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DYNAMIC PRICING: THEORY OR A REALITY FOR EMERGING MARKETS CASE STUDY OF SERBIA

Dinamičko upravljanje cenama – teorija ili stvarnost za tržišta u razvoju Studija slučaja Srbije

Abstract

Revenue management (RM) is a technique used in hospitality for over 3 decades. North American corporate hotel chains have started to implement RM principles already in the early '80s of the last century [13]. The basic principles of RM are dynamic pricing in which demand forecasting is having a major role. Today, almost 40 years after the introduction of RM, specific markets still have not implemented successfully the RM principles in their daily operations nor on a strategic level. In this paper, the research was conducted looking at the pricing strategy of Serbian hotels from 2013 to the end of 2017. The Serbian market is a rapidly growing tourism market as it records higher growth rates than the European and global average. However, Serbia is still an emerging market concerning the overall level of tourism development. Results of the research show that Serbian hotel managers manage their rates monthly, while RM on a weekly or a daily basis is used very little. Besides time management in pricing strategy, the research shows that the price is dominantly influenced by room supply, which is, as it was shown in the research, very static in comparison to demand. Simply said, hotels in Serbia pay more attention to the room supply rather than room demand. Furthermore, results from the research reveal that the market is witnessing a strong decrease in average daily rate (ADR). However, the drop in ADR is still leading to an overall increase in total revenue. Yet, tourism demand demonstrated significant intervals of price inelasticity where potential revenue was lost due to inadequate pricing policy. Therefore, we argue that the wider application of RM principles is necessary in order to maximize favourable trends of arrivals and overnights that Serbia has been recording in the last 10 years.

Keywords: *revenue management, dynamic pricing, Serbian hotels.*

Sažetak

Revenue management (RM) je tehnika koja se u hotelijerstvu koristi više od 3 decenije. Korporativni hotelski lanci iz Severne Amerike su počeli da koriste ove principe već u ranim 80-tim godinama prošlog veka [13]. Osnovni principi RM-a nalaze se u dinamičkom upravljanju cenama u kojima predviđanje tražnje igra ključnu ulogu. Danas, gotovo 40 godina nakon pojave RM-a, pojedina tržišta još uvek nisu uspešno implementirala RM principe u svoje poslovanje, kako na operativnom, tako i na strateškom nivou. Ovo istraživanje je sprovedeno prateći cenovnu politiku srpskih hotela u periodu od 2013-2017. godine. Srpsko tržište je brzo rastuće turističko tržište koje beleži više stope rasta turističkog prometa u odnosu na evropski i svetski prosek. Ipak, Srbija je još uvek tržište u razvoju gledajući ukupan nivo razvoja turizma. Rezultati ovog istraživanja pokazuju da menadžeri hotela u Srbiji upravljaju svojim cenama na mesečnom nivou, dok se RM na nedeljnom i dnevnom nivou koristi jako malo. Pored vremenskog okvira, istraživanje pokazuje da odluke o cenama dominantno zavise od rasta ponude, koja je, kako je u istraživanju pokazano, prilično statična u odnosu na tražnju. Jednostavno rečeno, hotelijeri u Srbiji obraćaju veću pažnju na kretanja na strani ponude u odnosu na tražnju. Rezultati istraživanja takođe ukazuju da tržište karakteriše snažan pad u prosečnoj naplaćenoj ceni sobe (ADR). Ipak, pad ADR-a još uvek dovodi do rasta ukupnog prihoda. Međutim, turistička tražnja pokazala je značajne intervale cenovne neelastičnosti u kojima je izgubljen potencijalni prihod zbog neadekvatne cenovne politike. Stoga, mi zagovaramo širu upotrebu RM principa kako bi se maksimizirali efekti pozitivnih trendova koje Srbija beleži u dolascima i noćenjima turista u poslednjih 10 godina.

Ključne reči: *revenue management, dinamičko upravljanje cenama, srpski hoteli.*

Introduction

The Serbian tourism market follows international trends when it comes to the increasing number of participants in international travels. In addition, over the past 5 years, the growth rates in the tourism industry have been higher than global and European average [26, pp. 180-192], [28]. Along with the increased number in arrivals and overnight stays, a dynamic growth in the number of hotels has also been recorded, whereby corporate hotel chains stand out in particular [20, pp. 33-56]. Although growth rates indicate a rapid development of tourism in Serbia, it should be noted that contribution that travel and tourism have to the country's GDP remains low. Serbia was ranked 107th globally out of 185 countries in WTTC report for 2018. The economic impact that tourism has on the local economy was estimated at 2.3% directly to GDP and 6.7% of total contribution to GDP, which is still significantly lower that global average (direct 3.2% and total 10.7%) [31]. Yet, growth rates, and stronger competition in Serbia has led to substantial improvements in the supply, particularly when considering quality of accommodation and services [16, pp. 245-258]. However, the Serbian economy is lagging behind in digital transformation in regards to the countries of the European Union [5, pp. 19-41]. This is extremely important as information and communication technology has already been identified as the key of hotel's competitiveness, and since the new generation of travellers will have radically different requests and demands from hotels [20, pp. 33-56], [24, pp. 151-156]. Several recommendations for Serbian digital transformation have already been presented, one of which is the wider absorption and diffusion of technology [25, pp. 107-119]. Globally, hotels were one of the early adopters of technology in general, and even quicker adopters of revenue management systems in particular [30, pp. 178-190]. Yet, it remains unclear to what extent hotels in emerging markets have implemented technology in their daily operations, as well as how strongly they rely on technology as one of the keys for strategic and sustainable development. As Serbia has already been identified as an emerging market, our aim in this paper was to investigate the pricing strategy of Serbian hotels, and the need for implementation of revenue management systems. Precisely, how efficient Serbian hotels are regarding dynamic pricing and whether they are successful at demand forecasting.

One of the first impressions, looking at the dataset, was surprising as it indicated a clear and strong decrease in average daily rate of Serbian hotels. In the long term, this could lead to a revenue decline. Apart from the financial consequences, in the long term this could also have other effects on the tourist destination itself. This trend has been recorded on the Serbian market over the past several years looking into available data. This paper explores other important hotel indicators, such as the change in room supply, room demand, demand elasticity, change in ADR and hotel revenue over the past four years.

Price decline which was noted could be justified when demand is showing significant elasticity coefficients, as well as in a situation when the overall accommodation capacity is increasing faster than the demand expressed. The paper argues that there is a need for wider application of the revenue management principles in order to maximize the effects of the positive trends for a destination to achieve a sustainable development. Given that the concept of revenue management is a broad one and that it is understood and seen differently in the literature, the literature review section discusses the concept in more details, whereas its adequacy for broader application on the Serbian market would be additionally discussed in the section presenting the results and discussion.

Literature review

The concept of revenue management has been present in the literature for over 3 decades. Pioneer papers date back to the early 1950s. One of the first papers was published in Transportation Science journal just before the infamous deregulation process happened in the airline industry [26, pp. 180-192]. Rothstein dealt with designing a model that would overcome the problem of empty seats that airlines had to resolve on a daily basis due to the cancelled reservations. The substance of the RM principle is something that has been known to economists for centuries. Robert Cross [4] states that its essentials date to the commencement of the

commerce itself. However, controlling different prices for different market segments, which is the essence of RM, has been thoroughly explained in the monopolistic third degree price discrimination by Pigou in its Economics of Welfare [2].

Revenue management is simply a new way of approaching the old problem, supply/demand management [4]. Most of the papers published in the seventies dealt with RM at operational level. Over time, and particularly after great shocks in the international tourism, such as 09/11, RM gained a more strategic role [19, pp. 293-305]. Since the 1970s, RM has left the purely mathematical sphere in modelling control of the reservations made and today has a strategic position in business strategy of large hotel enterprises and airlines that use information systems considerably [18, pp. 233-236]. Today almost all corporate hotel chains own a large information system used for RM [12].

In general, former research in the RM field could be divided into three sections: 1) descriptive or the ones developing concepts of the possible application of RM across the industries, 2) price-oriented, and 3) research based on capacity management [13]. Results of the research dealing with the application of the RM concept have generally been assessed as successful though some unsuccessful attempts were recorded. Today RM is recognized as a concept that most certainly contributes to better business results [30, pp. 178-190]. Interestingly, Ivanov noticed that while the basics of the RM principle could be easily understood and applied in several different areas, each activity was characterized by many particularities that could cause certain models not to function in every industry [8].

Revenue management implies the sale of available accommodation units to the "ideal" buyer at the highest price possible for the longest possible period of stay. Any lower price or shorter stay would result in the lost revenue, whereas a possible increase in price could result in the lost user. Therefore, RM implies a strong and precise segmentation of the buyers and management of distribution channels in an adequate way. More on the influence of the internet distribution systems on RM is to be found in the paper [3].

One of the commonly used definitions describes RM as a dynamic method of predicting demand and allocating "perishable" goods by applying various pricing categories and making decisions on when, at what price, and to what extent to allow overbooking [1, pp. 502-517]. The authors define "perishable" goods as all the products and services whose sales capacities fall down to zero at some point. This is the case with the unsold rooms in a hotel at the end of the day. The unsold rooms on a certain day lose their potential and could never result in a revenue in future. Thus, potential revenue gained from these rooms is lost for good. Hotel RM was defined by several authors, but for the purpose of this paper the definition given by Vinod was accepted as the appropriate one. He says that RM in hospitality reflects the process of selective acceptance or denial to the users due to pricing policy, duration of stay and date of arrival in order for the revenues to be maximized [30, pp. 178-190].

Apart from hotel and airline industries, RM has become an ever more interesting concept for researchers and practitioners in other fields, as well. Models for the application of RM in the following industries have been developed: in the processing industry [17, pp. 2185–2201], in media planning and buying [22], in transport and air cargo industries [10, pp. 16-44], in venue management (management of congress venues or cinemas) [14, pp. 33-46], and today increasingly more in the area of restaurateurship and management of golf clubs [15, pp. 332-344].

The increased interest for the research in the field has led to the launch of special scientific journals in the field. The first one, Journal of Revenue and Pricing Management has been published since 2002 by Palgrave MacMillan, and five years later the journal International Journal of Revenue Management was first published by Inderscience Publishers [8], [9], [7].

Today users of services are more accustomed to dynamic price management. Kimes from Cornell University was among the first to research how users perceived dynamic pricing, i.e., whether users and guests considered it fair to pay a different price for the same service depending on duration of stay, reservation date, and other factors [11, pp. 22-29]. She established that purchasers consider a "reference price" when making decisions. The reference price is a set of several components: previously paid price for a similar service, previously most often paid price for

the same service, prices that other purchasers paid for the same service or other prices available for the public to see them [13]. Yet, what she discovered is that reference price is not a constant, and customers' perception about it could change. This was a major discovery that enabled businesses to implement dynamic pricing. Therefore, international travellers today understand and accept the dynamic pricing in the airline industry, even though it was not the case in its beginnings. About the same process was present at the beginning of dynamic pricing in hospitality. Guests used to static prices started protesting. Nevertheless, perception of users has changed over time and, thus, some prices that may have once seemed as unfair became "reference prices" afterwards. All these results have as their basis long-lasting work of the professor Kimes and her associates from Cornell University. It made it possible for the RM principle to be applied across numerous industries.

The fact that the average price per accommodation unit has been on a steady decrease can be worrying when considered all previously stated. Low prices become "reference prices" and this could leave lasting consequences on the destination itself.

All this raises questions how to best manage revenues in hotels in Serbia. The foundation lies in thorough knowledge of the market and objective decision-making resting on the data basis. When setting the prices, hoteliers must take into account several key parameters, such as: period of stay, duration of stay, reservations in the property management system for the given day, reservations in the system for the same day in previous years, competition prices, external and internal factors that could affect demand, weather conditions, fixed and variable costs per sold accommodation unit, etc. It is a rather significant number of indicators that hoteliers must consider. It is even more complex to decide the importance of the factors in the pricing process. In situations like this, RM software with good user interface comes in handy. It can be used by hoteliers as a personal assistant during the decision-making process. Weatherford researched satisfaction of the employees who used RM systems in the airline industry and discovered that 97% of the airlines from the sample processed their flights by using an RM system [31, pp. 323-329]. Moreover, the most common mark the employees used to rate their satisfaction with using this software was 4 (on the scale 1 to 5) [31]. Based on the results of the research, the paper argues that implementing an RM programme would contribute to the more adequate pricing policy on the Serbian market. Sample, methodology and results of the research are given further on.

Sample and methodology

For the purpose of this research, we used the data provided by the company STR, which is a global leader in gathering data on hotels [28]. The sample size used in this paper represents almost 1/3 of the Serbian hotel market, i.e., 28.85% from June 2018 [21]. The paper considered trends, namely increase in supply included in the sample, trends in the average price per accommodation unit, as well as increase in demand, demand elasticity and its effect on total revenue. Descriptive statistics, correlation matrix and 3 regression models were developed for data processing. The results were processed in IBM SPSS 20 software. According to our knowledge, no similar analysis has been done so far in the hotel sector in Serbia. The results of the research are presented below.

Results and discussion

Table 1 shows descriptive statistics used for the average daily rate, total room supply in the sample, and the number of rooms sold in the same hotels for the period of 1,156 days from 2013 to 2017. Therefore, those are the data gathered daily for the past 3 years and 61 days.

The table indicates that the minimum charged average daily rate was RSD6,158.67, whereas maximum charged rate was RSD13,368.13. The average rate per accommodation unit for the given period accounted for RSD9,382.84. It is noticeable that coefficient of variation of this variable was 12%. On the other hand, minimum number of rooms sold was 721 accommodation units, whereas maximum was 7,847 daily. The average number of arrivals for the given period was at the level of 4,339.95, i.e., 4,340 accommodation units. High standard deviation and coefficient of variation of 36% were expected.

Finally, an increase in accommodation capacities was also evident. Minimum number of the available accommodation capacities in the sample was 7,286 whereas the maximum was 7,943. Also, a rather low coefficient of variation of 2% was observed. Table 1 indicates that the demand for the rooms in the hotels in the sample is a highly dynamic variable that significantly varies on a daily basis. On the other hand, supply of accommodation units is rather steady with small variation, whereas the average price varies daily but significantly less than demand and significantly more in comparison to the offer.

Trends in average value of each variable for the past five years are given graphically in Figures 1, 2 and 3. Figure 1 indicates decrease of the average daily rate for the analysed hotels. In 2013, the average rate accounted for RSD11,949.56, whereas the average rate of the charged room was RSD9,062.43. Figure 1 clearly indicates that the average room rate decreased by almost a quarter, i.e., by 24% over the five-year period. This indicator itself is a cause for concern, but it is even more important to discover the causes of this fall in the price and its effect on the total revenue.

Figure 2 indicates trends in the average room supply in hotels from the sample for the last five years. In 2013, there were 2,399 rooms available in the hotels from the sample. As it can be seen from the figure, the number increased every year and amounted to 2,897 rooms in 2017. The number of rooms can vary in case a new hotel is to open or some of the existing ones are to close. Apart from that, the number of rooms could also vary on a daily, monthly, or yearly level in case some of the hotels were not open throughout the year, or some rooms were not available due to various reasons (redecoration, breakdown, etc.). Even though an increase in the number of rooms was evident, the growth in percentage was slow when compared to the fall of the average rate. The average number of rooms increased for the period of 5 years by one fifth, i.e., 20% from 2013 to 2017.

Finally, Figure 3 shows an average increase in demand for the same period, i.e., 2013-2017. From 1,142,944 rooms sold in 2013, hotels from the sample reached the figure of 1,948,923 rooms sold in 2017. Moreover, the highest increase in the average number of the rooms sold was recorded for the year 2017 when compared with the previous

Table 1: Descriptive statistics

	N	Minimum	Maximum	Mean		Std. Deviation	CV	Variance
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic	Statistic
ADR	1156	6158.67	13368.13	9382.8438	33.82842	1150.16613	0.12258	1322882.115
Demand	1156	721.00	7847.00	4339.9567	46.05078	1565.72655	0.36077	2451499.645
Supply	1156	7286.00	7943.00	7795.0657	5.00665	170.22605	0.02184	28976.906
Valid N (listwise)	1156							

Figure 1: Trends in the average room rate for the 2013-2017 period

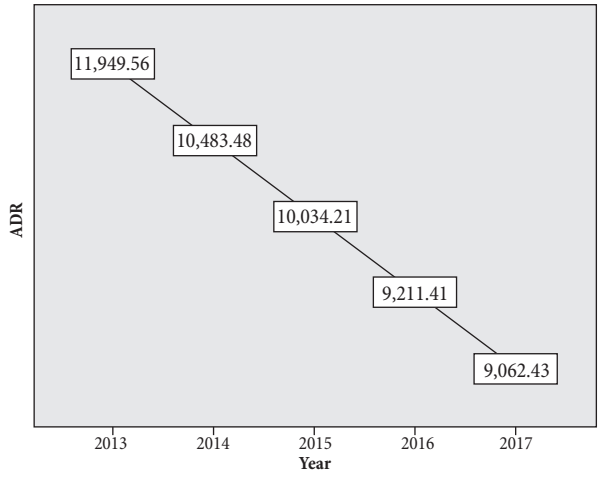
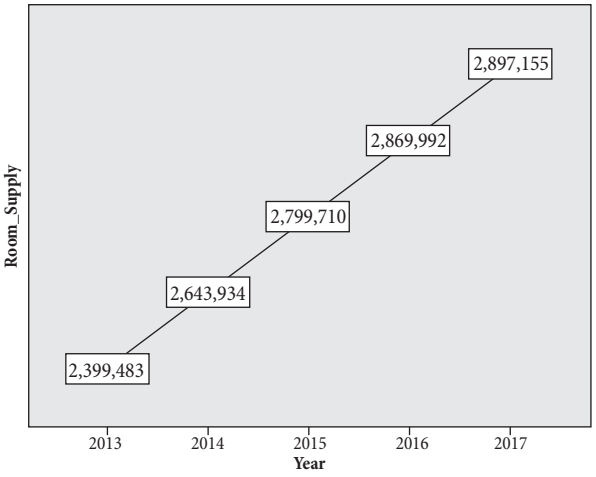


Figure 2: Trends in the average room supply for the 2013-2017 period



year. The total increase of the rooms sold over the period of 5 years was 70% in the year 2017 when compared to 2013. However, such a strong growth in demand did not result in a significant growth in revenue. It was even the opposite in several cases.

When demand is not showing price elasticity, then any increase in price would lead to increased revenue, while price decline would result in lower revenue. Therefore, we calculated price elasticity of demand for the given period. Price elasticity was calculated on a daily, monthly and yearly level. Figure 4 shows only periods where demand was not elastic, i.e., did not react significantly to the change in price.

Interestingly, demand was not elastic in April, May, September, October in general, then on Thursday daily, and finally, demand was not price-elastic to the overall price changes in the year 2015. This leads us to a conclusion that every price decline in the periods indicated above would lead to lower revenue. Therefore, we look at the indicators of hotels performance in periods indicated above.

Tables 2, 3 and 4 show that almost all of the most significant indicators of hotel performance (RevPAR, ADR and revenue) recorded negative index points. This is especially important for total revenue, which recorded negative growth rates on all occasions except September 2016.

Total revenue represents a relation between the number of units sold and the average rate charged. If hotels could forecast successfully room demand and calculate demand price elasticity, they could better manage their revenue. In order to determine the dynamics of pricing strategy in hotels in Serbia, we developed three regression models.

Figure 3: Trends in the average room demand for the 2013-2017 period

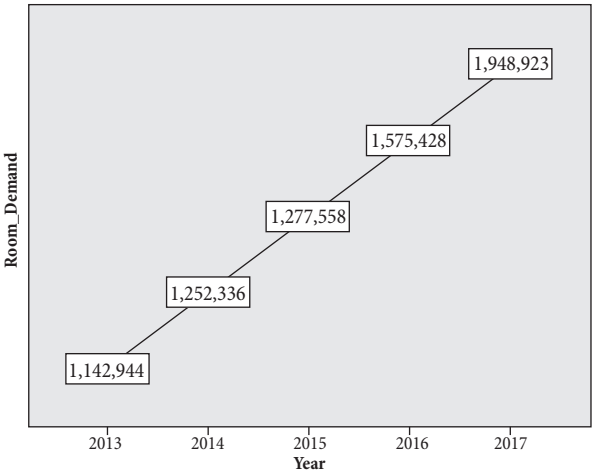


Table 2: RevPAR moving average

	April	May	September	October
2014	- 19.8	- 5.5	-16.9	-3.1
2015	9.9	-6.2	-12.8	-24.5
2016	-7.3	-9.2	16.9	16.0

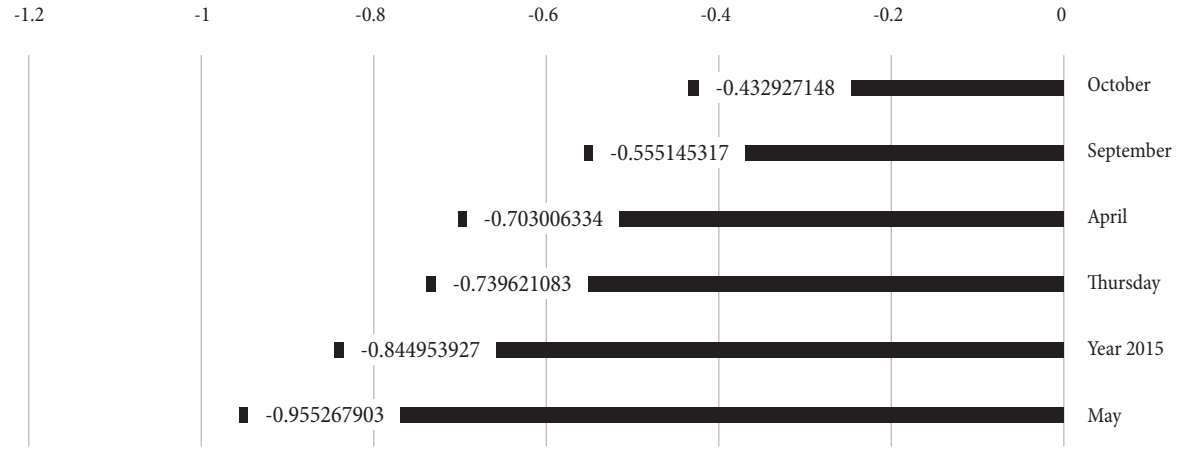
Table 3: Total revenue moving average

	April	May	September	October
2014	-11.3	4.5	-9.4	5.7
2015	14.8	-1.1	-5.6	-18.3
2016	-3.5	-6.4	18.4	17.4

Table 4: ADR moving average

	April	May	September	October
2014	-13.5	-13.7	-16.9	-7.9
2015	5.4	-8.1	-5.5	-10.4
2016	-10.2	-6.0	-6.2	-6.7

Figure 4: Price elasticity of demand



Regression model no. 1 (Table 5), where ADR was set as a dependent variable, while room supply and room demand were used as independent variables using daily data from hotels. A total of 1,156 observations were analysed in the last 5 years. As it is clearly visible, the regression model 1 done with daily data, showed that R square explained only .309 of the variance using room supply and demand as independent variables in the indicated period. Moreover, in Table 6, regression coefficients reveal that even in this relatively poorly explained model, room supply plays a more significant role than room demand.

However, we ran a regression model that observed the variables on a weekly basis (Table 7). There again, we can see that ADR is now moderately explained with room supply and demand, although in Table 8 we can see that room supply coefficients still dominantly influence the ADR. More precisely, almost 4/5 of the variance in the model developed on a weekly basis is explained with room supply. Inversely, 36% of variance is explained with room demand.

Finally, model 3 was developed with monthly data. Again, ADR was used as a dependent variable, while room demand and supply were used as independent ones. As it is presented in Table 9, this model is almost perfectly explained with R square resulting in .983. Results from Tables 9 and 10 clearly show that hotels in Serbia decide on their prices mainly on a monthly basis. Even though it could indicate the poor operation of RM efficiency, what is causing even more concern is that the results of regression coefficients indisputably show that ADR is created with respect to the room supply and not room demand. In addition, this is not a result of a steady increase in room supply, as it was demonstrated before that room supply on this market is quite static, especially with respect to the room demand.

In addition, room demand has negative coefficients in the final model, which explains the drop in the ADR in the last five years. This means that Serbian hotel managers show little knowledge about demand forecast, demand price elasticity, dynamic pricing and revenue management.

Clearly, many other factors also influence hotel pricing strategy. Mainly hotel costs, and then other micro and macroeconomic factors. However, room demand is a factor that must have a bigger influence on the decision-making and pricing strategy. Therefore, in conclusion of this paper, results of the research and certain limitations will be summed up and recommendations for further research will be given.

Conclusion

Serbia has been recording a stable growth rates in international arrivals and overnight stays for the last 10 years. Yet, travel and tourism contribution to the country's GDP remains below European and global

Table 5: Model 1 summary - ADR daily dependence

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.556[a]	.309	.308	956.98020

Table 6: Coefficients of the regression model no. 1

Model		Unstandardised Coefficients		Standardised Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	39767.691	1397.288		28.461	.000
	Supply	-4.058	.184	-.601	-22.080	.000
	Demand	.287	.020	.391	14.374	.000

Table 7: Model 2 summary - ADR weekly dependence

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.661[a]	.437	.430	632.30072

Table 8: Model 2 regression coefficients

Model		Unstandardised Coefficients		Standardised Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	38561.863	2598.040		14.843	.000
	Supply	-3.875	.347	-.786	-11.174	.000
	Demand	.238	.047	.360	5.119	.000

Table 9: Model 3 summary - ADR monthly dependance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.991[a]	.983	.982	115.68517

Table 10: Regression model 3 coefficients

Model		Unstandardised Coefficients		Standardised Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	23508.050	354.617		66.291	.000
	Supply	-.004	.000	-.786	-26.622	.000
	Demand	-.001	.000	-.252	-8.541	.000

average. A positive trend is recorded in total revenue as well. However, the market is witnessing a significant drop in average daily rates. Therefore, our aim was to explore the pricing strategy of Serbian hotels, i.e., how good they are in demand forecasting, dynamic pricing and finally revenue management.

Results reveal that price is dominantly explained with room supply rather than room demand. Moreover, specific periods were identified where demand did not demonstrate price elasticity and where potential revenue was lost. As it was discussed in the results section, hoteliers managed their ADR mainly on a monthly level. In addition, their decision was majorly driven by the changes in room supply rather than in room demand.

One of the major limitations of this research is the fact it was done with aggregated data. The average room number in Serbia is 50 rooms, while hotels differ significantly in size and in category, ranging from 10 rooms to 478 rooms [21]. Further research could reveal that these aggregated data are largely affected by one market category or by the hotels of similar size. This is also a recommendation for further research, i.e., exploration of key destinations in order to determine generators of such pricing strategy.

As it was mentioned earlier, it is a well-known fact that hotels can increase their revenues and profitability by using RM in order to best harmonize supply and demand on the most profitable market segments for each and every establishment [30, pp. 178-190]. Numerous tools for RM were designed so far in order to facilitate daily operations of hotel managers. As research showed limitations in pricing policy used so far, the authors argue for further and increased use of the RM system in hotels on the Serbian market, improved training of the employees in a specific field, as well as partnership approach to destination development.

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