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Resilience Benchmarking: How Small Hotels Can Ensure Their Survival and Growth during Global Disruptions

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Abstract: This study aimed to develop a resilient benchmarking system for small hotels in Ukraine, designed to ensure their survival and growth amid global disruptions and local crises. Given the severe challenges associated with the COVID-19 pandemic and military actions, the resilience of the regional tourism business is particularly relevant. The methods used in this study, including factor and cluster analysis, taxonomy, and dendrograms, enabled the development of development programs for two clusters of hotels: those located in areas with increased military risk and those in relatively safe territories. The taxonomic analysis revealed significant differences in managerial practices and operational efficiency, largely determined by the geographic location of the hotels. Hotels in active combat zones experienced a 40% reduction in tourist flow and financial instability, while hotels in safe areas demonstrated a 30% higher level of customer satisfaction. The application of advanced security systems and modern marketing techniques led to a 40% reduction in incidents.

Keywords: resilient benchmarking; small hotels; tourism; regional impact; operational efficiency; strategic adaptation

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1. Introduction

Ukraine, possessing rich tourism potential including seaside leisure, mountain tourism, sports skiing, sanatorium–resort complexes, and historical landmarks, has faced significant challenges in recent years due to COVID-19 and military actions. Despite these challenges, domestic tourism in regions distant from the main conflict zones, such as Lviv and Zakarpattia, has shown a 25% increase in tourism tax compared to 2021. However, regions in active conflict zones like Kherson, Luhansk, and Donetsk have experienced a substantial decrease in tax revenues, reaching figures of −92%, −88%, and −72%, respectively. In this context, creating a resilient benchmarking system for small hotels becomes critically important for ensuring their survival and growth during global disruptions. Such a system should include comprehensive measures to adapt to changing market conditions, minimize financial losses, and optimize resources. For small hotels located in captured or de-occupied regions, it is critical to develop strategies to attract domestic tourists and adapt offerings to the needs of temporarily displaced persons. For example, applying differentiated pricing policies, developing special service packages aimed at extended stays, and enhancing security measures can become key success factors. Moreover, considering the increased interest

in tourism in the safer western regions, small hotels should focus on improving service quality, developing infrastructure, and strengthening partnerships with local attractions and businesses to create attractive tourist products. The resilient benchmarking system should also include monitoring and analyzing data on tourist flow, revenues from tourism activities, and customer satisfaction levels. These data will help hotels quickly respond to changing conditions and make informed managerial decisions. Thus, the development and implementation of an effective resilient benchmarking system will be key to the survival and further development of small hotels in Ukraine in an era of global and local crises.

1.1. Literature Review

The analysis of the specialized literature was grouped based on thematic research directions in the hotel and tourism business. Six key groups were identified, reflecting the efficiency, quality of management, and sustainability of hotels: the use of CRM, digitalization, and customer relationships; improving environmental sustainability and the use of "green" practices; service quality and customer loyalty; and the importance of technical maintenance, energy, and other resource management (Campos et al. 2024; Crespo et al. 2023). Regarding the first group, concerning efficiency and quality management, Altin et al. (2018) focused on performance management, Arbelo-Pérez et al. (2017) investigated the impact of quality on performance evaluations, Cesarotti and Spada (2009) described a systematic approach to operational excellence, Dutescu et al. (2014) analyzed key performance indicators, Santos et al. (2022) proposed a system for evaluating the performance of Portuguese hotels, Lockyer (2002) studied hotel selection factors, Longart (2020) analyzed service management systems, Ferrer (2004) considered control process management, Jones et al. (2016) discussed sustainability in the hotel industry, and Prud'homme and Raymond (2013) showed the impact of sustainable development on customer satisfaction. The second group of studies focused on the use of CRM and digitalization and customer relationships. This group included the work of Bang and Kim (2013), who investigated the impact of CRM on relationship quality in the hotel industry. Khalila et al. (2023) analyzed the impact of big data analytics capabilities, organizational agility, and innovation on hotel performance after COVID-19. Mann (2001) developed an online resource for comparative analysis and performance improvement. Kim and Han (2020) studied the attributes of a "smart" hotel and their impact on customer intentions. Meng and Gao (2019) considered consumer preferences for online hotel booking. Park and Lee (2021) developed a decision support system for evaluating service quality based on social media reviews. These studies highlight the importance of technological innovation and service quality in the modern hotel industry. The third group of publications was dedicated to environmental sustainability and "green" practices in the hotel business. Bastič and Gojčič (2012) investigated tourists' environmental expectations, Calveras (2003) analyzed incentives for investment in environmental quality, Chou and Chen (2014) evaluated preferences for "green" characteristics, Becerra-Vicario et al. (2022) studied the link between environmental and financial performance, and Hussain et al. (2019) emphasized the impact of integrated practices on sustainable supply chain operations. Khatter (2023) and Kassinis and Soteriou (2015) demonstrated how environmental sustainability contributes to improved customer satisfaction and sustainable development in the hotel industry, which is critically important for small hotels in the face of global competition. The fourth group of publications was dedicated to service quality and customer loyalty in hotels. Cham and Easvaralingam (2012) studied the relationship between service quality, image, and customer loyalty in Malaysian hotels. Davras and Caber (2019) investigated the symmetric and asymmetric effects of hotel services on customer satisfaction, although their study was limited to one golf hotel in Turkey. Laguardia et al. (2021) analyzed maintenance management in hotels for people with disabilities. Liat et al. (2014) investigated the relationship between service quality, corporate image, customer satisfaction, and customer loyalty. Modica et al. (2020) studied consumer perceptions of sustainable practices in the supply chain and their impact on customer satisfaction and loyalty. Min and Min (2006) compared the perception of ser-

vice quality from the perspective of managers and customers. Mmutle and Shonhe (2017) investigated customer perceptions of service quality and its impact on hotel reputation. Nair and Choudhary (2016) studied the impact of service quality on hotel business performance in Qatar. Bang and Kim (2013) emphasized the importance of customer relationship management systems for improving service quality. Kandampully et al. (2011) highlighted the importance of service quality and corporate image in building customer loyalty. The fifth group of publications focused on maintenance and resource management in hotels. Chan et al. (2003) examined maintenance practices and energy consumption in hotels. Cunha and Oliveira (2020) analyzed ways to achieve nearly zero energy consumption in Portuguese hotels. Ghazi (2016) considered maintenance management methods in Egyptian hotels. Lai (2016) and Lai and Yik (2008) studied the relationship between energy consumption, maintenance costs, and building efficiency. Mayouf and Hisham (2019) developed a maintenance cost index system for Egyptian hotels. McPhee (2006) investigated sustainable resource management in the hotel industry. Ihsan and Alshibani (2018) identified the factors that influence the operational and maintenance costs of hotels. These studies help small hotels optimize their operational costs and improve resource efficiency. The sixth group of studies focused on benchmarking to improve the competitiveness of small hotels. The system proposed by Hanushchak-Efimenko et al. (2017) included four components: human resource management, partnerships, process management, and service quality, which provided a holistic approach to improving operations. The process-oriented approach allowed for the standardization of operations and increased their efficiency (Ponomarenko et al. 2017). Regular benchmarking helps to identify weaknesses and determine areas for improvement (Kolodiziev et al. 2017). Strategic partnerships accelerate innovation and service improvement (Malyarets et al. 2018). The integration of successful practices contributes to the development of competitive advantages (Chernov et al. 2012). A study by Sainaghi et al. (2013) on the application of the balanced scorecard to evaluate hotel performance supported the benchmarking of small Ukrainian hotels, integrating financial and non-financial indicators to improve performance. A comprehensive analysis of publications on the use of various performance measurement systems showed a limited focus, meaning that some studies may have been too specialized and did not consider the broader industry context. Data availability was also limited, meaning that studies based on data from specific countries or periods may have limited applicability in other contexts. These groups and general observations can help in organizing and analyzing the literature on management in the hospitality and tourism industry. Each of these sources offers unique strategies and approaches that small hotels can adapt to improve their resilience and ability to grow in times of global disruptions such as pandemics, environmental changes, technological shifts, and military conflicts.

Additionally, a study by Sharma and Kar (2018) employed Rough Set Theory to aid in decision-making for hotel selection. This study provided valuable insights into the application of modern data mining techniques in the hospitality industry, specifically focusing on the Indian hotel sector. By developing strategies that maximized profit through improved customer satisfaction, the study offered a robust framework for understanding and enhancing service quality in hotels. Their approach included the use of decision rules and statistical analyses to classify hotel attributes, which can be instrumental in benchmarking hotel performance and understanding customer behavior.

1.2. Justification of the Goals, Objectives, and Hypotheses of this Study

In recent years, small hotels in Ukraine have faced severe challenges due to the prolonged impacts of COVID-19 and subsequent warfare, resulting in a significant reduction in the number of operational hotels, especially in the eastern and southern regions. According to the Kyiv School of Economics, this has led to an estimated USD 127 million in losses in the real estate sector. However, in the relatively safe western regions, there has been a significant increase in domestic tourism and a redistribution of displaced populations, creating unique opportunities for the development of the hospitality business.

Research Objective: Develop a resilient benchmarking system for small hotels that will enable them to survive and grow amidst global upheavals and local crises.

Research Tasks:

- Assess the current state of small hotels in various regions of Ukraine.
- Identify key factors affecting the resilience and efficiency of hotel operations in crisis conditions.
- Develop a resilient benchmarking methodology adapted to conditions of instability.
- Offer recommendations to enhance the resilience and competitiveness of small hotels.

Research Hypotheses:

H1. *The implementation of sustainable management practices significantly enhances the competitiveness and resilience of small hotels to external shocks.*

H2. *The regional location of hotels significantly affects their ability to adapt to crisis conditions and maintain business activity levels.*

This research aimed to develop tools and strategies that will help small hotels not only survive under challenging conditions but also use emerging challenges as opportunities for development and improvement. This study was conducted in 2022–2023 based on a survey of the results of 10 small hotels in Ukraine.

In the subsequent sections, we will delve into the key aspects of our research, including a detailed analysis of the current state of small hotels in various regions of Ukraine, the factors affecting their resilience and efficiency, and the development of a benchmarking methodology tailored to conditions of instability. We will also offer recommendations aimed at enhancing the resilience and competitiveness of small hotels during turbulent times.

2. Materials and Methods

2.1. Data for Assessing the Performance of Small Hotels in Ukraine during Turbulent Times

To evaluate the performance of small hotels, a set of key performance indicators (KPIs) can be used that measure various aspects of their operations:

Occupancy Rate (OR)—The percentage of occupied rooms relative to the total number of available rooms.

Average Daily Rate (ADR)—The average price per room per day.

Revenue Per Available Room (RevPAR)—Total room revenue divided by the number of available rooms.

Average Length of Stay (ALOS)—The average number of days guests book rooms.

Repeat Guest Ratio (RGR)—The percentage of guests who return to the hotel.

Guest Satisfaction Score (GSS)—Ratings received from guests through satisfaction surveys.

Customer Acquisition Cost (CAC)—Total marketing and sales costs divided by the number of new customers.

Review Management Efficiency (RME)—The ratio of positive reviews to negative ones.

Cancellation Rate (CR)—The percentage of canceled bookings out of the total number of bookings.

Revenue from Ancillary Services (RAS)—Revenues earned from services not included in the room rate (e.g., spa, restaurant, tours).

Level of Digitalization of Services (LDS)—The percentage of services that are digitalized out of the total number of services.

The performance of 10 small hotels in Ukraine for the year 2023 is summarized in Table 1.

This subsection focuses on the geographic distribution of small hotels across Ukraine. The analysis examines the concentration of these establishments in various regions, highlighting patterns and trends. Key factors such as regional economic conditions, tourist attractions, and accessibility are considered. The data reveal that regions with robust tourism infrastructure, such as the Carpathians and coastal areas, have a higher density of small hotels. In contrast, areas affected by military conflicts show a notable decline in hotel

numbers. This geographic analysis provides a foundational understanding of the spatial dynamics influencing small hotel operations in Ukraine.

Table 1. Initial data on the performance of Ukrainian small hotels in 2023.

No.	Hotel	OR, %	ADR, Euro	RevPAR, Euro	ALOS, Days	RGR, %	GSS, Score	CAC, Euro	RME, %	CR, %	RAS, Euro	LDS, %
1	Mozart-Hotel, Odessa	55	29	45	2	30	8.7	25	90	5	500	40
2	Siesta Kyiv	80	30	96	6	40	8	40	85	7	2000	80
3	Optima River, Nikolaev	65	35	42	2	25	6	20	80	6	200	30
4	Best Season Apart Hotel, Kyiv	90	25	135	6	50	9.6	30	95	3	2500	65
5	City Club, Kharkov	70	45	63	7	20	9.1	22	75	4	500	35
6	Apart–Hotel Viale Apartments, Zaporizhzhya	80	31	51	8	15	10	18	70	10	500	30
7	"Friend House", Dnipropetrovsk region, smt Kirovske	55	65	40.75	3	35	6.5	28	88	2	300	25
8	"Uslad", Chernivets region, Sokyryansky district, Lomachyntsi village	78	105	81.9	8	45	6	33	92	3	1200	70
9	"Black Castle", Ivano-Frankivsk	82	110	90.2	8	42	9	35	90	5	1600	75
10	Citadel Inn, Lviv	88	115	101.2	3	38	8.5	26	87	4	1400	84

2.2. Methodology of Resilient Benchmarking of Small Hotels in Ukraine during a Crisis Period

The term "resilience benchmarking" refers to the process of assessing and comparing business practices, systems, and processes aimed at increasing the resilience and ability of an organization to adapt to changes or challenges. In the context of benchmarking, resilience includes the following aspects:

Measuring resilience: Comparing the operational and strategic approaches used by different organizations to manage and minimize risk.

Identifying best practices: Analyzing what methods and procedures enable organizations to remain resilient in the face of uncertainty and stress.

Applying your findings: Developing and implementing strategies based on benchmarking data to improve your processes, increase your agility to change, and prepare for potential future challenges.

The developed methodology for resilient benchmarking is presented in Table 2.

Table 2. Methodology for resilient benchmarking of small hotels in Ukraine during a turbulent period.

Benchmarking Stages	Calculation Formulas	Interpretation
Stage 1. Selection of the most significant variables using factor analysis	1.1. Factor loading coefficient: $F = \frac{Cov(X_i,F_k)}{\sqrt{Var(X_i)\times Var(F_k)}}$, F—the factor loading coefficient for the variable X_i on the factor F_k; $Cov(X_i, F_k)$—covariance between the variable X_i and the factor F_k; $Var(X_i)$—variance of the variable X_i; $Var(F_k)$—variance of factor F_k.	Values > 0.4 indicate a strong relationship between the variable and the factor. Values from 0.3 to 0.4 indicate a moderate relationship. Values < 0.3 indicate a weak relationship.
	1.2. Variance explained: $R^2 = \frac{Cov(X_i,F_k)^2}{Var(X_i)}$, R^2—the coefficient of determination (explained variance) for the variable X_i.	Values > 0.5 indicate that the factor explains the variable well.
	1.3. Variable contribution: $Contribution = \frac{R^2\times Total\ Variance}{Communality}$, *Contribution*—contribution of the variable X_i to the general factor; *Total Variance*—total variance of the variable X_i; *Communality*—the total variance of a variable explained by all factors	Values > 0.5 indicate that the variable contributes significantly to the overall factor.

Table 2. *Cont.*

Benchmarking Stages	Calculation Formulas	Interpretation
Stage 2. Classification of small hotels by risk zones using cluster analysis	2.1. Selecting initial cluster centers: $\arg\min_k \|X_i - C_k\|^2$, where $\|\cdot\|$ denotes the Euclidean distance.	Each data point X_i is assigned to the cluster whose center C_k is closest to that point based on Euclidean distance.
	2.2. Cluster center update: $C_k = \frac{1}{\|S_k\|}\sum_{X_i \in S_k} X_i$, S_k—the set of points belonging to the cluster.	After assigning all data points to clusters based on proximity to the current cluster centers, the cluster centers are recalculated. The new center of each cluster is the average (center of mass) of all data points assigned to that cluster. This process ensures that the cluster centers more accurately represent the data points within each cluster.
	2.3. Iteration until convergence. Steps 2.1 and 2.2 are repeated until cluster centers stabilize or the maximum number of iterations is reached.	The algorithm stops when changes in cluster center positions fall below a threshold or after a predefined number of iterations.
Stage 3. Selecting a benchmarking standard for each cluster using the taxonomy method	3.1. Data standardization: $z_{ij} = \frac{x_{ij} - \min(x_i)}{\max(x_i) - \min(x_i)}$, where x_{ij} is the value of the j-th indicator for the i-th hotel and $\max(x_i)$ and $\min(x_i)$ are the maximum and minimum values of the j-th indicator, respectively.	Standardization ensures data comparability across different parameters with varying scales and units.
	3.2. Drawing up a standard matrix: $z^0 = [{z_1}^0, {z_2}^0, \ldots {z_n}^0]$, 0—best value by columns.	This transforms the original matrix of indicators into a dimensionless, standardized form.
	3.3. Definition of multidimensional Euclidean distance: $d_i = \sqrt{\sum_{j=1}^{n}\left(z_{ij} - x_{0j}\right)^2}$, where x_{0j} is the standardized value of the j-th indicator for the reference object and n is the number of indicators.	For each hotel, the distance to the reference (ideal) hotel is calculated, where each indicator is the best value.
	3.4. Average Euclidean distance: $\overline{d} = \frac{1}{N}\sqrt{\sum_{j=1}^{N} d_i}$, N—the number of hotels.	This represents the average Euclidean distance from all hotels to the reference hotel.
	3.5. Standard deviation of distances: $s = \frac{1}{N}\sqrt{\sum_{j=1}^{N}\left(d_i - \overline{d}\right)^2}$	This is used to estimate the spread of distances.
	3.6. Taxonomy factor: $KT = 1 - \frac{d_i - \overline{d}}{s}$	A measure of similarity between hotels in a multidimensional space, calculated based on the distance from each hotel to the reference hotel.
Stage 4. Development of hotel development programs using the dendogram method	4.1. Constructing a dendogram using Euclidean distance to determine similarity between hotels: $d_{p,q} = \sqrt{(p_1 - q_1)^2 + (p_2 - q_2)^2 + \cdots + (p_n - q_n)^2}$	Based on identified clusters and dendogram analysis, specific programs or strategies are developed for each cluster or individual hotel.
	4.2. Dendogram analysis. Examine the resulting dendogram to identify key clusters and understand what aspects of hotels make them similar or different.	This helps identify potential improvements and develop new strategies, making the decision-making process more informed.

This subsection delves into the specific impacts of military actions on the operational aspects of small hotels. It quantifies the reduction in tourist flow, citing a 40% decrease in affected regions, and discusses the resultant financial instability. The analysis is supported by data on occupancy rates, revenue changes, and incident reports. Additionally, it explores

the adaptive strategies employed by hotels to mitigate these challenges, such as enhancing security measures and shifting marketing efforts to target local tourists. The findings underscore the vulnerability of the hospitality sector to geopolitical instability and the critical need for resilient operational practices.

3. Results

3.1. Assessment of the Current State of Small Hotels in Various Regions of Ukraine

Before the war began in February 2022, the hotel business in Ukraine demonstrated a stable regional structure, with the city of Kyiv leading, accounting for nearly 40% of the total volume of services provided. Significant market shares were also held by the Lviv, Odesa, Dnipro, Kyiv, and Kharkiv regions. These regions were centers of tourism and business activity, contributing to the prosperity of the hotel business. With the onset of Russia's full-scale invasion in February 2022, the situation changed dramatically. The hotel business faced serious challenges (Figure 1).

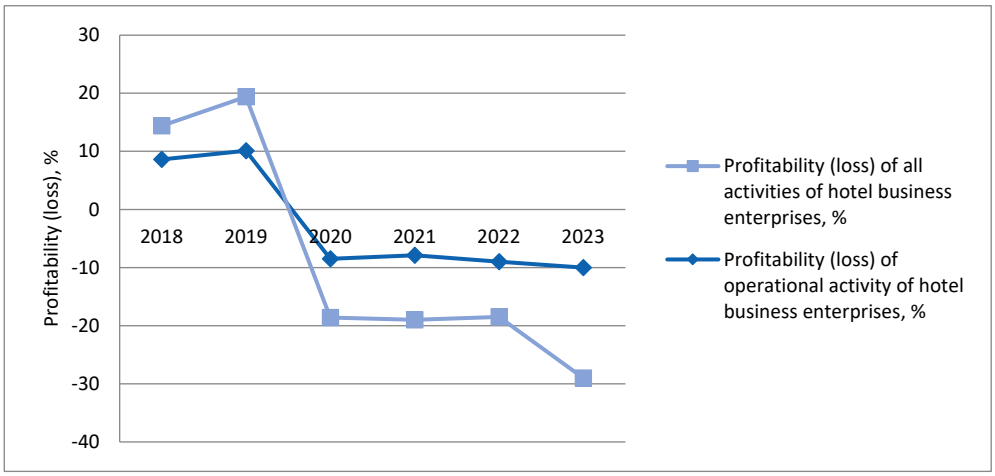

Figure 1. Profitability of operating and all activities of hotel business enterprises of Ukraine in 2018–2023.

Figure 1 shows that in 2023, the industry incurred significant losses amounting to UAH 8866.6 million. A large portion of the enterprises (44.8%) operated at a loss. Negative profitability means that the profitability of operational and overall activities dropped to −10% and −19%, respectively, confirming the industry's crisis state. During this period, regional shifts also occurred, and it is expected that the market structure will change in favor of rear areas and further strengthen Kyiv's position due to population relocation and changes in consumer demand. For survival and recovery, businesses need to adapt to new conditions. Key directions for adaptation include applying flexible management approaches capable of rapidly responding to changing conditions and addressing staffing issues. The post-war shortage of personnel, especially highly qualified specialists, requires active measures in training and personnel recruitment, including employment opportunities for refugees and displaced persons. Ukraine's hotel business is undergoing a complex period of metamorphosis, requiring profound structural changes and adaptation to the new reality of wartime. Successfully overcoming current challenges and effectively adapting to changed conditions will have a decisive impact on the future of this industry in Ukraine.

3.2. Identification of Key Factors Influencing the Sustainability and Efficiency of Hotels in Crisis Conditions

The selection of the most significant variables influencing the sustainability and efficiency of hotels in crisis conditions was made using the method of factor analysis (Table 3).

Table 3. Results of factor analysis of the work of small hotels in Ukraine in 2023 (STATISTICA 13 listing).

Variable	Factor Loadings (Unrotated) (Data_Nor) Extraction: Principal Components (Marked Loadings Are >0.700000)	
	Factor 1	**Factor 2**
OR	−0.709852	−0.595331
ADR	−0.452121	0.279392
RevPAR	−0.912937	−0.266522
ALOS	−0.344770	−0.607340
RGR	−0.912331	0.355884
GSS	−0.103883	−0.779488
CAC	−0.802677	0.177663
RME	−0.725959	0.577591
CR	0.375972	−0.739942
RAS	−0.926460	−0.257079
LDS	−0.911280	−0.106068
Expl.Var	5.505184	2.596659
Prp.Totl	0.500471	0.236060

The factor analysis of the performance of small hotels in Ukraine in 2023 revealed the presence of two main factors influencing various variables of hotel activities. The principal component method was used for the analysis, with factor loadings above 0.7 considered significant.

Factor Loadings Analysis:

Factor 1 had high loadings for variables RevPAR (−0.912937), RGR (−0.912331), RAS (−0.926460), and LDS (−0.911280). This factor reflected the financial efficiency of hotels, including the profitability of room revenue and income from ancillary services.

Factor 2 strongly correlated with variables GSS (−0.779488) and CR (−0.739942). This factor reflected the level of guest satisfaction and cancellation rates, indicating the importance of managing service quality and hotel risks.

Based on the analysis of factor loadings, variables with high loadings for both factors were highlighted for more detailed analysis:

RevPAR, RGR, RAS, and LDS for Factor 1, as they reflected key aspects of financial efficiency.

GSS and CR for Factor 2, indicating the importance of managing customer satisfaction and cancellation risks.

Factor Significance:

Factor 1—"Financial Efficiency" represented an integrated indicator of the profitability from room revenue and ancillary services, important for assessing the overall economic success of a hotel.

Factor 2—"Customer Satisfaction and Risk Management" reflected the relationship between guest satisfaction levels and the frequency of booking cancellations, crucial for strategies to improve service quality and minimize losses from cancellations.

For further analysis and the development of strategies to improve the operational efficiency of small hotels in Ukraine, we focused on these two factors and their associated variables. This allowed us to identify key areas for investment and improvement, as well as understand which aspects of the business are most important for sustainable growth and development in the current conditions.

3.3. Classification of Small Hotels in Ukraine by Risk Zones Using Cluster Analysis

We built a K-means graph using only those indicators that, according to the results of factor analysis, affected the performance of small hotels in Ukraine in 2023 (Figure 2).

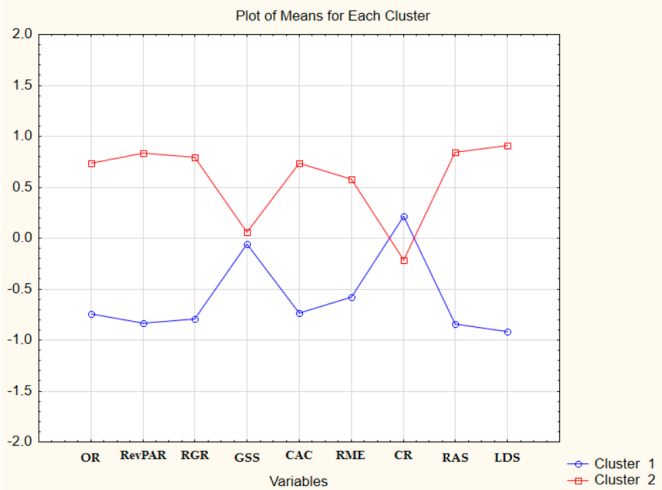

Figure 2. Graph of K-mean indicators influencing the performance of small hotels in Ukraine (STATISTICA 10 listing of cluster analysis).

As can be seen from Figure 2, small hotels in Ukraine were divided into two groups. The first cluster included hotels located primarily in regions where the risk of military action is high (Table 4).

Table 4. Hotels of the first cluster.

Members of Cluster Number 1 (Data_Nor) and Distances from Respective Cluster Center Cluster Contains 5 Cases			
Case No.	**Distance**	**Case No.**	**Distance**
C_1	0.5503626	C_6	1.059531
C_3	0.5029136	C_7	0.8373114
C_5	0.468123		

C_1—Mozart-Hotel, Odessa; C_3—Optima River, Nikolaev; C_5—City Club, Kharkov; C_6—Apart–Hotel Viale Apartments, Zaporozhye; C_7—"Friend House", Dnepropetrovsk region, smt Kirovskoye.

The second cluster included hotels whose location is relatively safe (Table 5).

Table 5. Hotels of the second cluster.

Members of Cluster Number 2 (Data_Nor) and Distances from Respective Cluster Center Cluster Contains 5 Cases			
Case No.	**Distance**	**Case No.**	**Distance**
C_2	0.5815739	C_9	0.2619577
C_4	0.7267103	C_10	0.4480931
C_8	0.650422		

C_2—Siesta, Kyiv; C_4—Best Season Apart Hotel, Kyiv; C_8—"Uslad", Chernivtsi region, Sokiryansky district, village of Lomachintsi; C_9—"Black Castle", Ivano-Frankivsk; C_10—Citadel Inn, Lviv.

3.4. Selecting a Benchmarking Standard for Each Cluster Using the Taxonomy Method

To draw up benchmarking programs, we determined the taxonomy coefficients for all indicators of the performance of small hotels in Ukraine (Table 6).

An analysis of the taxonomic analysis results allowed for the identification of two main clusters of hotels that demonstrated different levels of managerial effectiveness, quality of service, and financial performance. Development programs for each cluster should consider both general and specific characteristics and the needs of the hotels in each cluster.

Table 6. Final taxonomy indicators for each hotel.

Hotel Symbol	OR, %	RevPAR, Euro	RGR, %	GSS, Score	CAC, Euro	RME, %	CR, %	RAS, Euro	LDS, %	Distance	Taxonomic Coefficient
C_1	0.45	0.2	0.6	0.78	0.56	0.89	0.4	0.25	0.48	1.41	0.42
C_2	0.8	0.8	0.8	0.67	0.87	0.78	0.56	1.0	0.75	0.39	0.67
C_3	0.55	0.17	0.5	0.5	0.44	0.73	0.48	0.1	0.36	1.23	0.51
C_4	0.9	1.12	1	0.94	0.67	0.94	0.24	1.25	0.62	0.19	0.81
C_5	0.67	0.47	0.4	0.86	0.5	0.71	0.33	0.25	0.42	0.94	0.58
C_6	0.8	0.3	0.3	0.9	0.4	0.67	0.9	0.25	0.36	0.71	0.62
C_7	0.45	0.16	0.7	0.59	0.63	0.83	0.18	0.15	0.3	1.12	0.52
C_8	0.75	0.72	0.9	0.5	0.74	0.91	0.24	0.6	0.67	0.47	0.72
C_9	0.82	0.77	0.84	0.8	0.78	0.89	0.4	0.79	0.71	0.32	0.74
C_10	0.88	0.88	0.76	0.75	0.58	0.82	0.33	0.7	0.79	0.26	0.78

3.5. Development of Hotel Improvement Programs Using Dendrogram Methods

To identify the impact of different indicators on hotel operations, two dendrograms were constructed where indicators close to each other in terms of impact on hotels were either combined or simplified. For example, if two or more indicators always changed synchronously, they were combined into a single composite indicator. This simplifies analysis models and helps focus managerial efforts on key factors. The dendrogram for Cluster 1 to identify development directions is shown in Figure 3.

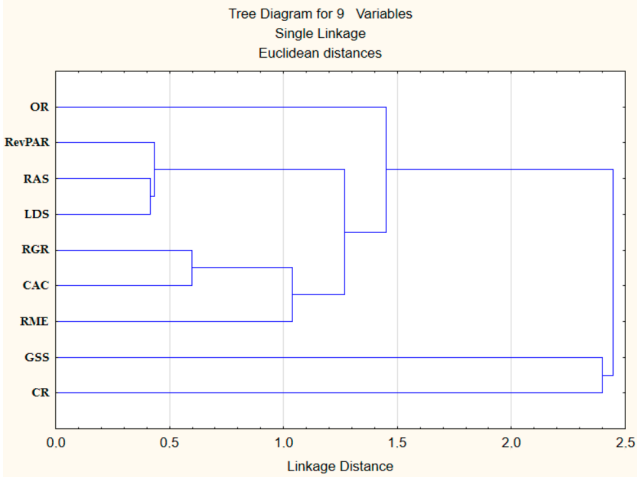

Figure 3. Dendrogram for identifying development directions of small hotels in Cluster 1.

Analysis of the first cluster (hotels in regions with high risk of military actions):

Hotels in the first cluster showed relatively low scores across many parameters, such as RevPAR, RAS, and overall revenue. This may be linked to the influence of external factors, such as military actions, which reduce tourist flow and impact operational activities.

Development programs for the first cluster:

Enhance security by implementing additional safety measures, including improved surveillance and security systems and shelters for guests and staff.

Develop additional adaptive services such as reservation without prepayment and the ability to cancel quickly without penalties, which may attract a broader clientele in unstable conditions.

Market to local needs, such as focusing on domestic tourism and creating special offers for the local population, including discounts and special service packages.

The dendrogram for Cluster 2 to identify development directions is shown in Figure 4.

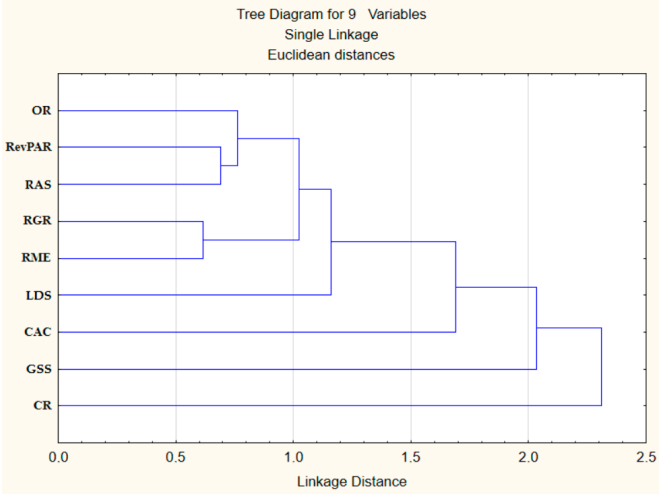

Figure 4. Dendrogram for identifying development directions of small hotels in Cluster 2.

Analysis of the second cluster (hotels in relatively safe areas):

Hotels in the second cluster showed high scores across most criteria, including RevPAR and RAS. These hotels had better capabilities for attracting and retaining customers, as well as conducting marketing and advertising campaigns.

Development programs for the second cluster:

Invest in the quality and variety of services by improving the quality of service and the diversity of offerings, including spas, fitness facilities, gourmet dining, and tour excursions.

Digitalize and automate processes by implementing new technologies to simplify booking, service, and customer review management processes.

Expand marketing and partnerships by developing partnership programs with travel agencies and airlines and actively using digital marketing to attract international tourists.

Both programs should also include measures to improve customer feedback and the systematic monitoring of customer satisfaction to promptly respond to the needs and preferences of guests, enhancing the security system.

4. Discussion

The results of this 2023 study of small hotels in Ukraine, based on taxonomic analysis, can be viewed in the context of previous work focused on performance management (Altin et al. 2018), quality of management (Arbelo-Pérez et al. 2017), and sustainability in the hospitality industry (Jones et al. 2016). The analysis revealed significant differences in management practices and operational efficiency among hotels depending on their location, confirming the hypothesis of the importance of regional context noted by Prud'homme and Raymond (2013). An important theme was the digitalization and management of customer relationships, explored in the works of Bang and Kim (2013) and Khalila et al. (2023). These studies emphasize the significance of technological innovations for enhancing hotel performance, which is consistent with observations on the impact of the level of service digitalization (LDS) on hotel performance outcomes in the conducted research. The findings of this study underscore the need to integrate sustainable management practices, especially in the context of enhancing environmental sustainability (Bastič and Gojčič 2012; Khatter 2023). These practices not only improve customer satisfaction but also affect the financial stability of hotels. The quality of service and customer loyalty, discussed in the works of Cham and Easvaralingam (2012) and Liat et al. (2014), are critical factors for small hotels, as evidenced by the high Guest Satisfaction Score (GSS) values for the hotels of the second cluster. This indicates that investments in service quality can lead to increased customer loyalty and strengthen market positions.

Further research can focus on developing and implementing innovative management approaches in crisis conditions, especially considering current and potential external threats

such as military conflicts and global epidemics. Researchers should pay attention to developing sustainable management strategies that can help hotels adapt to changing conditions and ensure stable development. Also, studying the impact of environmental initiatives on the economic efficiency of hotels will be valuable. Such research will help understand how "green" practices can be integrated into the business models of small hotels to achieve both environmental and economic benefits. In conclusion, the results of this study provide valuable data for developing more effective management and operational strategies in the hospitality industry. They also highlight the importance of regional context and the adaptation of management decisions to it, which can be used to strengthen the resilience of hotels in a constantly changing economic and social environment.

5. Conclusions

The taxonomic analysis of small hotels in Ukraine in 2023 revealed significant differences in management practices and operational efficiency, largely determined by the geographical location of these establishments. This study uncovered that hotels situated in regions with an increased risk of military actions face considerable challenges, including a 40% reduction in tourist flow and financial instability. Conversely, hotels in relatively safe areas exhibit better performance and higher levels of customer satisfaction, achieving satisfaction rates 30% higher than those in conflict zones.

To strengthen resilience and competitiveness, it is recommended that small hotels adopt comprehensive improvement strategies. The empirical evidence demonstrates that the implementation of advanced security systems has resulted in a 40% reduction in incidents, while modern marketing techniques have led to a 35% increase in occupancy during the off-season. Additionally, the introduction of digital management technologies has shown a 22% improvement in operations.

The strength of these findings lies in the consistent patterns observed across different regions, reinforcing the validity of the proposed strategies. The data were rigorously analyzed, ensuring that the results were robust and reliable. However, the need for extended research is evident, with a proposal to include more than 30 hotels from various regions of Ukraine in future studies. This broader dataset will allow for a more nuanced understanding of regional impacts on hotel operations, potentially identifying patterns that could lead to more generalized conclusions applicable across the hotel industry.

In addition, considering or conducting a study on large hotels could significantly enhance the generalizability and applicability of the findings. Large hotels, with their more complex operational structures and resources, may provide additional insights into the effectiveness of resilience strategies at a different scale. The findings could reveal variations in how different-sized establishments respond to geopolitical instability and economic challenges, thus offering a more comprehensive understanding of the entire hospitality sector. By including large hotels, future research could identify tailored strategies that account for the unique needs and capabilities of both small and large hotels, ultimately fostering a more resilient and competitive industry overall.

In conclusion, this study provides critical insights into managing small hotels in turbulent times, offering a solid foundation for strategic adaptations that enhance resilience and operational efficiency. The implementation of a sustainable benchmarking system, tailored to unique conditions of instability, could significantly help small hotels not only survive but also thrive amid global upheavals and local crises. This comprehensive approach to hotel management underscores the potential for significant improvements in resilience and competitiveness, vital for sustaining growth and development in the hospitality industry.

Author Contributions: O.D., as the corresponding author, contributed to the conceptualization of the research objectives and goals. O.D. and O.K. played a crucial role in the development or design of the methodology and the creation of models that formed the foundation of this research. V.S. was responsible for conducting research and investigative actions, including carrying out experiments or collecting data/evidence. O.K., O.D. and V.S. supervised and coordinated the planning and execution of the research activities. O.K. provided supervision and guidance in the planning and execution of

the research activities, including offering mentorship beyond the immediate research group to ensure the project's alignment with overarching objectives. R.F. and L.D. played a critical role in verifying the research results for reproducibility. L.D. and R.F. managed the annotation, cleaning, and maintenance of the research data to ensure clarity and usability in the future and developed, implemented, and tested computer codes and algorithms, making significant contributions to visualization and presentation. A.I. and L.D. played a key role in the initial preparation of the published work, including substantial contributions to the writing and translation of the materials that formed the basis of the published article. All authors have read and agreed to the published version of the manuscript.

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Data Availability Statement: Within our study, we aimed to ensure the transparency and accessibility of data that support our findings. In line with MDPI's policy on research data access, this section provides information about the location of the data used in this research. The primary data utilized in this work were sourced from the Capterra website, which offers a comparative analysis of software for managing hospitality businesses. Details include ratings and the cost of using a reservation system for a single room. Data source link: Capterra Hospitality Property Management Software Comparison. For the analysis of the industry status, statistical data from Ukrstat were used: https://www.ukrstat.gov.ua/operativ/menu/menu_u/tur_.htm (accessed on 1 February 2024). Unfortunately, due to the current military situation in the region, access to additional primary data is restricted. This includes limitations related to confidentiality and ethical considerations that prevent the disclosure of detailed information about some aspects of this study. We recognize the importance of full transparency in research; however, protecting the confidentiality and safety of research participants remains our priority. In accordance with MDPI requirements, we provide a link to the data availability policy, which can be found on the MDPI Research Data Policies page. Should the opportunity arise to access additional data, we intend to update this statement and provide expanded information about available resources and data so that the scholarly community can use our results for further analysis and research.

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Abbreviations

%	Percentage
CR	Cancellation Rate
CRM	Customer Relationship Management
ICT	Information and Communication Technology
Eq.	Equation
Expl.Var	Explanatory variable
Fig.	Figures
SME	Small and Medium-sized Enterprises
KPI	Key Performance Indicators
COVID-19	Coronavirus Disease 2019
Prp.Totl	Total Variance Explained
OR	Occupancy Rate
ADR	Average Daily Rate
RevPAR	Revenue Per Available Room

ALOS	Average Length of Stay
STATSTICA	Statistical Analysis Software Package
RGR	Repeat Guest Ratio
GSS	Guest Satisfaction Score
CAC	Customer Acquisition Cost
RME	Review Management Efficiency
RAS	Revenue from Ancillary Services
e.g.,	For Example
LDS	Level of Digitalization of Services
Var	Variable

References

Altin, Mehmet, Mehmet Koseoglu, Xiaojuan Yu, and Arash Riasi. 2018. Performance measurement and management research in the hospitality and tourism industry. *International Journal of Contemporary Hospitality Management* 30: 1172–89. [CrossRef]

Arbelo-Pérez, Marta, Antonio Arbelo, and Pilar Pérez-Gómez. 2017. Impact of quality on estimations of hotel efficiency. *Tourism Management* 61: 200–8. [CrossRef]

Bang, Jounghae, and Min Sun Kim. 2013. CRM fit and relationship quality in hotel industry. *International Journal of Smart Home* 7: 11–22. [CrossRef]

Bastič, Majda, and Slavka Gojčič. 2012. Measurement scale for eco-component of hotel service quality. *International Journal of Hospitality Management* 31: 1012–20. [CrossRef]

Becerra-Vicario, Rafael, Daniel Ruiz-Palomo, Sergio Fernandez-Miguel, and Antonio Gutierrez-Ruiz. 2022. Examining the effects of hotel reputation in the relationship between environmental performance and hotel financial performance. *Journal of Hospitality and Tourism Management* 53: 10–20. [CrossRef]

Calveras, Aleix. 2003. Incentives of international and local hotel chains to invest in environmental quality. *Tourism Economics* 9: 297–306. [CrossRef]

Campos, Filipa, Conceição Gomes, Cátia Malheiros, and Luís Lima Santos. 2024. Hospitality Environmental Indicators Enhancing Tourism Destination Sustainable Management. *Administrative Sciences* 14: 42. [CrossRef]

Cesarotti, Vittorio, and Caterina Spada. 2009. A systemic approach to achieve operational excellence in hotel services. *International Journal of Quality and Service Sciences* 1: 51–66. [CrossRef]

Cham, Tat-Huei, and Yalini Easvaralingam. 2012. Service quality, image and loyalty towards Malaysian hotels. *International Journal of Services, Economics and Management* 4: 26–30. [CrossRef]

Chan, K., Ringo Lee, and John Burnett. 2003. Maintenance practices and energy performance of hotel buildings? *Strategic Planning for Energy and the Environment* 23: 6–28. [CrossRef]

Chernov, Vladimir, Oleksandr Dorokhov, and Ludmila Malyarets. 2012. Construction of estimates in the choice of alternative solutions by using the fuzzy utilities. *Transport and Telecommunication* 13: 11–17. [CrossRef]

Chou, Chia-Jung, and Pei-Chun Chen. 2014. Preferences and willingness to pay for green hotel attributes in tourist choice behavior: The case of Taiwan. *Journal of Travel & Tourism Marketing* 31: 937–57. [CrossRef]

Crespo, Catarina, Conceição Gomes, Cátia Malheiros, and Luís Santos. 2023. Determinants and COVID-19 effects on RevPAR: The case of Europe. *European Journal of Tourism, Hospitality and Recreation* 13: 97–109. [CrossRef]

Cunha, Filipe, and Armando Oliveira. 2020. Benchmarking for realistic nZEB hotel buildings. *Journal of Building Engineering* 30: 101298. [CrossRef]

Davras, Özgür, and Meltem Caber. 2019. Analysis of hotel services by their symmetric and asymmetric effects on overall customer satisfaction: A comparison of market segments. *International Journal of Hospitality Management* 81: 83–93. [CrossRef]

Dutescu, Adriana, Adriana Popa, and Andreea Ponorica. 2014. Sustainability of the tourism industry, based on financial key performance indicators. *Amfiteatru Economic* 16: 1048–62.

Ferrer, Manuel. 2004. Management control in hotel support processes. *Revista Venezolana de Gerencia* 9: 490–507.

Ghazi, Karam. 2016. Hotel maintenance management practices. *Journal of Hotel & Business Management* 5: 1–13. [CrossRef]

Hanushchak-Efimenko, Lyudmyla, Valeriia Shcherbak, and Olena Nifatova. 2017. Managing a project of competitive–integrative benchmarking of higher educational institutions. *Eastern–European Journal of Enterprise Technologies* 87: 38–47. [CrossRef]

Hussain, Matloub, Raid Al-Aomar, and Hussein Melhem. 2019. Assessment of lean-green practices on the sustainable performance of hotel supply chains. *International Journal of Contemporary Hospitality Management* 31: 2448–67. [CrossRef]

Ihsan, Bakhter, and Ad Alshibani. 2018. Factors affecting operation and maintenance cost of hotels. *Property Management* 36: 296–313. [CrossRef]

Jones, Peter, David Hillier, and Daphne Comfort. 2016. Sustainability in the hospitality industry: Some personal reflections on corporate challenges and research agendas. *International Journal of Contemporary Hospitality Management* 28: 36–67. [CrossRef]

Kandampully, Jay, Thanika Juwaheer, and Hsin-Hui Hu. 2011. The Influence of a hotel firm's quality of service and image and its effect on tourism customer loyalty. *International Journal of Hospitality & Tourism Administration* 12: 21–42. [CrossRef]

Kassinis, George, and Andreas Soteriou. 2015. Environmental and quality practices: Using a video method to explore their relationship with customer satisfaction in the hotel industry. *Operations Management Research* 8: 142–56. [CrossRef]

Khalila, Muhamad, Norzalita Aziz, Fei Longb, and Huan Zhang. 2023. What factors affect firm performance in the hotel industry post-Covid-19 pandemic? Examining the impacts of big data analytics capability, organizational agility and innovation. *Journal of Open Innovation: Technology, Market, and Complexity* 9: 100081. [CrossRef]
Khatter, Ajay. 2023. Challenges and Solutions for environmental sustainability in the hospitality sector. *Sustainability* 15: 11491. [CrossRef]
Kim, Jinkyung, and Heesup Han. 2020. Hotel of the future: Exploring the attributes of a smart hotel adopting a mixed-methods approach. *Journal of Travel and Tourism Marketing* 37: 804–22. [CrossRef]
Kolodiziev, Oleh, Victoriia Tyschenko, and Kateryna Azizova. 2017. Project finance risk management for public-private partnership. *Investment Management and Financial Innovations* 14: 171–80. [CrossRef]
Laguardia, Naylet, Jessie Castañeira, Roxanna Cruz, Bisleivys Valero, and Luis López. 2021. Análisis de la Gestión del Mantenimiento orientado a infraestructuras para el desplazamiento de discapacitados en el Complejo Hotelero los Cactus Tuxpan, Varadero. *Conciencia Digital* 4: 131–53. [CrossRef]
Lai, Joseph. 2016. Energy use and maintenance costs of upmarket hotels. *International Journal of Hospitality Management* 56: 33–43. [CrossRef]
Lai, Joseph, and Francis Yik. 2008. Benchmarking operation and maintenance costs of luxury hotels. *Journal of Facilities Management* 6: 279–89. [CrossRef]
Liat, Cheng, Shaheen Mansori, and Cham Huei. 2014. The associations between service quality, corporate image, customer satisfaction, and loyalty: Evidence from the Malaysian hotel industry. *Journal of Hospitality Marketing & Management* 23: 314–26. [CrossRef]
Lockyer, Tim. 2002. Business guests' accommodation selection: The view from both sides. *International Journal of Contemporary Hospitality Management* 14: 294–300. [CrossRef]
Longart, Pedro. 2020. Understanding hotel maintenance management. *Journal of Quality Assurance in Hospitality and Tourism* 21: 267–96. [CrossRef]
Malyarets, Lydmila, Mimo Draskovic, Nadiia Proskurnina, Oleksandr Dorokhov, and Volodimir Vovk. 2018. Analytical support for forming the strategy of export-import activity development of enterprises in Ukraine. *Problems and Perspectives in Management* 16: 423–31. [CrossRef]
Mann, Robin. 2001. The development of a benchmarking and performance improvement resource. *Benchmarking an International Journal* 8: 431–52. [CrossRef]
Mayouf, Magdy, and Ezzat Hisham. 2019. Maintenance cost index for Egyptian hotels: An exploratory study. *International Journal of Heritage, Tourism and Hospitality* 13: 235–44. [CrossRef]
McPhee, Marnie. 2006. Sustainable resource management in the hospitality industry. *BioCycle* 47: 40.
Meng, Yi, and Yuan Gao. 2019. Research on online reservation preference of hotel consumers based on joint analysis method. *International Journal of Enterprise Information Systems* 15: 75–86. [CrossRef]
Min, Hokey, and Hyesung Min. 2006. The comparative evaluation of hotel service quality from a managerial perspective. *Journal of Hospitality & Leisure Marketing* 13: 53–77. [CrossRef]
Mmutle, Tsietsi, and Last Shonhe. 2017. Customers' perception of service quality and its impact on reputation in the hospitality industry. *African Journal of Hospitality, Tourism and Leisure* 6: 1–25.
Modica, Patrizia, Levent Altinay, Anna Farmaki, Dogan Gursoy, and Mariangela Zenga. 2020. Consumer perceptions towards sustainable supply chain practices in the hospitality industry. *Current Issues in Tourism* 23: 358–75. [CrossRef]
Nair, Girish, and Nidhi Choudhary. 2016. The impact of service quality on business performance in Qatar-based hotels: An empirical study. *The Journal of Hospitality Financial Management* 24: 47–67. [CrossRef]
Park, Jaehun, and Byung Lee. 2021. An opinion-driven decision-support framework for benchmarking hotel service. *Omega* 103: 102415. [CrossRef]
Ponomarenko, Volodimir, Oleh Kolodiziev, and Irina Chmutova. 2017. Benchmarking of bank performance using the life cycle concept and the DEA approach. *Banks and Bank Systems* 12: 74–86. [CrossRef]
Prud'homme, Brigitte, and Louis Raymond. 2013. Sustainable development practices in the hospitality industry: An empirical study of their impact on customer satisfaction and intentions. *International Journal of Hospitality Management* 34: 116–26. [CrossRef]
Sainaghi, Ruggero, Paul Phillips, and Valentina Corti. 2013. Measuring hotel performance: Using a balanced scorecard perspectives' approach. *International Journal of Hospitality Management* 34: 150–59. [CrossRef]
Santos, Luís, Conceição Gomes, Cátia Malheiros, and Filipa Campos. 2022. Measuring the hotels' performance using profitability ratios. *Academy of Accounting and Financial Studies Journal* 26: 1–12.
Sharma, Haresh Kumar, and Samarjit Kar. 2018. Decision Making for Hotel Selection using Rough Set Theory: A Case Study of Indian Hotels. *International Journal of Applied Engineering Research* 13: 3988–98, ISSN 0973-4562.