Determinants of the Competitiveness of Small and Medium Hotel Enterprises Affecting the Attraction of International Tourism to Two Mexican Cities

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Abstract

The objective of this study is to determine that transportation infrastructure, innovation, price, and skilled labor are variables that positively impact the international competitiveness of hotel micro, small, and medium-sized enterprises (MSMEs) in the cities of Puebla de Zaragoza, Puebla, and Morelia, Michoacán, México. The theoretical basis is Michael Porter's Theory of Competitive Advantage. The methodology involved defining the hotel MSMEs in both cities and conducting fieldwork using questionnaires. We used the Kolmogorov-Smirnov (K-S) test to select the best statistical analysis for the hypothesis. We used the Mann-Whitney U test as a contrast method based on the results obtained. Additional validation was subsequently conducted using Bayes' Theorem. The results obtained indicate that the variables have a positive impact on hotel MSMEs, contributing to increasing their competitiveness in attracting international tourism. We recommend that collaboration between the public and private sectors be encouraged to design and implement comprehensive tourism promotion public policies to increase the attractiveness of international tourism to the cities of Puebla and Morelia.

Keywords: competitiveness, hotel sector, SMEs, international tourism

1. Introduction

The study highlights the issue of limited international tourism competitiveness among hotel-producing MSMEs in Mexican colonial cities like Puebla and Morelia, which is attributed to the concentration of international tourist arrivals in major tourist centers. Competition for tourism from inland cities with attractions other than sun and sand has been complex and unequal. The main tourist attractions of Mexican cities, with historical and cultural heritage dating back to the Spanish colonial era, lie precisely in their heritage assets, concentrated in their historic centers. Puebla and Morelia share a historical and colonial heritage, both recognized as United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Sites. However, this comparative advantage is insufficient to convince international travelers to prioritize our country as their destination when considering it.

Therefore, this paper aims to identify the variables that impact the competitiveness of hotel MSMEs and influence the attraction of international tourism to the cities of Puebla and Morelia, which have experienced significant growth in their tourism industries in recent years. The hypothesis is that transportation infrastructure, innovation, price, and skilled labor are variables that positively impact the competitiveness of hotel MSMEs in these cities in attracting international tourism.

The scope of this study encompasses the hotel MSMEs in the cities of Morelia and Puebla, and it determines the primary factors that impact competitiveness. Based on the above, the document is divided into four parts: the first part provides a review of the tourism sector in Mexico and its competitiveness; the second part reviews the hotel industry in Puebla and Morelia; the third part explains the methodology; and finally, the fourth part presents the analysis of the results and conclusions.

2. Background

Mexico boasts a rich natural, historical, and cultural heritage, positioning it among the most visited nations in the world. However, for decades, it has faced a competitiveness problem that has prevented it from sustaining its

position in global preferences. Over the last 20 years, the country's accommodation supply has doubled; however, the geographical distribution of available rooms for lodging remains concentrated in coastal destinations. In summary, a considerable proportion of tourism services is driven by the high demand for sun and beach products. This trend suggests the underutilization of tourism capital, as evident in demand, promotion, and marketing (Secretaría de Turismo [SECTUR], 2013). Mexico's competitiveness dropped from 31st in 1999 to 37th in the World Economic Forum's 2022 Global Competitiveness Report. This implies a significant lag in relative competitiveness compared to other countries (World Economic Forum [WEF], 2020).

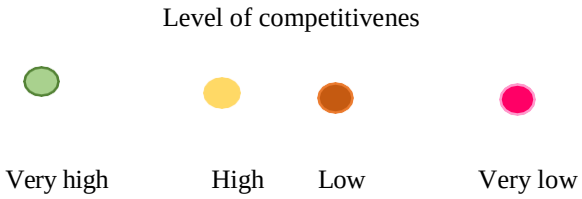
As shown in Figure 1, this report highlights setbacks for Mexico, both in the values of various indicators and in its relative position among the evaluated nations. These setbacks reflect adverse shocks and the country's persistent inability to build the foundations that would allow it to become more competitive globally. Given this scenario, the Mexican Institute of Competitiveness (IMCO) presents proposals to inform the public debate and consider specific actions that allow us to rethink the country's path and thus stop and reverse the slow but steady decline it has suffered in the International Competitiveness Index (ICI) over the years (Instituto Mexicano de la Competitividad [IMCO], 2022).

Figure 1. Mexico's historical performance in the International Competitiveness Index (Authors based on IMCO)

Table 1 shows how the rise in the ranking of countries with the highest number of international tourists has been constant, even before the pandemic, since Mexico is the only country in Latin America that regularly exceeds 25 million foreign visitors per year and is, therefore, the only Latin American country in the top 10. However, they face the challenge of becoming an attractive destination for tourists who spend significant money on their trips. Key data for this objective include accommodation, infrastructure, and the establishment of networks among tourism service providers (Organización Mundial del Turismo [OMT], 2019).

Table 1. General Index Ranking (Authors based on IMCO).

1	Denmark	12	United Kingdom	23	Chile	34	Peru
2	Norway	13	Canada	24	Hungary	35	Türkiye
3	Swiss	14	Germany	25	Poland	36	Russia
4	Sweden	15	Belgium	26	Malaysia	37	**Mexico**
5	Netherlands	16	USA	27	Greece	38	Brazil
6	South Korea	17	France	28	Costa Rica	39	Argentina
7	Japan	18	Israel	29	Tailand	40	South Africa
8	Irland	19	Portugal	30	China	41	India
9	Finland	20	Czech Republic	31	Panama	42	Guatemala
10	Australia	21	Spain	32	Indonesia	43	Nigeria
11	Austria	22	Italy	33	Colombia		



Destinations are measured by the foreign currency earned, not the number of tourists. Therefore, Mexico still lacks product integration into communities to fully meet tourist expectations through quality and management systems based on the product's sustainability, generating more foreign currency. Mexico can better leverage its tourism potential. It has comparative advantages associated with its geographic location, connectivity potential, extensive tourism infrastructure, and capacity to produce high-quality tourism products. However, it has lost market share globally.

In 2024, Mexico attracted 45 million international tourists, generating an economic impact of $ 33 billion (USD) (SECTUR, 2025), a historic record for the country. However, gaps exist in areas such as infrastructure, human resources, and pricing in tourism services, which impact competitiveness. This issue is increasingly attracting attention in the tourism industry, of which the hotel industry has historically been seen as a reflection.

2.1 Hotel Industry in Morelia and Puebla

Latin America and the Caribbean have less developed hotel infrastructure compared to developed countries. However, in the last decade, large International Hotel Groups (IHGs) have turned their attention to this part of the world to expand their interests, encouraged by the neoliberal reforms recently implemented in various countries, which favor the influx of foreign capital. This scenario has enabled the growth of established IHGs, particularly in Mexico and the Caribbean, as well as the entry of new companies through franchising and other strategic approaches (Propin, López & Sánchez, 2004).

Hotel chains in Mexico expanded due to the growing demand for international tourism and a lack of suitable accommodations for travelers. In the second half of the 20th century, Mexico transitioned from rural to urban areas, shifting from the countryside to the city (Jiménez, 1993). As of 2019, the accommodation offer consisted of just over 836 000 rooms and almost 23,700 establishments. Given this, and considering the nature of the tourism phenomenon, which involves overnight stays outside a person's usual residence, it is evident that hotel chains play a leading role in the operation of the tourism system (Madrid, Godínez & Casar, 2020).

Hotel chains have grown steadily across all sectors. They have increased from 59 in 1994 to 120 in 2019, with an average annual growth rate (AGR) of 2.9 percent. However, the Coronavirus Disease 2019 (COVID-19) pandemic has brought a time of reinvention and change to the tourism sector, particularly for the hotel industry, which was significantly affected by social distancing regulations, mobility restrictions, and other containment measures resulting from the health crisis. As shown in Table 2 below, Quintana Roo and Baja California, both beach resorts,

have the highest percentage of occupied rooms.

Table 2. Main Federal Entities with the highest occupancy percentage in 2023 (Authors based on INEGI)

	Federative Entity	Available Rooms	Occupied Rooms Total	Occupied Rooms by Mexicans	Rooms Occupied by Foreigners	Occupancy Percentage Total
1	Quintana Roo	44 471 615	32 643 170	5 286 554	27 356 616	73.4%
2	Baja California Sur	8 532 017	6 056 330	1 610 829	4 445 501	71.0%
3	Nayarit	8 127 959	4 974 427	2 657 726	2 316 701	61.2%
4	Chihuahua	8 282 339	4 968 769	4 588 770	379 999	60.0%
5	Sinaloa	7 991 654	4 621 162	4,102 925	518 238	57.8%
6	Morelos	3 824,227	2 201 958	1 980 855	221 103	57.6%
7	Nuevo León	6 967,095	3 900 668	3 185 731	714 936	56.0%
8	Baja California	10 410,351	5 728 819	3 797 618	1 931 201	55.0%
9	Jalisco	21 314,433	11 418 443	8 507 081	2 911 362	53.6%
10	Mexico City	18 991 296	10 150 834	7 417 086	2 733 748	53.4%
11	Yucatán	4 714 352	2,457 117	2 039 378	417 740	52.1%
12	Coahuila	4 626 651	2,321 423	2 031 196	290 227	50.2%
13	Sonora	5 979 809	2 965 635	2 634 634	331 001	49.6%
14	Durango	1 977 505	978,548	948 573	29 975	49.5%
15	Querétaro	4,922 307	2 411 644	2 148 132	263 512	49.0%
16	Oaxaca	6 826 359	3 327 327	2 862 953	464 374	48.7%
17	Tabasco	3 184 741	1 513 059	1 400 432	112 627	47.5%
18	Guerrero	10 358 787	4 905 143	4 640,056	265 086	47.4%
19	Colima	2 326 133	1 071 162	1 017 632	53 530	46.0%
20	Campeche	2 615 998	1 201 592	1 029 742	171 850	45.9%
21	San Luis Potosí	4 422 913	2 006 970	1 835 536	171 434	45.4%
22	Veracruz	12 268 604	5 302 787	4 882 518	420 269	43.2%
23	Puebla	7 789 997	3 280 030	2 940 183	339 847	42.1%
24	Aguascalientes	2 290 303	962 122	860 241	101 881	42.0%
25	Michoacán	5 378 041	2 242 607	2 059 222	183 385	41.7%

MORELIA

Regarding tourism, Morelia is strategically located in the State of Mexico, Jalisco, and Mexico City (CDMX), representing the primary states that generate tourists to the city. Morelia's location constitutes a competitive advantage, as it is situated in the north of the state of Michoacán, close to the main communication routes with the aforementioned states, which account for most current and potential tourism origins. Morelia boasts a hotel infrastructure of nearly 4,400 rooms and welcomed over one million tourists in 2020.

The city primarily attracts domestic tourism; however, as part of the sector's evolution and growing internationalization, an increase in foreign tourism is possible, which will, to a greater or lesser extent, evolve in parallel with the increase in domestic tourism (SECTUR, 2013).

In this sense, Table 3 shows that the flow of non-resident tourists in Mexico was approximately fifty thousand in 2017 and 2018; however, it increased significantly to 245 thousand international tourists in 2019. In 2020, there was a decline in both national and international tourism. That year's low influx had national and international factors, including the COVID-19 pandemic.

Table 3. Tourists who arrived in Morelia, Mexico, annual series from 2015 to 2020 (Authors based on INEGI)

Concept	2015	2016	2017	2018	2019	2020
Residents in the country	2 518 756	2 478 400	2 782 945	3 034 138	2 764 187	1 129 307
Non residents in the country	22 854	33 931	47 767	45 955	241 038	196 863
Arrival of tourists by tourist residence	2 541 610	2 512 331	2 830 712	3 080 093	3 005 225	1 326 169

In 2020, the state saw fewer foreign tourists among its total arrivals. Domestic tourists, as seen on Table 4, occupied most hotel rooms.

Table 4. Indicators of tourism activity in Michoacán (Authors based on INEGI)

Year 2020	Arrival of Tourists Total	Arrival of Mexican Tourists	Arrival of Foreign Tourists	Sum of Available Rooms	Sum of Available Rooms Foreign Tourists	Sum of Available Rooms Mexican Tourists	Sum of Occupied Rooms Total
Michoacán	1 326 169	1 129 307	196 863	5 457 000	248 997	1 434 483	1 683 480

In Morelia, companies dedicated to tourist accommodation as their primary economic activity are significant because they directly influence the revitalization of the various economic activities surrounding tourism, and to the extent of their competitiveness, contribute to it and the well-being of society. However, for these companies to be successful, they must be efficient, productive, and competitive.

PUEBLA

Puebla is the state capital and the fourth-largest city in Mexico by population. Its socioeconomic activities include agriculture, commerce, industry, and tourism. Internationally, the most important indicator for measuring the hotel industry's performance is the occupancy rate, also known as the percentage of rooms occupied (INEGI, 2020).

Based on the information in Table 5, in 2020, Puebla had 219 registered hotels and 10,250 hotel rooms. Hotel occupancy for the entire state of Puebla in 2020 was 1 309 244 00 hotel rooms, of which foreigners occupied 142,162. This year's occupancy was significantly lower than in 2019, when tourists occupied 3 808 668 hotel rooms (INEGI, 2020).

Table 5. Total rooms available and rooms occupied in the year (Authors based on INEGI)

Year	State/Municipality	Sum of Available Rooms	Sum of Occupied Rooms by Foreigns	Total Occupied Rooms by Mexicans	Sum of Occupied Rooms Total
2019	Puebla	7 301 954	506 651	3 302 017	3 808 668
2020	Puebla	7 426 185	142 162	1 167 082	1 309 244

We can notice that the number of foreign tourists is lower compared to the number of national tourists.

Table 6. Tourist arrivals, and tourists per night in a hotel (Authors based on INEGI)

Year	State/ Municipality	Tourist Arrivals Total	Tourist Arrivals Mexicans	Tourist Arrivals Foreigns	Tourists Night Total	Tourists Night Mexicans	Tourists Night Foreigns
2019	Puebla	6 608 202	5 817 054	791 148	11 400 900	10 036 143	1 364 757
2020	Puebla	1 996 146	1 789 577	206 569	3 347 717	2 976 917	370 800

Puebla experienced a decrease in tourists in 2020 due to the COVID-19 pandemic; however, the average number of rooms available increased. Table 7 illustrates the decline in hotel occupancy in 2020 compared to 2019, as well as the decrease in arrivals of both domestic and international tourists (INEGI, 2020).

Table 7. Average rooms, occupancy percentage and tourist arrivals in Puebla 2020 (Authors based on INEGI)

Year	Tourist center	Average rooms	Occupancy percentage	Tourist arrivals		
				Total	Mexicans	Foreigners
2019	Puebla	9515	61.30%	3 053 728	2 592 985	460 743
2020	Puebla	9703	20.50%	932 760	792 123	637

3. Method

In this research, we collected data using a structured questionnaire based on the study variables. The questionnaire consists of 34 items, designed as questions and statements, allowing respondents to express their opinions on each item through ratings. The Likert-type scale was the instrument chosen for measuring attitudes. The Likert-type scale is a set of items presented as statements to measure the subject's reaction in three, five, or seven-point categories (Hernández, Fernández, & Baptista, 2003).

The sampling method used in this research is probabilistic, and the study population includes companies belonging to the hotel sector and classified as MSMEs according to the 2023 National Statistical Directory of Economic Units (DENUE), located in the cities of Morelia, Michoacán, and Puebla, Puebla. In Morelia, there are seventy-eight hotel MSMEs; in Puebla, there are 189 hotel MSMEs. We calculated the sample size for obtaining data from the known population using the appropriate formula (N).

$$n = \frac{P(1-P)}{\frac{E^2}{Z^2} + \frac{P(1-P)}{N}} \quad (1)$$

Once we applied the formula, we obtained 65 companies for Morelia and 126 companies for Puebla, all of which were administered the questionnaire. A data collection instrument must meet two essential requirements: validity and reliability. For this purpose, we used the Cronbach's alpha coefficient.

$$\alpha = \frac{k\left(1-\sum\frac{s_i^2}{s_t^2}\right)}{k-1} \quad (2)$$

A coefficient of 0.95 was obtained, which, according to George and Mallery (2003), indicates excellent reliability for the measurement instrument. The final test was given to the sample population based on these results.

A descriptive analysis was then conducted, consisting of the following tests:

3.1 Pearson Correlation Coefficient

It is an indicator used to quantitatively describe the strength and direction of the relationship between two quantitative variables that follow a normal distribution. It identifies whether two variables tend to move together, known as covariance.

3.2 Kolmogorov-Smirnov Normality Distribution Test

It is a statistical significance test to verify whether the sample data comes from a normal distribution. It is used for continuous quantitative variables and when the sample size exceeds fifty. Since the sample size exceeds fifty in this research, the correct test is the K-S test (Romero, 2016).

3.3 U-Mann-Whitney Hypothesis Test

This test aims to examine the null hypothesis by determining whether two independent random samples originate from the same population or populations with identical distributions, when the assumptions of normality and homoscedasticity, measured on an ordinal scale, are not satisfied.

3.4 Bayes' Theorem

It indicates how subjective probabilities should be modified when additional information is received from an experiment. This approach, which advocates Bayesian statistics, is proving useful in specific estimates based on subjective a priori knowledge and allows those estimates to be revised based on evidence, which opens new ways of making knowledge (Fernández, 2009).

4. Results

The results of the Pearson correlation analysis for the city of Morelia, shown in Table 8, consistently reveal a positive correlation between the dependent variable of Competitiveness and the independent variables of Skilled Labor, Innovation, and Price. The Transportation Infrastructure variable shows no correlation. Therefore, a positive association exists between Competitiveness and the variables examined, except for Transportation Infrastructure, which does not show a significant relationship in this context.

Table 8. Correlation between Competitiveness and its dimensions in the city of Morelia (Authors)

		Competitiveness	Skilled labor	Innovation	Transportation infrastructure	Price
COMPETITIVENESS	Pearson correlation	1	**.503****	.269*	.294*	.429**
	Sig. (bilateral)		.000	.033	.019	.001
	N	63	63	63	63	62
SKILLED LABOR	Pearson correlation	**.503****	1	**.665****	.148	**.673****
	Sig. (bilateral)	.000		.000	.244	.000
	N	63	64	64	64	63
INNOVATION	Pearson correlation	.269*	**.665****	1	.222	**.672****
	Sig. (bilateral)	.033	.000		.078	.000
	N	63	64	64	64	63
INFRASTRUCTURE	Pearson correlation	.294*	.148	.222	1	.183
	Sig. (bilateral)	.019	.244	.078		.150
	N	63	64	64	64	63

PRICE	Pearson correlation	.429**	**.673****	**.672****	.183	1
	Sig. (bilateral)	.001	.000	.000	.150	
	N	62	63	63	63	63

** The correlation is significant at the 0.01 level (2-tailed).

* The correlation is significant at the 0.05 level (2-tailed).

Table 9 shows the Pearson correlation for the city of Puebla. It shows a strong and significant positive correlation between the variables and all their dimensions, suggesting that the object of study responds significantly to the bilateral significance level of 5% in all variables. This indicates a robust relationship between Competitiveness and the analyzed dimensions, suggesting that these variables can significantly influence the level of Competitiveness in attracting international tourism in the context of the city of Puebla.

Table 9. Correlation between Competitiveness and its dimensions in the city of Puebla (Authors)

		Competitiveness	Skilled labor	Innovation	Transportation infrastructure	Price
COMPETITIVENESS	Pearson correlation	1	**.698****	**.695****	**.604****	**.675****
	Sig. (bilateral)		.000	.000	.000	.000
	N	124	124	124	124	124
SKILLED LABOR	Pearson correlation	**.698****	1	**.951****	**.720****	**.812****
	Sig. (bilateral)	.000		.000	.000	.000
	N	124	124	124	124	124
INNOVATION	Pearson correlation	**.695****	**.951****	1	**.726****	**.819****
	Sig. (bilateral)	.000	.000		.000	.000
	N	124	124	124	124	124
INFRASTRUCTURE	Pearson correlation	**.604****	**.720****	**.726****	1	**.725****
	Sig. (bilateral)	.000	.000	.000		.000
	N	124	124	124	124	124
PRICE	Pearson correlation	**.675****	**.812****	**.819****	**.725****	1
	Sig. (bilateral)	.000	.000	.000	.000	
	N	124	124	124	124	124

** The correlation is significant at the 0.01 level (2-tailed).

According to the results in Tables 8 and 9, the variables show a higher correlation in the city of Puebla than in the city of Morelia. Regarding transportation infrastructure, there is no correlation in Morelia; however, a high correlation exists with other variables in Puebla.

4.1 Kolmogorov-Smirnov Normality Distribution Test

According to the results obtained, since the P-value was less than 0.05, the null hypothesis (H0) was rejected, and the alternative hypothesis (H1) was accepted. As detailed in Table 10 below, this result indicates that the analyzed data do not follow a normal distribution and exhibit considerable dispersion relative to their mean. Consequently, nonparametric statistical methods were used to evaluate the proposed hypothesis, given the nature of the data.

Table 10. Kolmogorov Smirnov normality test for Puebla and Morelia (Authors)

PUEBLA	Statistical	df	P	
COMPETITIVENESS	.094	124	.010	Not normal
SKILLED LABOR	.109	124	.001	Not normal
INNOVATION	.099	124	.005	Not normal
INFRASTRUCTURE	.082	124	.040	Not normal
PRICE	.110	124	.001	Not normal
MORELIA	Statistical	df	P	
COMPETITIVENESS	.115	64	.036	Not normal
SKILLED LABOR	.099	64	.194	Normal
INNOVATION	.122	64	.020	Not normal
INFRASTRUCTURE	.130	64	.009	Not normal
PRICE	.096	64	.200	Normal

4.2 U-Mann-Whitney Hypothesis Test

The value of the non-parametric test statistic was calculated:

$$U_1=n_1n_2+\frac{n_1(n_1+1)}{2}-R_1 \quad (3)$$

$$U_2=n_1n_2+\frac{n_1(n_2+1)}{2}-R_2 \quad (4)$$

U= min (U1, U2)

Where:

- ✓ $n1=TTaTTaño\ dddd\ lla\ TTmmddmmtmma\ ddddll\ ggmmmmggo\ 1$
- ✓ $n2=TTaTTaño\ dddd\ lla\ TTmmddmmtmma\ ddddll\ ggmmmmggo\ 2$
- ✓ $R_1 = Sumatorially\ and\ prantice\ and\ brot\ with\ 1$
- ✓ $R_2 = Sumatorially\ and\ prantice\ brot\ with\ 2$

If *U* is greater than 10, *Z* is calculated:

$$Z=\frac{U-\frac{n_1n_2}{2}}{\sqrt{\frac{n_1n_2(n_1n_2+1)}{12}}}\sim N(0,1) \quad (5)$$

Table 11 presents the results of this test for each variable, dependent (Competitiveness) and independent (Skilled labor, Innovation, Transportation infrastructure, and Price).

Table 11. P-value results of the variables by item (Authors)

Competitiveness		Skilled labor		Innovation		Transportation infrastructure		Price	
P-VALUE=	**0.0049**	P-VALUE=	1.0000	P-VALUE=	0.2868	P-VALUE=	**0.0314**	P-VALUE=	0.2234
P-VALUE=	0.3513	P-VALUE=	0.0961	P-VALUE=	0.0714	P-VALUE=	**0.0004**	P-VALUE=	**0.0229**
P-VALUE=	**0.0001**	P-VALUE=	0.1028	P-VALUE=	**0.0365**	P-VALUE=	**0.0000**	P-VALUE=	0.3492
P-VALUE=	0.5130	P-VALUE=	0.5039	P-VALUE=	0.1746	P-VALUE=	**0.0031**	P-VALUE=	0.1325
P-VALUE=	0.2298	P-VALUE=	0.1477	P-VALUE=	0.0926	P-VALUE=	0.0470	P-VALUE=	**0.0000**
P-VALUE=	**0.0093**	P-VALUE=	0.2600	P-VALUE=	0.2916	P-VALUE=	0.4668	P-VALUE=	0.1375
				P-VALUE=	0.1549	P-VALUE=	0.3239	P-VALUE=	**0.0510**
				P-VALUE=	0.0937				

The results of the comparative analysis between the cities of Morelia and Puebla show a significant difference, at the 0.05 level, in their transportation infrastructure. Rejecting the null hypothesis indicates a significant difference in transportation infrastructure between Morelia and Puebla.

4.3 Bayes' Theorem

This theorem calculates the probability of an event. The probability of competitiveness is determined by comparing the abilities of Morelia and Puebla to attract international tourists based on significant variables. The sample space obtained is 0.35, as detailed below:

$$P(A|B) = \frac{P(B|A) \cdot P(A)}{P(B)} \quad (6)$$

$$P(\text{dif}) = \sum_{i=1}^{n} P(A_i|\text{dif})P(\text{dif}) = \left(\frac{1}{5}\right)\left(\frac{3}{6}\right) + \left(\frac{1}{5}\right)\left(\frac{0}{6}\right) + \left(\frac{1}{5}\right)\left(\frac{1}{8}\right) + \left(\frac{1}{5}\right)\left(\frac{3}{7}\right) + \left(\frac{1}{5}\right)\left(\frac{3}{7}\right) + \left(\frac{1}{5}\right)\left(\frac{5}{7}\right) = 0.35$$

Therefore, the conditional probability is calculated for each of the variables considered in the analysis, both the dependent and the independent variables, using the following equation:

$$(Ai/\ differences) = \frac{(Ai \cap Dif)}{P(Dif)} \quad (7)$$

4.4 Probabilities Results According to Bayes' Theorem

1. Conditional Probability of Competitiveness: 28.57%

The conditional probability of competitiveness is 28.57%, suggesting that there is a greater posterior probability of influencing competitiveness. Thus, the null hypothesis can be rejected, eliminating the uncertainty regarding the importance and influence of this factor in the sample.

2. Probability of Skilled Labor: 0.00%

The chance of observing Skilled Labor's competitiveness level is 0%. It is because the skill level of Skilled Labor is identical between both cities, suggesting that this factor does not contribute significantly to competitiveness in the sample. The lack of variation prevents any meaningful comparison between cities, making this a crucial but not determining factor for their competitiveness in attracting international tourism.

3. Probability of Innovation: 7.14%

According to the data, the posterior probability of the innovation dimension, calculated at 7.14% and observed as a difference between cities, indicates that innovation has an influence but is not a determining factor in competitiveness. The lack of innovation in both cities renders this factor irrelevant for attracting international tourism in this comparative sample.

4. Price Probability: 24.49%

With a probability of 24.49% associated with price, given that prices differ between cities, the price could have a moderate impact on competitiveness compared to other factors analyzed. Although both cases exhibit a lack of price competitiveness, some differences enable us to compare the rates between the two cities and identify the factors that make one more competitive. This observation provides sufficient evidence to reject the null hypothesis regarding the influence of price on competitiveness in attracting international tourism.

5. Probability of Transport Infrastructure: 40.80%

The highest probability, 40.80%, is associated with Transportation Infrastructure, given that this variable differs between the two cities. It suggests that infrastructure may be one of our context's main drivers of competitiveness. It is determined that there is sufficient evidence to reject the null hypothesis regarding the considerable influence of infrastructure on competitiveness.

The information is summarized in Table 12 below.

Table 12. Conditional probability (Authors)

Probability	Competitiveness They are not equal.	(1/5) (3/6) 0.35	=	3/30 0.35	=	0.1 0.35	=	28.57%
Probability	Skilled labor They are not equal.	(1/5) (0/0) 0.35	=	0 0.35	=	0 0	=	0.00%
Probability	Innovation They are not equal.	(1/5) (1/8) 0.35	=	1/40 0.35	=	0.025 0.35	=	7.14%
Probability	Price They are not equal.	(1/5) (3/7) 0.35	=	3/35 0.35	=	0.0857 0.35	=	24.49%
Probability	Infrastructure They are not equal.	(1/5) (5/7) 0.35	=	5/35 0.35	=	0.1428 0.35	=	40.80%

5. Discussion

The results show that skilled labor, innovation, transportation infrastructure, and price are crucial factors for the competitiveness of MSMEs in the hotel sector of colonial cities such as Morelia and Puebla, particularly in attracting international tourism. This importance is supported by studies in other colonial cities, which emphasize the relevance of these variables. For example, García et al., (2022) identify skilled labor as a key factor in competitiveness for tourism services among MSMEs in Querétaro.

Regarding innovation, Mexico faces various challenges in its tourism industry within the colonial cities of Puebla and Morelia. In the MSME hotel sector in these cities, companies that lack innovation face significant competition

from those that do innovate. In short, we agree that hotel and tourism companies can only maintain their operations in protected or isolated markets in the short and medium term. However, in open and highly competitive markets, innovation becomes an essential strategic asset for maintaining a competitive advantage.

Regarding transportation infrastructure, Tello et al., (2024) highlight, through their research conducted in three Mexican colonial cities—San Cristóbal de las Casas, Oaxaca, and Puebla—that there are notable differences in their competitive advantages. Among these, it stands out that the most competitive city in the study owes its leadership primarily to its transportation infrastructure, which is considered one of its main strengths.

Regarding the price factor, the results are somewhat divergent; in the case of our research, we found that price is a variable that affects competitiveness, so the companies studied seek to ensure a balance between cost and quality; these results agree with those of Amini et al., (2024), who found that, according to Porter's diamond model, the most effective and influential indicators in the field of tourism competitiveness in the case of an Iranian city are natural and craft resources. The most influential factors are demand conditions and cultural and natural resources, including prices among the former.

6. Conclusions

Based on this research, comparisons were made between Puebla and Morelia regarding the competitiveness of hotel MSMEs and their influence on attracting foreign tourism. The analysis highlights similarities, differences, and areas for improvement in each destination. This study aimed to determine the variables that impact the competitiveness of hotel MSMEs and influence the attraction of international tourism to the cities of Puebla, Puebla, and Morelia, Michoacán, Mexico. A comparative analysis was conducted between these cities to achieve this objective.

The results of the comparative analysis led us to the following conclusions:

1. No significant difference was found in the level of competitiveness between the cities in general. However, there were discrepancies in some specific items comprising this variable. These discrepancies were eliminated using Bayes' Theorem, which revealed a certain degree of influence. Therefore, the H0 hypothesis could be rejected in this case. This uncertainty arises because, although both cities are colonial cities with numerous tourist attractions for foreigners, this does not translate into an increase in hotel occupancy for MSMEs in either city.

2. In terms of skilled labor, there was no significant difference between the two cities. This suggests similarities in this aspect. Therefore, the H0 hypothesis, which indicates that there are no significant differences in skilled labor between the cities because both lack skilled labor, is accepted. It was an important but not determining factor for competitiveness in this research.

3. Innovation in both cities did not show a statistically significant difference, indicating low innovation in both locations. Therefore, the H0 hypothesis regarding significant differences found in innovation could not be rejected. However, according to the results of Bayes' Theorem, it is likely that innovation is an influential factor in competitiveness, albeit with a lower percentage compared to other variables in this comparison. This is because the current economic environment is characterized by rapid technological progress, where innovation has become a key determinant of competitiveness.

4. A significant difference was found in transportation infrastructure between Morelia and Puebla. It indicates that this variable has a considerable impact on competitiveness in attracting foreign tourism. For this reason, the H0 hypothesis was rejected. 5. No significant difference was found in the overall variable Price, but significant variations were observed in some specific aspects within this variable. Applying Bayes' Theorem eliminated all uncertainty and revealed a significant impact on competitiveness. For this reason, H0 was rejected.

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Authors' contributions

Prof. Alcaraz was responsible for study design and revising. Prof. Alcaraz and Prof. Lagunas were responsible for data collection and analysis. Prof. Lagunas drafted the manuscript and Prof. Alcaraz revised it. All authors read and approved the final manuscript.

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