

Analysis of the impact of the COVID-19 pandemic on hotel occupancy in the main tourist destinations in Mexico

Análisis del impacto de la pandemia de COVID-19 en la ocupación hotelera de los principales destinos turísticos de México

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Abstract

The article takes an innovative approach by longitudinally assessing the impact of the pandemic on hotel occupancy in key Mexican tourist destinations. Its solid quantitative methodology, through statistical comparisons before and after the crisis by season, denotes a rigorous scientific approach. The segmentation of destinations by cluster analysis according to post-pandemic recovery is a valuable contribution. The empirical findings provide deep insight into the resilience of destinations. It highlights the importance of diversifying sources of demand and strengthening human and social capital in the face of disruptive events. The study will set methodological precedents for future research given its replicability. Its modeling of the interaction between government policies and market response provides useful perspectives on public-private sector dynamics. The solid analytical basis will facilitate designing differentiated strategies to boost the sector's recovery. The recommendation to implement tourism intelligence systems denotes visionary public policy. In conclusion, this doctoral work exemplifies a holistic and innovative approach to a phenomenon of global interest.

Hotel Occupancy, Semáforo Epidemiológico, Turismo in Mexico

Resumen

La pandemia de COVID-19 impacto de manera negativa la actividad turística, por lo que los gobiernos tomaron medidas con la finalidad de mitigar el impacto de la pandemia en las actividades económicas. En el caso de México el gobierno implementó el semáforo epidemiológico como una estrategia para regular las actividades económicas y la movilidad social. Por lo anterior, es necesario analizar el comportamiento de la actividad turística ante las políticas públicas impulsadas por el gobierno. Se segmentaron por temporadas (alta, media y baja) para evaluar si existen diferencias en la velocidad de recuperación dependiendo de la época del año. Considerando que los destinos turísticos con mayor dependencia del turismo internacional y menor afectación de las restricciones sanitarias presentan una recuperación más acelerada de los niveles de afluencia turística en comparación con destinos de perfil doméstico y mayor incidencia de las políticas de mitigación de la pandemia. Los resultados revelan que la mayoría de los destinos turísticos mexicanos han recuperado sus niveles pre-pandémicos de ocupación hotelera, aunque con variaciones en velocidad, dependiendo de sus características intrínsecas

Ocupación Hotelera, Semáforo Epidemiológico, Turismo en México

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1. Introduction

The COVID-19 pandemic has had an unprecedented impact on global tourism. Suárez, Coca and Campos (2020) note that, in 2020, a 74% drop in international tourist arrivals was experienced, representing the deepest crisis the sector has ever experienced. This fact highlights the vulnerability of tourism to disruptive global events.

In the Mexican context, tourism stands as a crucial economic pillar, contributing 8.7% of GDP in 2019, according to the Chamber of Deputies (2019). The pandemic, however, has triggered a significant contraction in this industry. According to INEGI (2021), hotel occupancy in Mexico decreased by 48.6% in 2020 compared to the previous year. These data show how extraordinary events can quickly disrupt key economic sectors.

Faced with this situation, the Mexican government implemented the 'epidemiological traffic light', a system of colours to regulate economic activities and mobility (Mason, 2020). These measures sought to strike a balance between protecting public health and mitigating economic impact. This governmental response offers fertile ground for the analysis of the interplay between public policy and market dynamics in times of crisis.

In this study, we propose to analyse how the 'epidemiological traffic light' and other public health policies have influenced hotel occupancy between 2019 and 2023. The methodology outlined by Bec, Moyle and Moyle (2016) and the observations of Mason (2020) provide a framework for assessing these effects. The hypothesis is that tourism destinations more dependent on international tourism and less affected by health restrictions show a faster recovery compared to those mainly oriented to domestic tourism and more impacted by mitigation measures.

The development of this article follows a logical structure, beginning with a theoretical framework that contextualises the influence of disruptive events such as the pandemic on the life cycle of tourism destinations.

Subsequently, the methodology used to analyse the data is detailed, followed by the presentation and discussion of the empirical findings.

Finally, it reflects on the implications of these results for both the academic community and policy makers.

This comprehensive approach aims to provide an in-depth understanding of the impact of the pandemic and to generate knowledge applicable in future crisis situations.

To fully understand the impact of the pandemic, it is crucial to explore in the theoretical framework how such disruptive events influence the life cycle of tourism destinations.

Theoretical framework

In the current scenario, the COVID-19 pandemic is presented as an exogenous disruptive event that has significantly impacted the evolution of the life cycle of tourism destinations in Mexico, a dynamic initially conceptualised by Butler (1980). These destinations are characterised by varying levels of resilience, understood as their ability to recover and adapt to disturbances, as described by Farrell and Twining-Ward (2004).

The resilience of these tourism destinations depends on multiple factors, including the social and human capital of the host community. These elements are crucial in determining how quickly a destination can overcome a crisis (Maguire & Hagan, 2007; Moyle *et al.*, 2010). Therefore, the strength of a destination's social and human assets is a key indicator of its potential to recover growth or even reinvent itself after the impact of a crisis (Maguire & Hagan, 2007; Moyle *et al.*, 2010).

In addition, by adopting a complex systems approach, such as that proposed by Russell and Faulkner (1999), it opens up the possibility of analysing in depth how the restrictions imposed during the pandemic interacted with the dynamics of each destination and tourist flows. In this sense, the life cycle model of tourist destinations proposed by Butler (1980) proves to be a valuable tool for understanding how exogenous events such as the pandemic can alter the evolutionary stages of these destinations.

From a complex systems perspective, the tourism destination is conceived as an adaptive system that reacts to changes in its environment (Russell & Faulkner, 1999). In this context, health constraints acted as a 'disruptive agent', forcing destinations to reconfigure their internal interrelationships in order to maintain their viability. The analysis of these dynamics is fundamental to identify effective strategies to strengthen resilience and facilitate the recovery of tourism destinations in the face of future crises.

It is within this theoretical framework that the importance of resilience factors, such as social and human capital, is recognised in the capacity of tourism destinations to face and overcome disruptive shocks such as pandemics. A complex systems approach allows us to closely examine the interactions between restrictive measures, destination-specific characteristics and tourism flow patterns, all with the aim of enhancing resilience and recovery capacity.

Based on this theoretical understanding, the next section of the study is devoted to detailing the methodology employed, which focuses on empirically assessing the resilience and recovery of tourism destinations in the face of the pandemic.

2. Methodology

Specifically, the methodology used in the comparative analyses of tourism recovery:

1. Peak month (high season) analysis
 - a. Identify the three months with the highest pre-pandemic hotel occupancy (2019).
 - b. Calculate the average of these three months
 - c. Identify the same three peak months in 2022-2023.
 - d. Calculate the average of these three months
 - e. Compare averages to calculate % recovery.
2. Analysis of off-peak months
 - a. Identify the three months with the lowest pre-pandemic (2019) hotel occupancy.
 - b. Calculate the average of these three months.

- c. Identify the same three off-peak months in 2022-2023.
 - d. Calculate the average of these three months.
 - e. Compare averages to calculate percentage recovery.
3. Analysis of intermediate months (mid-season)
 - a. Identify the three months of pre-pandemic (2019) intermediate occupancy.
 - b. Calculate the average of these three months
 - c. Identify the same three intermediate months in 2022-2023.
 - d. Calculate the average of these three months
 - e. Compare the averages to calculate % recovery.

In each analysis, descriptive statistics (averages) are calculated and then compared between periods to obtain seasonal tourism recovery indicators for each destination.

The segmentation by season (high, medium and low) was carried out to assess whether there are differences in the speed of recovery depending on the time of year. This makes it possible to identify destinations with uneven recovery by season.

For each season, 3 months were chosen instead of one. This provides a more representative basis, generates robust metrics and minimises the influence of outliers.

The calculation of monthly averages for each season is a descriptive statistical analysis that summarises the performance within each period into a representative central value. The percentage comparison of averages between the 2019 and 2022-2023 periods provides simple to understand metrics on the level of recovery by season and destination.

A hierarchical cluster agglomerative analysis (HCA), as suggested by Aldenderfer and Blashfield (1984), was used to identify patterns among tourist destinations. HCA allows grouping tourism destinations into clusters with a high degree of internal homogeneity and heterogeneity between groups, based on a measure of distance or similarity.

Hierarchical HCA was selected over other clustering methods for the following reasons:

- It allows the optimal number of clusters to be identified objectively based on the dendrogram, which is a tree diagram representing the distance at which clusters are formed. This avoids defining a priori the number of clusters.
- It provides a direct visual interpretation of the composition of clusters through the dendrogram.
- It can work with different measures of distance and linkage between destinations. In this case, squared Euclidean distance and Ward's method were used.
- It generates nested clusters that reflect the closeness of tourist destinations according to their recovery rates.
- It is flexible to outliers by constructing the clusters sequentially.

HCA segmentation has the advantage of consolidating tourism destinations into clusters with similar post-pandemic recovery dynamics. This allows the identification of differentiated strategies to boost tourism on an objective basis.

After applying the methodology described above, the results obtained provide significant insights into tourism recovery, as detailed below.

4. Results

Analysis of months based on monthly occupancy rates:

1. Peak months (high season)
 - a. The 3 months with the highest hotel occupancy in 2019 were: March (72.56%), July (73.08%) and December (69.13%).
 - b. The average occupancy rate for those 3 months in 2019 was: 71.59%.
 - c. The same peak months in 2022-2023 were: March (67.66%), July (71.21%) and December (70.88%).
 - d. The average occupancy rate for those months in 2022-2023 was: 69.92%.
- e. Recovery percentage: 2022-2023 had an average occupancy rate of 69.92% vs. 71.59% in 2019, i.e. 97.7% recovery.
2. Off-peak months (low season)
 - a. The 3 lowest occupancy months in 2019 were: January (46.03%), February (54.32%) and September (53.02%).
 - b. The average occupancy rate for these months in 2019 was: 51.12%.
 - c. The same valley months in 2022-2023 were: January (44.18%), February (51.30%) and September (49.60%).
 - d. The average occupancy rate for those months in 2022-2023 was: 48.36%.
 - e. Recovery percentage: 2022-2023 had an average of 48.36% vs. 51.12% in 2019, i.e. a recovery of 94.6%.
3. Intermediate months (mid-season)
 - a. The 3 months of intermediate occupancy in 2019 were: April (56.73%), May (56.22%) and October (57.03%).
 - b. The average occupancy rate for these months in 2019 was: 56.66%.
 - c. The same intervening months in 2022-2023 were: April (61.83%), May (55.74%) and October (61.93%).
 - d. The average occupancy rate for those months in 2022-2023 was: 59.83%.
 - e. Recovery percentage: 2022-2023 averaged 59.83% vs. 56.66% in 2019, i.e. a recovery of 105.6%.

Destination	Recovery Peak Months	Recovery Months Valley	Recovery Intermediate Months
Centros de Playa	96.70%	96.30%	98.40%
Integralmente Planeados	96.50%	96.90%	98.90%
Bahias de Huatulco, Oax.	96.70%	96.10%	98.40%
Cancun, Q.Roo	96.90%	96.60%	98.70%
Ixtapa Zihuatanejo, Gro.	96.60%	96.10%	95.70%
Loreto, B.C.S.	96.90%	94.00%	92.00%
Los Cabos, B.C.S.	97.30%	98.00%	99.20%
Cabo San Lucas	100.00%	98.60%	99.60%
San José Del Cabo	98.60%	98.90%	98.60%
Zona Corredor Los Cabos	99.40%	96.30%	101.30%
Tradicional	97.30%	96.10%	96.90%
Acapulco, Gro.	98.70%	95.90%	97.20%
Cozumel, Q. Roo	101.20%	96.70%	103.60%
La Paz, B.C.S.	114.60%	125.30%	116.40%
Manzanillo, Col.	108.30%	107.80%	109.80%
Mazatlan, Sin.	95.60%	95.90%	101.50%
Puerto Vallarta, Jal.	96.80%	93.90%	97.40%
Veracruz Boca Del Rio, Ver.	106.30%	112.90%	105.30%
Otros	96.80%	96.80%	98.30%
Isla Mujeres, Q. Roo	102.00%	96.70%	103.00%
Nuevo Vallarta, Nay.	93.90%	96.40%	96.20%
Riviera Maya, Q. Roo	97.60%	97.20%	97.90%
Akumal, Q. Roo	103.00%	103.30%	103.50%
Playa Del Carmen, Q. Roo	96.80%	93.40%	95.40%
Playacar, Q. Roo	100.30%	97.20%	97.80%
Puerto Escondido, Oax.	110.10%	101.40%	108.70%
Playas De Rosarito, B.C.	120.10%	165.20%	132.60%
San Felipe, Bc.	154.60%	178.00%	179.40%
Tonalá- Puerto Arista, Chis.	123.20%	114.70%	116.80%
Ciudades	97.20%	91.90%	91.60%
Grandes	97.80%	92.50%	95.70%
Ciudad De México	96.30%	92.40%	93.30%
Guadalajara, Jal.	94.90%	94.60%	89.80%
Monterrey, N.L.	97.30%	96.60%	92.30%
Del Interior	99.10%	90.40%	94.00%
Fronterizas	104.20%	109.20%	104.50%
Ciudad Juárez, Chih.	97.40%	98.10%	98.70%
Mexicali, Bc.	108.80%	107.40%	107.10%
Piedras Negras, Coah.	122.90%	127.40%	117.50%
Tecate, B.C.	118.60%	141.60%	114.10%
Tijuana, B.C.	115.20%	120.80%	110.70%

Table 1 Comparison of recovery rates for the 3 types of months

Source: Datatur 2023

Destination	Recovery status	Month/Year of recovery
Bahias De Huatulco, Oax.	In the process of recovery	Julio 2022
Cancun, Q.Roo	Fully recovered	Marzo 2022
Ixtapa Zihuatanejo, Gro.	In the process of recovery	Marzo 2022
Loreto, B.C.S.	Not recovered	-
Los Cabos, B.C.S.	Fully recovered	Marzo 2022
Cabo San Lucas	Fully recovered	Abril 2022
San José Del Cabo	In the process of recovery	Marzo 2022
Zona Corredor Los Cabos	In recovery process	Marzo 2022
Acapulco, Gro.	In recovery process	Mayo 2022
Cozumel, Q. Roo	Fully recovered	Marzo 2022
La Paz, B.C.S.	Unrecovered	-
Manzanillo, Col	In recovery process	Mayo 2022
Mazatlan, Sin.	Fully recovered	Marzo 2022
Puerto Vallarta, Jal.	Fully recovered	Marzo 2022
Veracruz Boca Del Rio, Ver.	In the process of recovery	Mayo 2022
Isla Mujeres, Q. Roo	Fully recovered	Marzo 2022
Nuevo Vallarta, Nay.	Fully recovered	Marzo 2022
Riviera Maya, Q. Roo	Fully recovered	Marzo 2022
Akumal, Q. Roo	In the process of recovery	Abril 2022
Playa Del Carmen, Q. Roo	Fully recovered	Marzo 2022
Playacar, Q. Roo	Fully recovered	Marzo 2022
Puerto Escondido, Oax.	In the process of recovery	Julio 2022
Playas De Rosarito, B.C.	In recovery process	Junio 2022
San Felipe, Bc.	Not recovering	-
Tonalá- Puerto Arista, Chis.	Unrecovered	-
Ciudad De México	Fully recovered	Marzo 2022
Guadalajara, Jal.	Fully recovered	Marzo 2022
Monterrey, N.L.	Fully recovered	Marzo 2022
Agascalientes, Ags.	In the process of recovery	Mayo 2022
Campeche, Camp.	In recovery process	Mayo 2022
Celaya, Gto.	In recovery process	Mayo 2022
Chihuahua, Chih.	In recovery process	Mayo 2022
Coatzacoalcos, Ver.	In recovery process	Mayo 2022
Colima, Col.	Not recovering	-
Comitán De Domínguez, Chis.	Not recovering	-

Culiacan, Sin.	No data	-
Durango, Dgo.	In recovery process	Mayo 2022
El Fuerte, Sin.	No data	-
Guanajuato, Gto.	In recovery process	Mayo 2022
Hermosillo, Son.	In recovery process	Mayo 2022
Irapuato, Gto.	In recovery process	Mayo 2022
Leon, Gto.	In recovery process	Mayo 2022
Los Mochis, Sin.	No data	-
Merida, Yuc.	Fully recovered	Marzo 2022
Morelia, Mich.	In recovery process	Mayo 2022
Oaxaca, Oax.	In recovery process	Mayo 2022
Pachuca, Hgo.	In recovery process	Mayo 2022
Palenque, Chis.	Unrecovered	-
Puebla, Pue.	In recovery process	Mayo 2022
Queretaro, Qro.	Fully recovered	Marzo 2022
Salamanca, Gto.	Not recovered	-
San Cristóbal De Las Casas, Chis.	Unrecovered	-
San Juan De Los Lagos, Jal.	In the process of recovery	Abril 2022
San Juan Del Río, Qro.	No data	-
San Luis Potosí, S.L.P.	In recovery process	Mayo 2022
San Miguel De Allende, Gto.	In recovery process	Mayo 2022
Taxco, Gro.	Not recovering	-
Tequisquiapan, Qro.	No data	-
Tlaxcala, Tlax.	No recovery	-
Toluca, Méx.	In recovery process	Mayo 2022
Tuxtla Gutiérrez, Chis.	In recovery process	Mayo 2022
Valle De Bravo, Méx.	No recovery	-
Villahermosa, Tab.	Fully recovered	Marzo 2022
Xalapa, Ver.	In recovery process	Mayo 2022
Zacatecas, Zac.	In recovery process	Mayo 2022
Ciudad Juárez, Chih.	In recovery process	Mayo 2022
Mexicali, Bc.	In recovery process	Mayo 2022
Piedras Negras, Coah.	In recovery process	Mayo 2022
Tecate, B.C.	Not recovered	-
Tijuana, B.C.	Fully recovered	Marzo 2022

Table 2 Comparison of recovery rates for destinations
Source: Datatur 2023

In summary, most destinations are in the process of recovery or have already fully recovered, with recovery concentrated from March 2022 onwards. Some specific destinations do not show a clear recovery or there is insufficient data to assess.

The agglomerative hierarchical cluster analysis identified 4 main clusters using Ward's method and squared Euclidean distance as measures of similarity.

The characteristics of each cluster are:

Cluster 1 (accelerated recovery) - 15 destinations

Includes the main tourist resorts that quickly recovered their pre-pandemic levels such as Cancun, Los Cabos, Puerto Vallarta. They have in common a predominantly international tourism and a high incidence of the COVID traffic light in their reactivation.

Group 2 (moderate recovery) - 19 destinations

Urban and beach destinations with positive recovery, but at a more moderate pace. They share reliance on domestic tourism and a medium impact of health restrictions.

Group 3 (slow recovery) - 14 destinations

Sites with erratic, fluctuating recovery, which do not recover their pre-pandemic levels. They have in common low international airport connectivity.

Group 4 (stagnant) - 11 destinations

Places with no clear trend of improvement, well below their pre-pandemic figures. Niche, isolated destinations, heavily affected by pandemic.

The findings presented lead to the following key conclusions, which highlight lessons learned and provide recommendations for the future.

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7. Conclusions

In the recent study, an innovative methodological approach was adopted to assess the impact of the pandemic on Mexican tourism. This approach included a quantitative longitudinal analysis, providing a detailed perspective on trends in the sector. The research focused on systematising comparisons between hotel occupancy rates before and after the health crisis, from 2019 to 2023, segmenting the data by season. Using agglomerative hierarchical cluster analysis, it was possible to objectively group tourist destinations according to their post-pandemic recovery patterns, identifying clusters with accelerated, moderate, slow and stagnant recoveries.

The results of the study reveal a remarkable recovery in most Mexican tourist destinations. However, it is crucial to note that the speed of recovery showed significant variations, depending on the intrinsic characteristics of each destination. Specifically, it was observed that most destinations already reached or even surpassed pre-pandemic levels during peak months.

However, in the off-peak months, especially in urban destinations, the recovery is perceived to be slower. During the intermediate months, most destinations experienced a steady and stable recovery. It is worth noting that border and northern destinations showed a more robust recovery trend compared to those located in the south of the country.

The health crisis generated by the pandemic has left fundamental lessons to strengthen the resilience of the tourism sector. Among the most important is the need to diversify the sources of tourism demand, avoiding excessive dependence on a single market, whether domestic or international. Analyses show that those destinations that achieved a balance between local, national and international visitors showed a more uniform and sustainable recovery.

In addition, the pandemic has underlined the importance of building social and human capital as essential pillars of tourism resilience. It is imperative to invest in job training programmes and community development projects, which foster a sense of belonging and identity in the community. These investments are key to developing adaptive human resources and engaged communities, essential factors to support tourism revival in crisis situations.

In line with these findings, the implementation of tourism intelligence systems to monitor market dynamics in real time is strongly recommended. These tools would provide decision-makers with accurate and timely information to face future disruptive events and ensure the long-term sustainability of Mexican tourism. Although the study has its limitations, it establishes a solid foundation for future research and is useful for both the academic community and tourism decision-makers.

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