Y., Tsurui, H., Mizutani, T., Hall, D. and Kuroda, Y. (2021), "Stochastic modelling of the effects of human-mobility restriction and viral infection characteristics on the spread of COVID-19", *Scientific Reports*, Vol. 11 No. 1, doi: 10.1038/s41598-021-86027-2.

Ashraf, B. (2020), "Devastation caused by COVID-19: is democracy to blame?", *SSRN Electronic Journal*, pp. 1-22.

Balasundharam, V. (2021), "Diversion of tourism flows in the Asia and Pacific region: lessons for COVID-19 recovery", IMF Working Papers, Vol. 2021 No. 224, p. A001, Oct 9, 2021, available at: https://www.elibrary.imf.org/view/journals/001/2021/224/article-A001-en.xml.

Bickley, S., Chan, H., Skali, A., Stadelmann, D. and Torgler, B. (2021), "How does globalization affect COVID-19 responses?", *Globalization and Health*, Vol. 17 No. 1, pp. 1-19, doi: 10.1186/s12992-021-00677-5.

Bjørnskov, C. (2016), "Economic freedom and economic crises", *European Journal of Political Economy*, Vol. 45 No. 1, pp. 11-23, doi: 10.1016/j.ejpoleco.2016.08.003.

Caci, G., Albini, A., Malerba, M., Noonan, D.M., Pochetti, P. and Polosa, R. (2020), "COVID-19 and obesity: dangerous liaisons", *Journal of Clinical Medicine*, Vol. 9 No. 8, available at: www.mdpi.com/2077-0383/9/8/2511/pdf.

Calderwood, L. and Soshkin, M. (2019), "The travel and tourism competitiveness report 2019. Travel and tourism at a tipping point", *World Economic Forum (WEF)*, available at: https://www.weforum.org/reports/the-travel-tourism-competitiveness-report-2019 (accessed 22 January 2021).

Chang, S., Pierson, E., Koh, P., Gerardine, J., Redbird, B., Grusky, D. and Leskovec, J. (2021), "Mobility network models of COVID-19 explain inequities and inform reopening", *Nature*, Vol. 589 No. 1, pp. 82-87, doi: 10.1038/s41586-020-2923-3.

Chica, M., Hernández, J. and Bulchand-Gidumal, J. (2021), "A collective risk dilemma for tourism restrictions under the COVID-19 context", *Scientific Reports*, Vol. 11 No. 1, p. 5043, doi: 10.1038/s41598-021-84604-z.

Dempere, J. (2021a), "A recipe to control the first wave of COVID-19: more or less democracy?", *Transforming Government: People, Process, and Policy*, Vol. 15 No. 4, pp. 597-611, doi: 10.1108/TG-08-2020-0206.

Dempere, J. (2021b), "Control of the first wave of COVID-19: some economic freedom-related success factors", *Journal of International Studies*, Vol. 14 No. 4, pp. 187-200, doi: 10.14254/2071-8330.2021/14-4/13.

Erdem, O. (2020), "Freedom and stock market performance during Covid-19 outbreak", *Finance Research Letters*, Vol. 36 No. 1, p. 101671, doi: 10.1016/j.frl.2020.101671.

Ferreira, F. and Castro, C. (2020), "Competitiveness of European tourism: a cluster Analysis", *Proceedings of the 3rd International Conference on Tourism Research*, Spain, Universidad Europea de Valencia, available at: https://www.academic-conferences.org/wp-content/uploads/dlm_uploads/2020/07/000_ICTR-2020-abstract-booklet.pdf.

Hannah, R., Ortiz-Ospina, E., Beltekian, D., Mathieu, E., Hasell, J., Macdonald, B., Giattino, C. and Roser, M. (2020), "Statistics and research. Coronavirus pandemic (COVID-19)", *Our World in Data*, available at: https://ourworldindata.org/coronavirus (accessed 10 July 2020).

Herren, C., Brownwright, T., Liu, E., El Amiri, N. and Majumder, M. (2020), "Democracy and mobility: a preliminary analysis of global adherence to non-pharmaceutical interventions for COVID-19", working paper, available at: https://papers.ssrn.com/sol3/Delivery.cfm/SSRN_ID3570206_code4099104.pdf?abstractid=3570206&mirid=1.

International Labour Organization (2020), "COVID-19 and accommodation and food service activities. Prevention and control checklist", available at: https://www.ilo.org/wcmsp5/groups/public/—dgreports/—dcomm/documents/publication/wcms_754201.pdf (accessed 30 May 2022).

International Organization for Standardization (2021), "ISO/PAS 5643:2021. Tourism and related services — requirements and guidelines to reduce the spread of Covid-19 in the tourism industry", available at: https://www.iso.org/standard/81500.html (accessed 30 May 2022).

Javed, M. and Tučková, Z. (2019), "Competitiveness in tourism: a comparative analysis of selected south-asian countries", *2nd International Conference on Tourism Research: 381-388, IX, XII*, The UK, ICTR-2019 by ACPI, available at: https://www.proquest.com/openview/7ff11cecce42bbf76c865d7dd980c64e/1?pq-origsite=gscholar&cbl=4451210.

Jones, P. and Comfort, D. (2020), "The COVID-19 crisis and sustainability in the hospitality industry", *International Journal of Contemporary Hospitality Management*, Vol. 32 No. 10, pp. 3037-3050, available at: https://www.emerald.com/insight/0959-6119.htm.

Kayar, C. and Kozak, N. (2010), "Measuring destination competitiveness: an Application of the travel and tourism competitiveness index (2007)", *Journal of Hospitality Marketing and Management*, Vol. 19 No. 1, pp. 203-216, doi: 10.1080/19368621003591319.

Knight, D., Xiong, L., Lan, W. and Gong, J. (2020), "Impact of COVID-19: research note on tourism and hospitality sectors in the epicentre of Wuhan and Hubei Province, China", *International Journal of Contemporary Hospitality Management*, Vol. 32 No. 12, pp. 3705-3719, available at: https://www.emerald.com/insight/0959-6119.htm.

König, M. and Winkler, A. (2020), "COVID-19 and economic growth: does good government performance pay off?", *Intereconomics*, Vol. 55 No. 4, pp. 224-231, doi: 10.1007/s10272-020-0906-0.

Kovalov, B., Burlakova, I. and Vorenenko, V. (2017), "Evaluation of tourism competitiveness of Ukraine's regions", *Journal of Environmental Management and Tourism*, Vol. VIII Nos 2(18), pp. 460-466, available at: https://journals.aserspublishing.eu/jemt/article/view/1204.

Kraemer, M.U., Yang, C.H., Gutierrez, B., Wu, C.H., Klein, B., Pigott, D.M., Open COVID-19 Data Working Group, Du Plessis, L., Faria, N.R., Li, R. and Hanage, W.P. (2020), "The effect of human mobility and control measures on the COVID-19 epidemic in China", *Science*, Vol. 368 No. 6490, pp. 493-497, doi: 10.1126/science.abb4218.

Lai, I. and Wong, J. (2020), "Comparing crisis management practices in the hotel industry between initial and pandemic stages of COVID-19", *International Journal of Contemporary Hospitality Management*, Vol. 32 No. 10, pp. 3135-3156, available at: https://www.emerald.com/insight/0959-6119.htm.

Miller, R. and Englund, K. (2020), "Transmission and risk factors of COVID-19", *Cleveland Clinic Journal of Medicine*, available at: www.ccjm.org/content/ccjom/early/2020/05/12/ccjm.87a.ccc029.full.pdf.

Montanari, M. and Girald, J. (2013), "Competitiveness in tourism: a comparison between Brazil and Switzerland", *Revista Brasileira de Pesquisa em Turismo*, Vol. 7 No. 1, pp. 92-113, doi: 10.7784/rbtur.v7i1.564.

Montero-Muradas, I. and Oreja-Rodríguez, J. (2017), "Determining competitive factors in tourism leadership in Spain 2015", *Cuadernos de Turismo*, Vol. 40 No. 1, pp. 701-710, doi: 10.6018/turismo.40.310071.

Morris, C. and Reuben, A. (2020), "Coronavirus: why are international comparisons difficult?", *BBC News*, available at: https://www.bbc.com/news/52311014 (accessed 7 August 2020).

Narayan, P.K., Narayan, S. and Smyth, R. (2011), "Does democracy facilitate economic growth or does economic growth facilitate democracy? An empirical study of Sub-Saharan Africa", *Economic Modelling*, Vol. 28 No. 3, pp. 900-910, doi: 10.1016/j.econmod.2010.11.004.

Nazmfar, H., Eshghei, A., Alavi, S. and Pourmoradian, S. (2019), "Analysis of travel and tourism competitiveness index in middle-east countries", *Asia Pacific Journal of Tourism Research*, Vol. 24 No. 6, pp. 501-513, doi: 10.1080/10941665.2019.1590428.

Nunkoo, R., Daronkola, H.K. and Gholipour, H.F. (2021), "Does domestic tourism influence COVID-19 cases and deaths?", *Current Issues in Tourism*, Vol. 1 No. 1, pp. 1-14, doi: 10.1080/13683500.2021.1960283.

Petrova, M., Dekhtyar, N., Klok, O. and Loseva, O. (2018), "Regional tourism infrastructure development in the state strategies", *Problems and Perspectives in Management*, Vol. 16 No. 4, pp. 259-274, doi: 10.21511/ppm.16(4).2018.22.

Popescu, D., Oehler-Şincai, I., Bulin, D. and Tănase, I. (2018), "CEE-16: a cluster Analysis based on tourism competitiveness and correlations with major determinants", *The AMFITEATRU ECONOMIC Journal, Academy of Economic Studies - Bucharest, Romania*, Vol. 20 No. 12, pp. 833-853, available at: https://www.amfiteatrueconomic.ro/temp/Article_2769.pdf.

Rali, A. and Sauer, A.J. (2020), "COVID-19 pandemic and cardiovascular disease", *US Cardiology Review*, Vol. 14 No. 1, available at: https://www.uscjournal.com/articles/covid-19-pandemic-and-cardiovascular-disease.

Richter, F. (2021a), "Tourism back to 1990 levels as pandemic halts travel", *Statista*, available at: https://www.statista.com/chart/21793/international-tourist-arrivals-worldwide/.

Richter, F. (2021b), "Tourism industry experts fear long road to recovery", *World Economic Forum*, available at: https://www.weforum.org/agenda/2021/02/tourism-industry-covid19-recovery-government-response/.

Salinas, J., Azevedob, P., Martín, J. and Rodríguez, J. (2020), "Determinants of tourism destination competitiveness in the countries most visited by international tourists: proposal of a synthetic index", *Tourism Management Perspectives*, Vol. 33 No. 1, pp. 1-13, doi: 10.1016/j.tmp.2019.100582.

Self, T., Gordon, S. and Jolly, P.M. (2019), "Talent management: a Delphi study of assessing and developing GenZ hospitality leaders", *International Journal of Contemporary Hospitality Management*, Vol. 31 No. 10, pp. 4126-4149, doi: 10.1108/IJCHM-11-2018-0915.

Seyfihttps, S., Hall, M. and Shabani, B. (2020), "COVID-19 and international travel restrictions: the geopolitics of health and tourism", *Tourism Geographies*, Vol. 1 No. 17, pp. 1-17, doi: 10.1080/14616688.2020.1833972.

Škare, M., Soriano, D.R. and Porada-Rochoń, M. (2021), "Impact of covid-19 on the travel and tourism industry", *Technological Forecasting and Social Change*, Vol. 163 No. 120469, DOI: 10.1016/j.techfore.2020.120469.

Skytrax (2022), "Airline, airport and COVID-19 safety ratings", available at: https://skytraxratings.com/ (accessed 30 May 2022).

Tahmasebi, P., Shokri-Kuehni, S., Sahimi, M. and Shokri, N. (2020), "How do environmental, economic and health factors influence regional vulnerability to COVID-19?", *Working Paper*, available at: www.medrxiv.org/content/10.1101/2020.04.09.20059659v1.full.pdf.

Terzić, L. (2018), "How tourism destination competitiveness contributes to GDP growth - the case of selected European economies", *Acta Oeconomica Pragensia, Prague University of Economics and Business*, Vol. 2018 No. 3, pp. 24-34, doi: 10.18267/j.aop.606.

The World Health Organization (2020), "The global health observatory. Explore a world of health data", available at: www.who.int/data/gho/data/indicators/indicator-details/GHO/mean-bmi-(kgm-)-(age-standardized-estimate (accessed 10 July 2020).

United Nations - UN (2020), "Policy brief: COVID-19 and transforming tourism", available at: https://www.un.org/sites/un2.un.org/files/sg_policy_brief_covid19_tourism_august_2020.pdf (accessed 10 July 2020).

United Nations Conference on Trade and Development - UNCTAD (2021a), "COVID-19 and Tourism. An update", available at: https://unctad.org/system/files/official-document/ditcinf2021d3_en_0.pdf (accessed 10 August 2020).

United Nations Conference on Trade and Development - UNCTAD (2021b), "Tourist numbers down 83% but confidence slowly rising", available at: https://www.unwto.org/news/tourist-numbers-down-83-but-confidence-slowly-rising (accessed 10 August 2020).

United Nations Conference on Trade and Development - UNCTAD (2021c), "The World Tourism Barometer", available at: https://www.unwto.org/unwto-world-tourism-barometer-data (accessed 10 August 2020).

United Nations World Tourism Organization (2022), "Tourism enjoys strong start to 2022 while facing new uncertainties", available at: https://www.unwto.org/news/tourism-enjoys-strong-start-to-2022-while-facing-new-uncertainties (accessed 1 June 2022).

Urashima, M., Otani, K., Hasegawa, Y. and Akutsu, T. (2020), "BCG vaccination and mortality of COVID-19 across 173 countries: an ecological study", *International Journal of Environmental Research and Public Health*, Vol. 17 No. 15, available at: www.mdpi.com/1660-4601/17/15/5589/pdf.

V-Dem Institute (2020), "V-Dem varieties of democracy. Global standards, local knowledge", available at: www.v-dem.net/en (accessed 23 January 2021).

Valev, D. (2020), "Relationships of total COVID-19 cases and deaths with ten demographic, economic and social indicators", *medRxiv*, License CC BY-ND 4.0, doi: 10.1101/2020.09.05.20188953.

Wang, Y. (2021), "Government policies, national culture and social distancing during the first wave of the COVID-19 pandemic: international evidence", *Safety Science*, Vol. 135 No. 1, pp. 1-13, doi: 10.1016/j.ssci.2020.105138.

Webster, C. and Ivanov, S. (2014), "Transforming competitiveness into economic benefits: does tourism stimulate economic growth in more competitive destinations?", *Tourism Management*, Vol. 40 No. 1, pp. 137-140, doi: 10.1016/j.tourman.2013.06.003.

WHO - World Health Organization (2019), "Novel coronavirus (2019-nCov). Situation report - 13", available at: https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200202-sitrep-13-ncov-v3.pdf (accessed 12 November 2021).

WHO - World Health Organization (2021a), "Fighting misinformation in the time of COVID-19, one click at a time", available at: https://www.who.int/news-room/feature-stories/detail/fighting-misinformation-in-the-time-of-covid-19-one-click-at-a-time (accessed 12 November 2021).

WHO - World Health Organization (2021b), "Social media and COVID-19: a global study of digital crisis interaction among Gen Z and Millennials", available at: https://www.who.int/news-room/feature-stories/detail/social-media-covid-19-a-global-study-of-digital-crisis-interaction-among-gen-z-and-millennials (accessed 12 November 2021).

World Bank (2020), "The global economic outlook during the COVID-19 pandemic: a changed world", available at: https://www.worldbank.org/en/news/feature/2020/06/08/the-global-economic-outlook-during-the-covid-19-pandemic-a-changed-world (accessed 7 August 2020).

World Bank (2021), "DataBank - world development indicators", available at: https://databank.worldbank.org/source/world-development-indicators# (accessed 1 November 2021).

World Health Organization (2020), "COVID-19 management in hotels and other entities of the accommodation sector", *Interim Guidance*, available at: https://apps.who.int/iris/rest/bitstreams/1297222/retrieve (accessed 30 May 2022).

World Travel & Tourism Council (2019), "The importance of travel and tourism in 2019", available at: https://wttc.org/Research/Economic-Impact/moduleId/1226/itemId/67/controller/DownloadRequest/action/QuickDownload (accessed 22 January 2021).

World Travel & Tourism Council (2020), "WTTC launches world's first-ever global safety stamp to recognise 'Safe Travels' protocols around the world", available at: https://wttc.org/News-Article/WTTC-launches-worlds-first-ever-global-safety-stamp-to-recognise-safe-travels-protocols-around-the-world (accessed 30 May 2022).

World Travel & Tourism Council (2021a), "Travel and tourism, economic impact 2021", *Global Economic Impact 2021*, available at: https://wttc.org/Portals/0/Documents/Reports/2021/Global%20Economic%20Impact%20and%20Trends%202021.pdf?ver=2021-07-01-114957-177 (accessed 19 July 2021).

World Travel & Tourism Council (2021b), "Lessons Learnt during COVID-19. The lessons learnt so far and how these can be used to prepare for future crises", available at: https://wttc.org/Portals/0/Documents/Reports/2021/Lessons-Learnt-%20COVID-19.pdf?ver=2021-08-19-095731-037 (accessed 1 June 2022).

Zhang, J., Xie, C., Wang, J., Morrison, A. and Coca-Stefaniak, J. (2020), "Responding to a major global crisis: the effects of hotel safety leadership on employee safety behaviour during COVID-19", *International Journal of Contemporary Hospitality Management*, Vol. 32 No. 11, pp. 3365-3389, available at: https://www.emerald.com/insight/0959-6119.htm.

Zutshi, V. (2020), "Handling the COVID-19 crisis and comeback planning - Vinod Zutshi, former tourism secretary", *BWHOTELIER*, available at: http://bwhotelier.businessworld.in/article/Handling-the-COVID-19-Crisis-Comeback-Planning-Vinod-Zutshi-Former-Tourism-Secretary/13-04-2020-188953/(accessed 25 October 2021).

Further reading

The World Bank (2020), "Databank. World development indicators", available at: https://databank.worldbank.org/source/world-development-indicators (accessed 10 July 2020).

Corresponding author

Juan Dempere can be contacted at: jdempere@hct.ac.ae