Urban tourism performance index over the COVID-19 pandemic

Oriol Anguera-Torrell, Jordi Vives-Perez and Juan Pedro Aznar-Alarcón

Abstract

Purpose – This study aims to propose and estimate the urban tourism performance index (UTPI), an index that can measure and track the month-by-month tourism performance on main tourism cities since the initial outbreak of the COVID-19 pandemic. The UTPI is estimated for the following urban destinations: Bangkok, Paris, London, Dubai, Singapore, Kuala Lumpur, New York, Istanbul, Tokyo, Seoul, Osaka, Phuket, Milan, Barcelona, Bali and Hong Kong.

Design/methodology/approach – Monthly based data measuring the tourism industry’s performance for these urban destinations has been collected. This data includes airlines’ and hotels’ performance, as well as potential tourists’ online searches. The obtained data has been combined using a principal component analysis, generating the UTPI.

Findings – The UTPI shows that all urban areas analyzed in this study experienced a devastating negative impact because of the COVID-19 pandemic outbreak. However, the tourism recovery evolution follows heterogeneous patterns.

Research limitations/implications – The proposed index can be estimated using additional variables. Moreover, the index is only estimated for 16 tourism cities. Future studies can reproduce the methodology by incorporating further variables and amplifying the geographical coverage.

Practical implications – The UTPI might be useful for researchers and policymakers interested in using a measure of tourism performance during the COVID-19 pandemic in some of the most important urban destinations. Likewise, the UTPI index may serve as a suitable aggregated measure of tourism performance in a post-COVID-19 era or to monitor tourism during future crises.

Originality/value – This study analyzes the tourism performance during the COVID-19 pandemic from an urban perspective.

Keywords Tourism cities, COVID-19, Pandemic, Recovery pattern, Tourism performance index

Paper type Research paper

1. Introduction

The pandemic generated by the coronavirus disease 2019 (COVID-19) has brought about an unparalleled public health crisis that has turned the world upside down, and it is considered the worst global health crisis that humankind has faced since the Second World War. By the end of November 2020, there have been more than 63 million diagnosed cases and more than 1.4 million deaths (Roser and Ritchie, 2020). Furthermore, the COVID-19 pandemic does not only come with negative health consequences but also with severe economic and social costs. The undertaken isolation and lockdown measures have practically impacted every developed and developing economy in the world. Government restrictions on commercial activity have hit financial markets so much forcefully compared to previous pandemics (Baker et al., 2020). The world’s economy is expected to decrease, on average, by 4.4% during 2020. This growth rate is even worse when looking at particular economies, such as those in which the economic structure is based on services that require human interactions and social contact. For instance, Spain, Italy and the UK are predicted to shrink by 12.8%, 10.6% and 9.8%, respectively (International Monetary Fund, 2020).
The unprecedented inability to move freely around the globe since the pandemic outbreak has made tourism one of the most worldwide affected economic industries. The number of international tourists is expected to fall by 80% during 2020 (UNWTO, 2020a). Previous evidence analyzing the tourism industry from different angles, including transportation, accommodation, restaurants and events, shows that the impacts are being devastating (Gössling et al., 2020; Hoque et al., 2020). During the first five months of 2020, the loss in international tourism receipts more than tripled the loss that the sector experimented during the Global Financial Crisis of 2007–2008 (UNWTO, 2020b). The wealth that tourism will produce during 2020 contrasts with pre-pandemic levels at which tourism accounted for more than 10% of world gross domestic product and 10% of global employment (World Travel and Tourism Council, 2019).

These impacts may be even of greater importance for tourist cities, which would draw a big distinction with the trend that urban tourism has reported in recent years. Before the pandemic outbreak, urban tourism accounted for almost half of international tourism. Moreover, over the past decades, tourism growth in urban destinations outweighed the one in non-urban areas (World Travel and Tourism Council, 2018). Yet, the COVID-19 pandemic has the potential to challenge the entire urban tourism business model, at least until an effective vaccine is available for general public or the health of those most vulnerable to the virus could be guaranteed. On the one hand, many countries have passed international travel restrictions (Escape, 2020), which undoubtedly impact cities traditionally fed by international travelers. On the other hand, the tourists themselves may prefer to visit nearby non-urban destinations rather than urban ones as long as the pandemic lasts. Non-urban areas might allow travelers to do outdoor activities and avoid large agglomerations of people, providing a certain sense of safety.

Hence, it becomes fundamental to measure and assess tourism’s performance on urban destinations since the COVID-19 pandemic outbreak. Several variables could be considered as excellent candidates to estimate tourism’s performance in cities. The different hotel industry’s key performance indicators, the number of international tourists, the number of visitors to museums, the number of flights or the quantity of tourism-related Google searches for each urban destination represent some clear examples. Indeed, the different institutions in charge of promoting tourism in a tourism city such as Barcelona have collected detailed information about the evolution of hotel bookings, scheduled flights or tourism-related Google searches about Barcelona since January 2020 (Observatori del Turisme a Barcelona, 2020). Similarly, this type of information is also gathered not only amid COVID-19 but also in regular times by important cities’ tourism boards to assess the state of tourism (Dubai Tourism, 2020; Observatori del Turisme a Barcelona, 2019; Office du Tourisme et des Congrès; 2020).

However, researchers and different tourism-related stakeholders might feel puzzled when confronted with choosing a single variable amongst all the possibilities to track urban tourism performance during the COVID-19 pandemic. Which is the variable that best represents tourism performance in cities? In fact, any of the available variables measuring some aspects of urban tourism provides valuable and unique information. Consequently, an efficient combination of them might become the first best solution to provide a reasonable estimate of tourism performance in urban destinations. Hence, this study aims to construct an index assessing urban tourism performance as a combination of different available variables measuring different tourism aspects.

This study proposes to construct and estimate the urban tourism performance index (UTPI). The UTPI combines tourism-related available information and is constructed for main tourist cities and on a monthly basis since January 2020. After a throughout desk review, the authors concluded that it was feasible to find city-level information about airline, accommodation and tourism-related Google searches from the same sources for main urban tourism destinations. Regarding the analyzed cities, this study aimed to estimate this
index for the 20 top tourist urban destinations before the COVID-19 outbreak, according to Mastercard (2019), because they represent an important and relevant case of study in terms of urban tourism. Nonetheless, owing to a lack of data for four of them, the UTPI has been finally estimated for the following 16 tourism cities: Bangkok, Paris, London, Dubai, Singapore, Kuala Lumpur, New York, Istanbul, Tokyo, Seoul, Osaka, Phuket, Milan, Barcelona, Bali and Hong Kong. Note that Bali’s whole island is considered an urban destination, as in Mastercard (2019). Once the data has been obtained, the information has been combined using the principal component analysis (PCA). This method seems appropriate as it allows obtaining an index constructed as a linear combination of a set of correlated variables such that the obtained index accounts for the greatest possible variance of the data set (Holland, 2019). The estimated index is reported per each city and month pair, portraying a general picture of each city’s tourism performance since the initial pandemic outbreak.

Thus, the UTPI is an index capable of measuring tourism performance across some of the main urban destinations and across time since the initial outbreak of the COVID-19 pandemic in January 2020 (World Health Organization, 2020). So far, the UTPI has been estimated for the first nine months of 2020, but the index will be regularly updated while the COVID-19 pandemic continues to struggle urban tourism, and the latest version of the UTPI estimates will be made available at https://sites.google.com/view/urban-tourism-performance/home. The UTPI might be useful for public institutions and tourism-related stakeholders to understand the effects of the COVID-19 health crises on tourist cities and to help the sector recover in a sustainable manner. In addition, this analysis might be valuable for understanding the recovery capacity for each urban region, which is partially determined by the effectiveness level of public policies related to controlling the pandemic and boosting their economies at each stage of the tourism recovery pattern. Finally, the proposed index might also be estimated in a post-COVID-19 era or in future crises as a useful tool to assess tourism performance using a single indicator.

The rest of this paper is organized as follows. Section 2 examines the related literature. Section 3 presents the methodology. Section 4 shows the results; whereas Section 5 discusses them. Finally, Sections 6 and 7 present the conclusions and limitations, respectively.

2. Related literature

2.1 Impacts of unexpected events on tourism

The tourism industry is considered to be one of the most negatively impacted economic sectors when facing unexpected non-macroeconomic events such as terrorism, natural disasters or health crises. The occurrence of these unexpected events tends to be followed by a decrease on international tourists’ arrivals (Barbhuiya and Chatterjee, 2020; Bassil et al., 2019; McAleer et al., 2010; Neumayer and Plümper, 2016; Page et al., 2012; Rosselló et al., 2020; Seabra et al., 2020) and, consequently, with a negative economic impact for tourism firms. For instance, Chen et al. (2005) demonstrate that non-macroeconomic forces, such as the 921 earthquake, the 9/11 terrorist attack or the SARS outbreak, significantly affect hotels’ stock returns. In the same vein, Kosová and Enz (2012) highlight that the 9/11 terrorist attacks brought about an abrupt impact on hotels’ occupancy rates and prices. Similarly, Chien and Law (2003) discuss that the SARS outbreak resulted in a large decrease in occupancy rates in Hong Kong. Likewise, Chen et al. (2007) demonstrate that the SARS outbreak negatively and significantly impacted the Taiwanese hotel industry, and Chiang and Kee (2009) examine how Singaporian hotel firms were affected by events such as the SARS outbreak or the Iraqi war. In their turn, Kim and Gu (2004) show how total and systemic risk for airlines’ stock returns significantly increased after the 9/11 attacks.
2.2 Impacts of COVID-19 on tourism

In this sense, the COVID-19 pandemic is expected to negatively and profoundly impact the tourism industry. Some initial attempts have been undertaken to document how the COVID-19 affects the tourism industry, coinciding in that the impacts are overwhelming. Karim et al. (2020) showcase that the entire Malaysian tourism industry has been negatively affected by the COVID-19 outbreak. Similarly, Hoque et al. (2020) argue that the initial outbreak of the virus also shocked the Chinese tourism industry. Indeed, the pandemic’s adverse effects are supposed to hit airlines globally, cruises, car rentals, hotels, casinos and restaurants, among others (Becker, 2020; Gössling et al., 2020). Polyzos et al. (2020) forecast post-crisis Chinese tourism arrivals to the USA and Australia and show that they may take more than 12 months to achieve pre-crisis levels.

More specifically, Anguera-Torrell et al. (2020) show that the stock returns of world’s major hotel companies negatively reacted to the increase of diagnosed cases and deaths. Maneenop and Kotcharin (2020) exhibit how 52 airline companies’ stock returns significantly declined after three major events representing the worldwide expansion of COVID-19. Sobieralski (2020) argue that airline employment recovery can take up to six years. Likewise, Sharma and Nicolau (2020) highlight that hotels, airlines, cruises and car rentals have already experienced a substantial fall in their stock market valuation. The mentioned negative stock performance indicates that investors have negative expectations about the future profitability and solvency for those firms in the tourism industry, with an expected cascade of bankruptcies, especially for medium and small firms, harming employment and economic growth in areas that mostly rely on the tourism industry. Besides that, Farzanegan et al. (2020) note that those countries with higher flows of international tourism are also more impacted by COVID-19 cases and deaths. Thus, tourism may have been a booster to the spread of the virus but, simultaneously, one of the worst affected economic sectors.

2.3 Urban tourism and COVID-19 pandemic

Historically, many urban destinations in which traditional economic activities declined, tourism represented an effective tool to boost economic growth (Law, 1993). The evolution that urban tourism has experimented over the past decades has displayed even faster growth than non-urban tourism (World Travel and Tourism Council, 2018). However, large urban areas are more vulnerable to public health crises compared to rural destinations (Bell et al., 2009) and, consequently, the COVID-19 pandemic might drastically hit the tourism industry in urban destinations. Alrol et al. (2011) highlight that urban destinations represent important hubs for transmitting infectious diseases. Along the same lines, Desai (2020) showcases that megacities, both in economically developed and developing countries, provide a very favorable scenario for infections to be easily spread. Hamidi et al. (2020) point out that the presence of high population density in cities is associated with more face-to-face interactions and convert cities as a potential hotspot for the rapid spread of the COVID-19 pandemic.

Correspondingly, urban tourism might be deeply impacted by the COVID-19 pandemic for at least the following two reasons. First, and because of the aforementioned characteristics of cities, the adopted travel restrictions and social distancing implemented by public authorities in urban areas seem to be stricter in comparison to rural ones (Rice et al., 2020; Samuelsson et al., 2020). Second, as the pandemic continues to struggle society, tourists might feel more secure when traveling to rural and non-dense destinations rather than to cities, decreasing the demand level for urban tourism. For example, Zhu and Deng (2020) suggest that rural tourism is expected to become one of the top destinations as the COVID-19 pandemic lasts. Indeed, Vaishar and Štůastná (2020) show that rural tourism in the
Czech Republic experienced an increase in demand in the 2020 summer season compared to the same period of past year.

In this context, it becomes necessary to monitor and assess the impact that COVID-19 has on cities in which tourism plays a crucial role in its economic relevance. This monitoring might be useful not only to design policies aimed to boost tourism in cities but also to obtain more sustainable tourism cities. In this latter sense, Hall et al. (2020) highlight that disease outbreaks and pandemics have clearly played a role in promoting social and economic change and that the COVID-19 outbreak may lead to the reorientation of tourism in certain destinations. In fact, prior to the COVID-19 outbreak, different protest movements around the globe opposed against issues related to the exponential growth of tourism in cities (Novy and Colomb, 2016, 2019), giving rise to several studies approaching the overtourism phenomena in cities (Amore et al., 2020; Milano et al., 2019; Nilsson, 2020, among others). On this basis, the COVID-19 pandemic represents an opportunity to take transformative actions toward more resilient and sustainable tourist cities (Sharifi and Khavian-Garmsir, 2020).

2.4 Tourism performance

Previous studies tended to measure tourism performance using different and alternative approaches. For example, Alola et al. (2019), Detotto et al. (2021); Manrai et al. (2019), Neuts et al. (2013); and Syafganti and Walrave (2020) used, among other variables, tourism expenditure, tourism receipts or tourism expenditures per inhabitant as proxies to determine tourism performance. Alternatively, Day et al. (2013) and Dogru et al. (2020) determined a set of relevant hotel industry key performance indicators to portray tourism performance. These indicators include revenue per available room, occupancy or the average daily rates. Previous literature has also used travel-related Google trends data to proxy tourism demand in main tourism destinations (Bangwayo-Skeete and Skeete, 2015). Finally, Manrai et al. (2019) used the number of tourism arrivals, receipts and tourism macroeconomic variables as key components of tourism performance. Indeed, this study combines similar variables as the ones used by previous literature to determine urban tourism performance by using an integral approach.

3. Methodology

To assess and track the affectation that the COVID-19 pandemic is having on the tourism industry in top urban destinations, this paper collects currently available 2020 monthly data about some significant indicators that are usually used to evaluate the performance of the tourism industry. Once this database is obtained for main tourism cities, this paper proposes to combine the different variables using the PCA method to obtain an index named UTPI, which can be used to monitor tourism performance in urban destinations since January 2020. This study follows previous research that has used the PCA method to combine a set of relevant variables that measure a specific phenomenon (Elgin et al., 2020; Liu et al., 2019; or Vyas and Kumanayanke, 2006). In the tourism arena, the PCA has also been used to construct different indexes. For example, Natalia et al. (2019) construct an index on tourism accessibility. Kimengsi et al. (2019) propose an index of ecotourism choices. In their turn, Rehman Khan et al. (2017) generate an index of competitiveness for inbound and outbound tourism, and Zaman et al. (2016) build a tourism development index. Furthermore, Fanelli and Romagnoli (2020), Goffi et al. (2020); and Tasci and Milman (2019) used the PCA as a dimensionality reduction tool for data sets composed of several tourism-related variables. Additional justification on using PCA is discussed below.

This paper considered the 20 top destination cities by the number of international visitors prior to the outbreak of the COVID-19 pandemic, according to Mastercard (2019). Because of data
missing on some of the considered variables, the cities of Antalya, Makkah, Pattaya and Palma de Mallorca have been excluded from the analysis. That is, all the information has been gathered for the following 16 tourism cities: Bangkok, Paris, London, Dubai, Singapore, Kuala Lumpur, New York, Istanbul, Tokyo, Seoul, Osaka, Phuket, Milan, Barcelona, Bali and Hong Kong. Different variables could be considered important to measure the performance of the tourism industry in the aforementioned cities. After a throughout desk review, the authors identified that some of these variables are feasible to be found at the city level and allow to proxy the urban tourism performance at a relatively reasonable delay. These variables measure relevant industry-related aspects such as tourism-related Google trends information, airlines’ data and hotel performance indicators. Hence, tourism-related Google searches could be interpreted as a measure of both domestic and foreign demand performance data. Alternatively, airline and hotel industries data should be viewed as market outcomes (the intersection of demand and supply). For each one of the chosen variables, the authors calculated the year-over-year percentage change.

First, Google Trends data is used to analyze the interest and curiosity of potential tourists for each of the considered touristic destinations in terms of the number of Google searches that could be assigned to the tourism activity (Google (2020)). For example, city-related searches on flights, accommodation, car rentals, itineraries or travel guides are included in the mentioned data. Specifically, Google provides a number on the range of 0–100, where the higher the number, the higher the popularity that a particular destination has in tourism terms during a specific period. Accordingly, this number provided by Google allows us to proxy the interest of potential tourists for a given tourism city in each moment of time. Correspondingly, this study obtained monthly Google trends data since January 2019 to study the evolution that this index followed in the first nine months of 2020. Specifically, this study created a variable named googlect that equals the year-over-year percentage change in the number provided by Google for each city c and month t. A negative percentage would show that, in a given month, the tourist interest for that city decreased compared to the same month of 2019.

Second, airline data is collected from Flightaware (2020). A variable named flightsct equals the year-over-year percentage change in actual flights for each city c and month t. The authors have taken into account the main airport that has relevant effects on providing tourist traffic to each of the studied urban areas. For instance, for the city of Paris, the Charles de Gaulle airport is considered as the main international airport influencing the Paris metropolitan area. Correspondingly, flightsct shows the change of flights to the main airport of each city compared to the same period of 2019 and partially captures the impact of the COVID-19 pandemic.

Third, key performance indicators for the hotel industry are obtained from STR (2020). Information on the monthly based year-over-year percentage change on occupancy rates and revenue per available room (RevPAR) have been collected for each of the studied cities. Accordingly, the variables occupancyct and revparct have been created for each city c and month t and are equal to the aforementioned key performance indicators for the hotel industry. Once again, a negative value for any of these variables portrays that for the studied indicator, the results have been worse compared to the same period of 2019.

As previously described, once the information is adequately obtained and structured in a panel database, the PCA method has been used to obtain the UTPIct for each city c and month t. The PCA technique allows reducing the dimensionality of data sets consisting of interrelated variables while retaining the highest variation possible in the studied dataset (Holland, 2019; Jolliffe, 2002). Therefore, this method seems to be appropriate for this study as the four created variables (googlect, flightsct, occupancyct, and revparct) are likely to be highly interrelated. Precisely, PCA creates a new set of linearly uncorrelated variables named principal components that successively maximize the explained variance of the
original data set (Jolliffe and Cadima, 2016). In particular, the UTPI equals the first principal component, which is the one explaining the largest amount of the variability of the original data set and, hence, can be an effective tool in capturing the monthly based tourism performance for each of the considered urban areas. Reader must note that the advantage of using the PCA method resides in that it efficiently summarizes a set of correlated variables into a single value for each city and month.

4. Results

Table 1 reports the descriptive statistics for the four variables used for the PCA. It can be seen that the means for the four considered variables across the 16 considered cities and the first three quarters of 2020 have been negative, indicating that major tourism indicators performed worse in the first nine months of 2020 compared to the same months of 2019. For instance, the mean for the google variable portrays, on average terms, a decrease of 42.16% on the popularity of tourism-related searches in the considered urban destinations compared to the same period of last year (from January to September). Likewise, the revpar variable highlights, on average terms, a decrease of 62.70% when comparing the current RevPAR with the one available before the outbreak of the COVID-19 pandemic and for the same period of last year. In fact, the minimum value of revpar reaches −99%, which corresponds to the year-over-year percentage change for Phuket in April 2020.

Table 2, in its turn, exhibits the pairwise correlations among the considered variables, showing that indeed all the variables considered for the study purpose are highly and statistically significant interrelated among them. For example, all the pairwise correlations between google and any of the other variables can be claimed to be either moderate or strong as all the estimates are above 0.5. Similar patterns are found when comparing any pair of the considered variables. These strong correlations suggest that the PCA method is appropriate to devise the UTPI (Smith, 2002).

Table A1 in the Appendix section reflects the PCA detailed results, including the eigenvalues and the proportion of the explained variance. The authors also conducted a Kaiser-Meyer-Olkin test to measure the sampling adequacy required to run the PCA analysis. The result of the mentioned test equals 0.76, meaning that the sample adequacy for running the PCA analysis is satisfactory.
level to run the selected methodology is more than acceptable (Kaiser, 1974). One criterion typically used in the PCA method, known as Kaiser’s rule, is to select components that have eigenvalues greater than one (Jolliffe, 2002). In this study, only the first component satisfies this condition. Moreover, this component alone can explain 85% of the data’s variance, suggesting that this first component alone might be a good indicator of the overall tourism performance of each studied urban area. Therefore, the UTPI is set to be equal to the first principal component estimate. The descriptive statistics of UTPI are reported in Table 3. As it is standard with PCA, UTPI is centered at 0 and, correspondingly, the mean for this study’s index equals 0. The UTPI takes values in the range from −2.37 to 4.86. Hence, a positive value of the UTPI means that the tourism performance in a city-month pair was better than the average across the rest of the observed data. Similarly, a negative value of the UTPI in a city-month pair implies that the tourism performance was worse than average. That is, the higher the UTPI, the better the tourism performance in a city-month pair.

In Figure 1, the evolution of the UTPI across the first nine months of 2020 is depicted for each of the selected tourism cities. From a general perspective, over the first four months of 2020, it can be seen a clear drop in the tourism performance in all the studied urban destinations. This plunge in the estimated index coincides with the COVID-19 pandemic outbreak and the lockdowns that many countries imposed to initially contain the spread of the virus. Once the first negative shock occurred, and because of the increased level of uncertainty, social distancing and confinement measures directly attributable to the global

<table>
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<th>Variable</th>
<th>Mean</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
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<td>1.84</td>
<td>−2.37</td>
<td>4.86</td>
<td>144</td>
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Figure 1: Evolution of the UTPI per each tourism city
health crises, the tourism performance of most of the studied urban areas remained at unprecedented low levels over the confinement period. Reader must consider that most of the Asian cities included in the analysis are the ones that firstly experiment a drop in the UTPI, which might be explained by the fact that the COVID-19 outbreak took place in the Chinese city of Wuhan in December 2019.

The recovery patterns followed by the different urban areas could be split up into different main trends. First, Bali, Bangkok, Hong Kong, Kuala Lumpur, London, New York, Osaka, Phuket, Seoul, Singapore and Tokyo suggest a “L-curve” pattern that will eventually transform into a potential “U-curve” recovery pattern. That is, after the initial drop, tourism performance has exhibited low levels. Ultimately, the tourism activity will very likely start to increase in these cities. Second, the cities of Barcelona, Dubai, Milan and Paris seem to follow a “W-curve” recovery pattern. That is, after the initial drop, tourism performance started to increase till the pattern changed by showing a steadily decline. However, this “W-curve” could be considered asymmetric in the sense that the first recovery period grew at a lower rate than the one of the initial decline phase. Finally, Istanbul’s case differs from the former two as it is the only city that experienced a continuous recovery, suggesting a “V-curve” recovery pattern.

Independently from the described recovery patterns, what is relevant for the study’s purpose is to determine which urban areas have been more affected by the COVID-19 pandemic. To this end, Table 4 showcases the average UTPI across the first nine months of 2020 for each of the tourism cities. It should be noted that cities are stated by following a decreasing order in the UTPI average. Hence, cities such as Dubai, Singapore or New York are the least affected among the considered urban destinations, on average, by the COVID-19 pandemic. On the contrary, cities such as Bangkok, Osaka or Phuket are found to be amongst the most affected tourism cities. Table A2 in the Appendix section showcases the monthly evolution estimates of the UTPI for each of the framed cities in the study to deeply capture the month-by-month COVID-19 pandemic effects.

5. Discussion

The performance of an urban destination is a direct consequence of many different factors that interact with each other. Scholars and experts in tourism face the challenge associated to highly correlated variables measuring those factors and how these variables may be aggregated in an index that effectively summarizes the most relevant information. Following previous studies, this paper proposes the UTPI, which is constructed using PCA (Elgin et al., 2020;
Kimengsi et al., 2019; Liu et al., 2019; Natalia et al., 2019; Rehman Khan et al., 2017; Vyas and Kumaranyake, 2006; Zaman et al., 2016). This method allows generating a single indicator accounting for the greatest possible variance of a data set composed of several correlated variables. The UTPI aims to provide tourism-related stakeholders and researchers with a comparative tool for monitoring tourism across different urban destinations. Specifically, this paper estimates the UTPI for 16 top urban destinations according to Mastercard (2019) on a monthly basis since the first COVID-19 outbreak and until September 2020. Nevertheless, this index could also very well be estimated for different cities and time periods. The analysis of its evolution over time may help scholars in identifying urban areas that have efficiently responded to the current economic and social crisis in the tourism industry.

The results show that, on average, the tourism performance has been significantly devastating for the 16 analyzed cities since the first COVID-19 breakout. Thus, these results are aligned with previous literature demonstrating that the tourism industry is negatively impacted by unexpected events (Barbhuiya and Chatterjee, 2020; Bassil et al., 2019; McAleer et al., 2010; Neumayer and Plümper, 2016; Page et al., 2012; Rosselli et al., 2020; Seabra et al., 2020). Likewise, this paper is also connected to those previous attempts of documenting the relationship between the impacts of the COVID-19 on the tourism industry (Anguera-Torrell et al., 2020; Gössling et al., 2020; Hoque et al., 2020; Karim et al., 2020; Maneenop and Kotcharin, 2020; Sharma and Nicolau, 2020; Sobieralski, 2020). Nevertheless, this study provides new insight as it analyzes the COVID-19 possible impacts on urban tourism by providing a monthly indicator that allows for constant tracking of its evolution on a monthly basis.

Besides, the results suggest that some of the studied metropolitan areas have been able to better control the colossal drop-in tourism activity. Specifically, Table 4 showcases that the cities of Dubai, Singapore, New York and Istanbul are the ones that have been, on average, the least affected during the first nine months of 2020. First, the case of Dubai might be explained because the United Arab Emirates is one of the countries that most effectively and rapidly responded to the COVID-19 pandemic by adopting stringent social distancing measures and by implementing efficient liquidity stimulus by the Central Bank (Bremmer, 2020). Additionally, the city of Dubai launched the initiative called “Dubai We learn – Conquering COVID-19” to capture global best practices and innovative ideas that were reported to the Dubai Executive Council’s Supreme Committee of Crises and Disaster Management, aiming to locate the city as a key global model of recovering from the pandemic (Dubai Government Excellence Program, 2020). Similarly, Singapore stands out for rapidly responding against to the initial COVID-19 outbreak (Lee and Ong, 2020). In this sense, tourism activity may have benefited from the agile response of local public institutions.

Second, New York might have resulted less affected during the first months of 2020 because of not being close to the Asian and European continents in which the pandemic initially appeared. Moreover, one should note that the higher size of the tourism’s domestic market in the USA might also be a relevant reason to explain the lower affectance of the tourism industry in New York. Third, the case of Istanbul may be explained by Turkey’s macroeconomic policies, such as monetary policy promoting the Turkish lira currency depreciation against other currencies. For instance, the Turkish lira has depreciated in comparison to the Russian Ruble, the euro, the Bulgarian Lev and the British pound (XE Currency Converter, 2020). Given that the top countries of origin of international tourists to Turkey are Russia, Germany, Bulgaria and the UK (Republic of Turkey Ministry of Culture and Tourism, 2020), this depreciation might have compensated the negative demand impact from the COVID-19 once mobility restrictions were eased.

In contrast, the cities of Bali, Bangkok, Osaka and Phuket display the most negative tourism performance since the pandemic outbreak. Tourism in urban areas located in small- and mid-size countries might rely more in international demand. Thus, the tourism industry in cities such as those mentioned may have been hit harder because of their dependency on international tourists travelling from further destinations. Indeed, the huge drop on airline
activity has been especially relevant for long distances (OECD, 2020). Accordingly, those destinations may have suffered the reduction of a relevant segment of customers with longer average stays and higher average expenditures than domestic tourists. Nevertheless, the UNWTO (2020c) states that around 53% of tourism destinations have started easing some travel restrictions over the last quarter of 2020, suggesting a potential gradual restart of the tourism activity.

The evolution of the index in the cities included in the research shows alternative patterns. Some cities, including Bangkok, New York, Osaka or Seoul experience a “L-curve” evolution pattern. After the unprecedented drop in tourism activity, these cities have been experiencing a flat evolution. The difficulties for a recovery in those urban destinations may be explained by different factors such as a higher dependency of international tourism travelling long distances, longer periods of social distancing or the outbreak of upcoming COVID-19 waves. Specifically, the case of New York may be explained by a lagged evolution of the COVID-19 cases in the USA. Other cities, such as Barcelona, Milan or Paris, have shown after the first fall in the index values, a slow recovery associated to an increase in domestic tourism during the summer period in the context of a relaxation of mobility and social distance restrictions. Yet, in the middle of the summer, the index experienced a new drop associated to the outbreak of the second wave of COVID-19 in Europe and the rapid implementation of new partial lockdown measures. Eventually, tourism activity in these cities may thrive again and the index in these cities may confirm a “W-curve” pattern.

6. Conclusions

The primary goal of this research was to propose and estimate an index that could be used to measure the tourism performance on urban destinations during the COVID-19 pandemic outbreak and over the months at which the pandemic effects will still prevail. To this aim, this paper has gathered city- and month-level data proxying the performance of the tourism industry. Specifically, the authors have collected airline, accommodation and tourists’ demand information for each of the following cities: Bali, Bangkok, Barcelona, Dubai, Hong Kong, Istanbul, Kuala Lumpur, London, Milan, New York, Osaka, Paris, Phuket, Seoul, Singapore and Tokyo. Then, by using a PCA method, this study proposed the UTPI. This index captures the month-by-month evolution of the tourism industry in each of the analyzed cities and points out that the COVID-19 pandemic has devastating effects on the main global tourism cities. Additionally, the index evolution can be used as a tool to analyze the different recovery paths these cities may experience.

The proposed index might become useful for future researchers interested in using a measure of tourism performance during the COVID-19 pandemic in some of the most important urban destinations. Therefore, it aspires to serve as a comparative tool for industry-related stakeholders, especially public administrations and tourism researchers, to determine the most suitable public policies to reactivate the tourism industry. Scholars may use the UTPI as proxy variable to capture the effect and the evolution the COVID-19 pandemic has had on the most relevant urban tourism destinations. Furthermore, the future index evolution may help identify cities that have succeeded to the recovery of tourism activity and establish best practices for future crises. Besides, urban tourism stakeholders that consider the COVID-19 pandemic as an opportunity to achieve more sustainable tourism may also use the UTPI as a supportive tool showcasing the tourism evolution in main urban destinations. In this context, this study also contributes to the limited academic literature on the effects of unexpected crises on tourism cities.

Finally, the constructed database will be regularly updated while the COVID-19 pandemic continues to struggle the urban tourism industry, and the latest version of the UTPI estimates will be made available at https://sites.google.com/view/urban-tourism-performance/home. It needs to be noted, that as more data will become available, the UTPI estimates might change from the ones reported in this study as the entire panel data set will be considered in the PCA.
7. Limitations

This paper has two main limitations. First, the current version of the UTPI estimates only considers 16 urban destinations. Future research should amplify the geographical coverage of this study by incorporating data for other tourism cities. Second, to construct the index, the authors used four variables at the city and month level that proxy airlines’ and hotels’ performance, as well as tourists’ interests for each of the analyzed urban destinations. Nevertheless, urban tourism performance can also be measured by using additional and alternative variables. For example, information relating to short vacation rentals, restaurants or cruises, among others, can also capture the evolution of the industry in each tourism city. Hence, future research might also use the same methodology by adding these other sources of information as they will be made available for research purposes over the upcoming months.

References


Holland, S.M. (2019), “Principal components analysis (PCA)”.


Observatori del Turisme a Barcelona (2019), Barcelona Tourism Activity Report.


World Travel and Tourism Council (2018), “City travel & tourism impact 2018”.


# Appendix

## Table A1  Principal component analysis

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