

The Role of the Property Management System in the Hotel Business: A Challenge for the Hotel Industry in Montenegro

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Abstract

Successful business in the hotel industry, especially in large hotels and hotels that are part of international hotel chains, today relies on several essential components, such as digitization of business, the application of modern information technologies, the implementation of artificial intelligence (AI), and the use of Property Management System (PMS) with Cloud technology. This research aims to address current trends in PMS development in the hotel industry, with a focus on the challenges faced by the Montenegrin hotel sector. The primary objective is to determine the clear role and importance of PMS in Montenegro's hotel industry as a key tool for successful hotel management. For this research, both primary and secondary data will be used. Primary data will be gathered through a structured online survey, employing purposive sampling to capture hoteliers' attitudes. Additionally, an extensive database of secondary data will be considered and examined. The data will be statistically analysed using IBM SPSS 25.0, and simple linear regression will be used for hypothesis testing. The results of this research will highlight that the application of PMS is crucial for the development of the Montenegrin hotel industry, allowing it to keep pace with leading market competitors.

Keywords: hotel, property management system, cloud computing, innovations, artificial intelligence

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Introduction

Digital technologies are an integral part of the hotel business. Through accelerated technological progress, hotel operations have completely transcended traditional methods and focused on the application of modern technology. One of the key elements of improving hotel operations' efficiency is implementing a Property Management System (PMS), which automates and optimizes key hotel operations, including reservations, billing, inventory management, and services. Given that the broader application of digital technologies in business is one of the leading international trends, it is essential to emphasize that research on the digitalization of the hospitality business is also increasingly common. The hotel industry in Montenegro recognizes the importance of integrating technologies, such as PMS systems. Still, it is characteristic that the system above is currently used only by larger hotels and hotels categorized with a higher number of stars.

The problem this research addresses is how to determine the role and impact of PMS in the hotel business, using key indicators of the hotel business in Montenegro. The primary objective of the research is to determine the clear role and importance of PMS in the hotel industry of Montenegro as a key tool for successful hotel management. In this regard, the research examines the role and impact of PMS implementation on operational efficiency and management quality in the Montenegrin hotel industry, with special emphasis on key indicators of hotel business success.

In this research, relevant secondary sources were used that relate to previous theoretical and empirical research on the implementation of PMS in the hotel industry. Scientific papers, books, and professional articles dealing with the digitalization of hotel business, the development of PMS, and its integration with modern standards such as USALI were analyzed. Based on secondary sources, a solid theoretical basis for interpreting the primary research results was provided.

Primary data were collected through a structured online questionnaire distributed among hotels in Montenegro. The collected data were processed using IBM SPSS 25.0 software. Several statistical methods will be used to test the hypotheses, clearly determining the importance of PMS in the Montenegrin hotel industry, especially in terms of its role and impact on key operational indicators of the surveyed hotels.

The paper is structured into three main parts. The first part of the paper presents an overview of previous research in the subject area known to the authors. The second part presents the research methodology, and the third part presents the research results themselves and discusses them to identify the importance of PMS for the hotel business in Montenegro.

Literature review

Digitalization and the application of innovative technological solutions in the hotel business are of interest to many authors. Numerous authors recognize the importance of applying modern technologies in the hotel industry, particularly to automate operations, increase efficiency, and enhance the user experience. In this regard, PMS is recognized as a key tool for integrating various business functions.

As a central component of hotel business management, PMS provides the tools necessary for the hotel and its employees to perform daily activities, such as handling reservations, check-in/out, managing the room sector, and other guest- and accounting-related activities (Čolović et al., 2013). Thanks to PMS, there is a significant

impact on increasing the efficiency and effectiveness of hotel operations (Dhiman et al., 2015).

The role and innovations in the development of PMS in the hotel business

In the hotel industry, numerous application systems are successfully implemented, among which we recognize PMS, POS, sales and marketing (S&M) systems, as well as other systems related to energy and waste management (Buhalis et al., 2018). One of the most popular and important innovations in the hotel business in the past decade is the property management system, known as PMS (Ogle et al., 2012). In essence, PMS is software used to manage hotel operations daily. It is a system composed of modules used according to the hotel's characteristics. For many hotels, PMS is a key segment of the business, recognized as a set of application programs for hotel management, reservations, room allocation and pricing, guest check-in and check-out management, accounting, bill settlement, and room status management (Kasyana et al., 2001). One of the most important advantages of data management through a PMS is the ability to easily collect and share information among employees, which is undoubtedly useful across various processes within the hotel (Moyeenudin et al., 2018).

Currently, a large number of Property Management Systems are used in the hotel industry, and most operate on similar principles. Of course, specific systems have emerged as market leaders and are the choice of some of the largest international hotel groups. The most popular Property Management Systems on the market are MicroFidelio, Opera Cloud by Oracel, Epitome, Betsai, Brilliant and many others. In essence, the decision on which PMS a hotel will use must align with the goals and needs of both the hotel and its guests, as well as the hotel's budget (Nirmala, 2021).

Cloud Computing technology has fully taken root across industries and has undoubtedly had a substantial impact on PMS in the hotel industry. Cloud Computing allows the use of resources over the Internet without the need to install the system on the computer itself (Cecowski et al., 2017). Previously, to implement a PMS, it was necessary to meet at least three conditions to establish one in a hotel, which relate to software, servers, and database systems. Cloud PMS eliminates the need for software and hardware upgrades because Cloud servers are updated to the latest technologies (Gulmez et al., 2015). Hotels can now rent PMS monthly, and the main advantage is that the system can be accessed from anywhere via portable devices as long as there is an available internet connection. Cloud PMS provides a direct connection to online reservations, an excellent advantage for hotels. Thanks to the established link between PMS and reservation mechanisms, prices and information about available rooms are automatically updated, thereby directly helping prevent overbooking (Gulmez et al., 2014).

In modern hospitality, a special focus is placed on improving the user experience when booking online. PMS allows tracking of reservations across different channels (Web, GDS, OTA) and automatically updates room availability in real time. Given the sensitivity of personal data, modern systems employ security measures to protect it from misuse, damage, viruses, and spyware (Moyeenudin et al., 2018).

Artificial intelligence (AI) is increasingly contributing to the efficiency of hotel operations, primarily through process automation and the abandonment of traditional working methods. AI also has significant applications in PMS, where it is used to analyze key performance indicators, particularly in revenue management and guest relations (Mariani et al., 2018). According to Bouchareb (2023), AI in PMS is

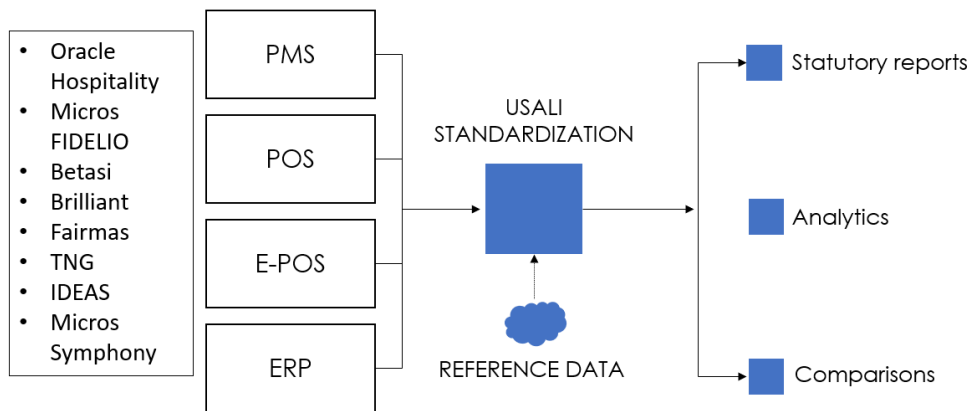
applied to dynamic pricing, occupancy management, feedback analysis, bright rooms, and predictive maintenance. By integrating these functionalities, AI enables management to make better-quality decisions and personalize services in line with the needs and expectations of guests and employees (Limna, 2022).

PMS reporting

Management reporting through PMS (Figure 1) is considerably simpler than in the previous period. Reports can be generated at any time, and based on them, a clear picture of the hotel's activities can be obtained. Financial reporting is critical, as it allows data to be collected from the balance sheet, income statement, cash flow statement, daily statistical reports on operations, sales, receivables, payables, purchases, etc.

Input systems, such as PMS, POS, E-POS, and ERP, are actually different data sources. Within the framework of USALI standardization, all collected data is systematized in accordance with the USALI standard to ensure consistent reporting and analysis. Also, reference or auxiliary data, such as prices, income/expense categories, which ensure the accuracy and uniformity of entries, are standardized according to the same principle. As a result of the aforementioned process, we recognize different types of reports and analyses that management uses to improve hotel operations. In this part, PMS plays a significant role as the central system for managing reservations, guest check-ins/check-outs, and billing.

Figure 1
Connection between PMS and USALI standardization



Source: Calan Driving Business Agility (2022).

A significant segment in hotel business management is the USALI standardization. It is a system whose primary goal is to provide accounting information on hotels' internal results, based on a unique system of identification, classification, organization, and consolidation of values expressed in a form that can be compared externally (Kosarkoska et al., 2012).

Methodology and Hypothesis

In accordance with the research objectives, two hypotheses, H1 (central hypothesis) and H2 (auxiliary hypothesis), were formulated to examine the impact of PMS implementation on hotel business performance in Montenegro. Testing the following

hypotheses enables a quantitative evaluation of PMS's role in relation to key hotel performance indicators.

H1: The implementation of the Property Management System is essential for a successful hotel business in Montenegro.

H2: Hotels that use PMS have a higher annual occupancy rate compared to those that do not use it.

The research applied qualitative and quantitative approaches. The qualitative part includes a literature review on the application of PMS to improve the efficiency and digitalization of the hotel business. Although numerous authors have researched this topic, to the author's knowledge, there is no focused research on the impact of PMS on hotel business performance, especially in Montenegro. The results of this work may be helpful to managers in the hotel industry and to future researchers, and can be considered a contribution to this field.

The study employed a quantitative research approach, using a questionnaire, to examine the role of PMS in the Montenegrin hotel industry. The collected data were processed using IBM SPSS 25.0 software. The survey was distributed electronically to include as many hotels in Montenegro as possible. The aforementioned method was chosen for practical reasons and time efficiency, as it allowed for faster feedback. The survey contained 14 questions, enabling data collection on the profiles of the surveyed hotels and the impact of PMS on key operational business indicators.

For the purpose of testing the hypotheses, the following statistical procedures were applied: (1) frequencies for determining absolute and relative frequencies, (2) descriptive statistics for calculating mean differences and standard deviations, (3) Kruskal-Wallis H test for calculating mean differences between multiple groups, (4) Mann-Whitney U test for calculating mean differences between two groups, (5) Kolmogorov-Smirnov test for assessing the normality of data distribution, (6) Spearman's correlation coefficient for analyzing the relationship between variables, (7) multiple regression analysis for examining the predictive significance of independent variables on a dependent numerical variable, (8) binary logistic regression analysis for examining the predictive significance of independent variables on a dependent binary variable, (9) ROC analysis of the relationship between PMS implementation and hotel business performance.

The survey was completely anonymous and was conducted during April 2025. The research targeted hotels operating in Montenegro and registered in the Central Tourist Register of Montenegro (CTR). The survey questionnaire was sent to the general managers of hotels registered in the CTR. A total of 53 hotels participated in the research, which constitutes a satisfactory sample for conducting the necessary tests to examine the validity of the set hypotheses.

Results and Discussion

Results

The distribution of hotels by basic characteristics (Table 1) shows that small hotels (up to 50 rooms) are the most represented (50.9%), while large hotels (more than 150 rooms) are the least represented (11.3%). Regarding hotel category, four-star hotels are the most represented (45.3%), while two-star hotels make up the smallest share (11.3%). As for the type of hotel, resort hotels dominate with 47.2%, followed by boutique hotels (35.8%), while condo and apartment hotels make up a negligible share.

The majority of hotels (69.8%) are not affiliated with hotel chains. Among hotels that belong to hotel chains, international chains are the most represented (56.3%), regional chains are less represented, and local chains are the least represented (18.8%). The application of PMS shows that the majority of hotels use these management systems (67.9%), while 32.1% do not. When it comes to PMS types, the Opera system is most often used in 28.3% of hotels, while systems such as Diventa (25%), Hotelier (11%), OTA SYNC (14%), and other PMSs (8.3%) have significantly lower representation.

Table 1
Hotel distribution and PMS applications

Hotel characteristics and PMS applications		Frequency	Percent	Valid Percent	Cumulative Percent
Type of hotel	small hotel	27	50.9	50.9	50.9
	medium hotel	20	37.7	37.7	88.7
	large hotel	6	11.3	11.3	100.0
Hotel category	2-star hotel	6	11.3	11.3	11.3
	3-star hotel	9	17.0	17.0	28.3
	4-star hotel	24	45.3	45.3	73.6
	5-star hotel	14	26.4	26.4	100.0
Type of hotel	resort hotel	25	47.2	47.2	47.2
	garni hotel	5	9.4	9.4	56.6
	boutique hotel	19	35.8	35.8	92.5
	condo hotel	1	1.9	1.9	94.3
	apart hotel	3	5.7	5.7	100.0
Belonging to a hotel chain	no	37	69.8	69.8	69.8
	yes	16	30.2	30.2	100.0
Type of hotel chain	International hotel chain	9	17.0	56.3	56.3
	Regional hotel chain	4	7.5	25.0	81.3
	Local hotel chain	3	5.7	18.8	100.0
	Total	16	30.2	100.0	
Application of PMS	no	17	32.1	32.1	32.1
	yes	36	67.9	67.9	100.0
	Total	53	100.0	100.0	
Type of PMS	Diventa	9	17.0	25.0	25.0
	Hotelier	4	7.5	11.1	36.1
	Opera	15	28.3	41.7	77.8
	OTA SYNC	5	9.4	13.9	91.7
	Other PMS	3	5.7	8.3	100.0
	Total	36	67.9	100.0	
Missing Total	System	17	32.1		
		53	100.0		

Source: Authors' work

Table 2 provides insight into the perceptions of 53 surveyed hotels regarding the key aspects of PMS, their impact on business, their contribution to increasing revenue, and their contribution to decision-making. Regarding the ratings for the importance of PMS in business, most hotels (43.4%) rated this item 5, while the fewest (7.5%) rated it 3. Regarding PMS's contribution to increasing income, 28.3% of respondents rated it 5, and the fewest hotels (3.8%) rated it 2. Regarding PMS's contribution to decision-making, 39.6% of respondents rated this item 5, while only 5.7% rated it 3.

Table 2

Distribution of hotels according to importance and contribution of PMS

Ratings of hotels on the importance of PMS	Frequency	Percent	Valid Percent	Cumulative Percent
The importance of PMS in business	3	4	7.5	11.1
	4	9	17.0	25.0
	5	23	43.4	63.9
Contribution of PMS to the increase in income	2	2	3.8	5.6
	3	10	18.9	27.8
	4	9	17.0	25.0
Contribution of PMS in decision-making	5	15	28.3	41.7
	3	3	5.7	8.3
	4	12	22.6	33.3
	5	21	39.6	58.3
	Total	36	67.9	100.0
Missing	Syst.	17	32.1	
Total		53	100.0	

Source: Authors' work

Table 3 presents the basic descriptive statistics for quantitative performance, which measures the specific results of the hotel business, and for subjective evaluations of the surveyed hotels on the importance and contribution of PMS in the hotel business. Based on the results in the first part of the table, the average length of PMS use is 7.72 years, while the annual hotel occupancy rate ranges from 10% to 64%, with an average of 42.18%. The daily room rate (ADR) ranges from €21 to €500, with an average of €112.27. The annual revenue of hotels also shows significant differences, ranging from €55,188 to €12,000,000, with an average of €1,685,366. There is significant variability in the variables mentioned, as shown by the standard deviation values.

Table 3

Descriptive statistics of hotel business performance and employee ratings on the importance and contribution of PMS

Hotel performance and employee ratings	N	Minimum	Maximum	Mean	Std. Deviation
Hotel performance					
Length of use of PMS (years)	36	1	19	7.72	4.12
Annual occupancy rate (%)	53	10	64	42.18	10.54
Average daily rate (ADR)	53	21.00	500.00	112.27	75.26
Annual hotel revenue	53	55,188	12,000,000	1,685,366	2,102,272
Ratings of surveyed hotels					
The importance of PMS in business	36	3	5	4.53	0.70
Contribution of PMS to the increase in income	36	2	5	4.03	0.97
Contribution of PMS in decision-making	36	3	5	4.50	0.65

Source: Authors' work

The second part of the table refers to hotels' evaluations and the importance of PMS. Hotels evaluated three aspects of PMS on an ordinal scale of 1-5, where the average rating of the importance of PMS in business is the highest (4.53), which indicates the high importance of this system. The PMS's contribution to income growth was rated lower, at 4.03, while its contribution to decision-making received a slightly higher rating of 4.50. Standard deviations indicate relatively low variation in ratings, which means that most respondents agree on the high importance of PMS.

Discussion of hypotheses

The central hypothesis of the research (H1) assumed that the application of PMS is crucial for the successful operation of hotels in Montenegro. It was tested with the following statistical methods: (1) Binary logistic regression was applied to determine whether hotels that use PMS achieve better results compared to those that do not, (2) Spearman's correlation analysis was applied to assess the relationship between the length of PMS use and business performance and (3) the Kruskal-Wallis test to examine the relationship between employees' perception (self-assessment) of the importance of implementing different types of PMS. Non-parametric tests were applied to test variables that do not have a normal distribution. Tests of normality were conducted using the Kolmogorov-Smirnov and Shapiro-Wilk tests.

The results of the logistic regression analysis (Table 4) show that applying PMS has a positive and significant impact on business performance. Application of PMS increases the annual occupancy rate by 17.1% ($\text{Exp}(B) = 1.171$, $p < 0.05$). The hotel's annual income also shows a positive impact of PMS, as a direct consequence of its implementation, with an increase in income of 20.6% ($\text{Exp}(B) = 1.206$, $p < 0.01$). Average daily rate (ADR), although it has a positive coefficient ($B = 0.018$) and a potentially positive contribution, is not statistically significant.

The results of the analysis confirm the central hypothesis that applying PMS significantly improves hotel business performance across key indicators of success, such as annual occupancy rate, annual revenue, and daily room price. The data provide direct support for the hypothesis, with a significant increase in the annual occupancy rate, suggesting that PMS facilitates effective management of hotel capacity and reservations.

Also, the significant increase in the hotel's annual revenue further confirms that PMS optimizes billing, pricing, and revenue management. Although the daily room price shows a positive trend, it is not significant, suggesting the need for additional adjustments to the pricing strategy to leverage the opportunities offered by PMS implementation fully.

In conclusion, the results of the logistic regression analysis support the basic assumption that PMS has a transformative effect on business performance, with a special emphasis on increasing occupancy and revenue, as key indicators of success.

Table 4

The relationship between PMS implementation and hotel business performance (Binary Logistic Regression Analysis)

Variables	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. EXP(B)	
							Lower	Upper
Annual occupancy rate (%)	0.169	0.037	5.732	1	0.017	1.171	0.961	1.453
Annual hotel revenue	0.193	0.021	6.808	1	0.009	1.206	1.032	1.486
Average daily rate (ADR)	0.018	0.016	1.226	1	0.268	1.018	0.986	1.051

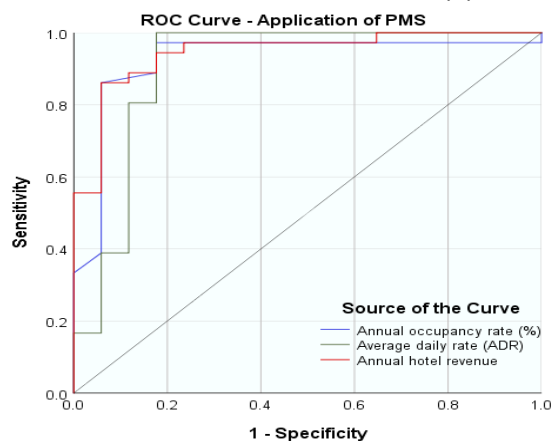
Source: Authors

Note: Dependent variable: Application of PMS

ROC analysis indicates the model's ability to reliably differentiate between successful and unsuccessful PMS applications, with high α -sensitivity and specificity. The use of PMS has the most significant positive impact on the annual income (red line, AUC = 0.944, $p < 0.01$) and the annual occupancy rate (blue line, AUC = 0.925, $p < 0.01$), while it has a weaker impact on the daily room price (green line, AUC = 0.904, $p < 0.01$). ROC analysis confirms the results of logistic regression and the key role of PMS in business optimization, supporting the central hypothesis (Figure 2).

Figure 2

The connection between the application of PMS and the hotel's business performance



Source: Authors' work

Spearman's correlation analysis was applied to assess the relationship between the length of PMS use and business performance. The analysis results (Table 5) confirm a positive relationship between the length of PMS use and the hotel's business performance. Length of PMS use shows a moderate and significant correlation with annual occupancy rate ($\rho = 0.264, p < 0.01$), daily room rate ($\rho = 0.232, p < 0.05$), and annual income ($\rho = 0.241, p < 0.05$). In addition, the annual occupancy rate shows significant correlations with the daily room rate ($\rho = 0.401, p < 0.01$) and the annual income ($\rho = 0.584, p < 0.01$). In contrast, the association between the daily room rate and income is moderate but significant ($\rho = 0.333, p < 0.01$). These results further confirm the importance of PMS for hotel performance optimization and thus support the central hypothesis.

Nirmal (2021) claims that implementing PMS in front-office departments improves organization and speeds response times to guest requests, findings consistent with the results presented in testing the central hypothesis.

Table 5

Correlation between the length of PMS use and business performance (Spearman's correlation analysis)

Spearman's rank correlation coefficient (ρ)		1.	2.	3.	4.
1. Length of use of PMS (years)	Coefficient	1.000	0.264**	0.232*	0.241*
	Sig. (2-tailed)		0.009	0.043	0.032
2. Annual occupancy rate (%)	Coefficient	0.264**	1.000	0.401**	0.584**
	Sig. (2-tailed)	0.009		0.000	0.000
3. Average daily rate (ADR)	Coefficient	0.232*	0.401**	1.000	0.333**
	Sig. (2-tailed)	0.043	0.000		0.000
4. Annual hotel revenue	Coefficient	0.241*	0.584**	0.333**	1.000
	Sig. (2-tailed)	0.032	0.000	0.000	
	N	36	53	53	53

Source: Authors' work

Note: Correlation is significant at the 0.01 level (2-tailed), *0.05

In addition, the relationship between the surveyed hotel's perception (self-assessment) of the importance of applying different PMS types was examined using the Kruskal-Wallis test. The test results (Table 6) showed statistically significant differences in employee ratings across the different types of PMS. As a whole, Opera stands out for the most positive employee perception and has the highest average rank across all ratings for the importance of PMS (25, 24.37, 23.8). Other PMS systems (Otasync, RoomExpert - Prosoft System, SAP) rank lowest in the assessment of the importance of PMS in business (12.17) and the impact of PMS on increasing revenue (7.50). In contrast, Hotelier has the lowest rank in the evaluation of PMS in decision-making (11.75). The differences in the evaluations of the importance of PMS in business are very significant ($H = 14.018, p < 0.01$), from the importance of PMS to the increase in income. ($H = 11.977, p < 0.05$) and the contribution of PMS in decision making ($H = 9.388, p < 0.05$).

Table 6

Correlation of hotels' ratings on the importance of applying different types of PMS (Kruskal-Wallis H test)

The price of the importance of PMS	Type of PMS	N	Mean Rank	Kruskal-Wallis H	df	Asymp. Sig.
The importance of PMS in business	Diventa	9	15.39	14.018	4	0.007
	Hotelier	4	13.00			
	Opera	15	25.00			
	OTA SYNC	5	12.80			
	Other PMS	3	12.17			
Contribution of PMS to the increase in income	Diventa	9	17.83	11.977	4	0.018
	Hotelier	4	15.25			
	Opera	15	24.37			
	OTA SYNC	5	11.30			
	Other PMS	3	7.50			
Contribution of PMS to the increase in income	Diventa	9	16.00	9.388	4	0.042
	Hotelier	4	11.75			
	Opera	15	23.80			
	OTA SYNC	5	16.10			
	Other PMS	3	12.50			
	Total	36				

Source: Authors' work

Auxiliary hypothesis (H2) with the assertion that hotels that use PMS have a higher annual occupancy rate, daily room rate (ADR), and annual hotel revenue compared to those that do not use PMS, was tested using the Mann-Whitney U test to determine the difference in business performance between these two groups of hotels.

The test results (Table 7) confirm very significant differences in business performance ($p < 0.01$) between hotels that do not apply PMS and those that do. Hotels that use PMS have a significantly higher annual occupancy rate than hotels without PMS (Mean Rank: 34.22 > 11.71). The daily room rate (ADR) is also higher (33.86 > 12.47), while the most pronounced impact of implementing PMS is on the hotel's annual revenue (34.56 > 11.00), confirming previous conclusions and providing broader support for the central hypothesis. Overall, the results of the Mann-Whitney U test fully confirm the auxiliary hypothesis (H2).

Table 7

Differences in business performance in groups of hotels that do not apply PMS (Mann-Whitney Test)

Performance	PMS	N	Mean Rank	Sum of Ranks	Mann-Whitney U	Wilcoxon W	p																												
Annual occupancy rate (%)	no	17	11.71	199.00	46.000	199.000	0.000																												
	yes	36	34.22	1232.00				Average daily rate (ADR)	no	17	12.47	212.00	59.000	212.000	0.000	Yes	36	33.86	1219.00	Annual hotel revenue	no	17	11.00	187.00	34.000	187.000	0.000	Yes	36	34.56	1244.00		Total	53	
Average daily rate (ADR)	no	17	12.47	212.00	59.000	212.000	0.000																												
	Yes	36	33.86	1219.00				Annual hotel revenue	no	17	11.00	187.00	34.000	187.000	0.000	Yes	36	34.56	1244.00		Total	53													
Annual hotel revenue	no	17	11.00	187.00	34.000	187.000	0.000																												
	Yes	36	34.56	1244.00					Total	53																									
	Total	53																																	

Source: Authors' work

The differences in the middle ranks confirm the claim that applying PMS significantly improves business performance. The mean ranks of hotels using PMS for annual occupancy rate (34.22), daily room rate (33.86), and annual revenue (34.56) are significantly higher than those of hotels without PMS, indicating a direct link between PMS implementation and improvements in key performance indicators. Therefore, the auxiliary hypothesis (H2) is confirmed.

Based on the results, it is clear that implementing PMS has a positive impact on key indicators of the hotel business. As Krželj-Čolović and Cerović (2013) state, the effective implementation of PMS makes the most significant contribution to hotel business performance. It is one of the most significant factors contributing to it, which is entirely consistent with the results obtained.

Furthermore, the research found that four and five-star hotels are more likely to adopt new technologies and innovations in PMS than lower-tier hotels. Similar to what Dhiman & Anand state in their research on the importance of PMS in the Indian hotel industry, where they also recognized the dominance of high-tier hotels over mid and lower-tier hotels in terms of PMS implementation. Based on this, it is clear that there is a connection between the two studies, as their results are highly consistent.

Overall, the previous analyses confirm the central hypothesis (H1) that implementing PMS significantly improves key hotel business indicators. The presented results show that hotels using PMS achieve better performance in all business segments, including an increase in annual occupancy rate, daily room rate (ADR) and annual revenue. Statistically significant differences between hotels with and without PMS further emphasize the value of implementing these systems. Also, the results of the

Mann-Whitney test indicate that implementing PMS significantly improves the performance of the surveyed hotels, fully confirming the auxiliary hypothesis (H2). Finally, all statistical analyses applied in this study indicate that the main (H1) and auxiliary hypotheses (H2) can be entirely accepted.

Conclusion

The results of this research provide concrete insight into the importance and role of PMS in the Montenegrin hotel industry, particularly in achieving better operational and financial performance. The research clearly established that applying PMS has a positive impact on hotel operations, particularly with respect to key operational business indicators. Based on the research findings, it is possible to fully confirm the central hypothesis: PMS is not only a technical but also a strategic solution that enables hotels to meet the demands of the modern market better. In this way, a direct answer was given to the central research problem - the role and impact of PMS in the context of key indicators of hotel operations in Montenegro.

The subject of the research - the role and impact of PMS on improving operational efficiency and quality of management in the Montenegrin hotel industry - was confirmed through specific performance indicators, while the primary goal - determining the role and importance of PMS as a key tool of hotel management - was fully achieved.

In addition, the surveyed hotels received outstanding and excellent ratings for the importance of PMS, its contribution to increasing revenue, and its role in decision-making, indicating a positive perception of the system's practical application and usefulness in the hotel's daily operations. Analysis of user ratings across different types of PMS shows the most positive perception of the specific Opera PMS system.

By combining quantitative and qualitative results, these findings provide broad and robust support for the claim that the application of PMS is not only a technical tool but also a strategic one for optimizing and increasing the efficiency of hotel operations. All of the above confirms the importance of PMS as a basic resource in modern hotel management and operations, supporting the central hypothesis as empirically justified and relevant. Also, the auxiliary hypothesis, that hotels that use PMS achieve better business results than those that do not, was confirmed, as statistical analyses showed a clear difference in performance between the two groups. Based on this, it was clear that PMS is a key tool for improving hotels' competitive position. The research highlights the challenges and shortcomings of PMS implementation, especially in small and lower-category hotels, opening the door to future improvements and the adaptation of software solutions to specific market needs.

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