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**ODRAŽAVAJU LI SE ZNAKOVI KVALITETE HOTELA U NJIHOVM
CIJENAMA? PRIMJER BOSNE I HERCEGOVINE****DO HOTEL QUALITY SIGNALS REFLECT IN THEIR PRICES?
EVIDENCE FROM BOSNIA AND HERZEGOVINA**

SAŽETAK: Ovo istraživanje propituje utjecaj čimbenika koji ukazuju na kvalitetu, kao što su mrežno ocjenjivanje gostiju, oznake održivosti, mogućnosti besplatnog otkazivanja i kategorizacije zvjezdicama, uz učinak destinacije na ocjene soba u hotelima u Federaciji Bosne i Hercegovine. Korištenjem hedoničkog cjenovnog modela koji ističe posebnosti i potencijalne opasnosti svojstvene za zemlje u razvoju težište ovog istraživanja je prvenstveno na prisutnosti nesavršenih uvjeta informiranja. Prema rezultatima istraživanja cijene hotela odražavaju značajne razlike u različitim destinacijama u zemlji i među raznim kategorijama hotela koji su klasificirani zvjezdicama. Oni također ukazuju na to da cijenu hotela u pojedinoj destinaciji znatno povećava oznaka održivosti kao i mrežno ocjenjivanje. Nasuprot tomu, mogućnosti besplatnog otkazivanja i drugih mrežnih ocjenjivanja gostiju ne utječu na cijene. Ovo istraživanje moglo bi ukazati na pogreške kod određivanja cijena ili na nerealistična očekivanja, što je u skladu s predodžbom o uvjetima nepotpunih informacija.

KLJUČNE RIJEČI: hedonički cjenovni model, ugostiteljstvo, elektronska predaja (*e-WOM*), kvaliteta usluge

ABSTRACT: This study investigates the impact of quality signaling factors, such as online guest ratings, sustainability labels, free cancellation policies, and star ratings, alongside the effect of destination on room rates in hotels from the Federation of Bosnia and Herzegovina. The study employs a hedonic pricing model, emphasizing its specificities and potential risks inherent to the context of developing countries, primarily focusing on the presence of imperfect information conditions. According to the findings, room rates exhibit significant differences across distinct destinations within the region and among various hotel categories represented by star ratings. Furthermore, the results indicate that the sustainability label increases room rates significantly, as does the online guest rating for a particular location. Conversely, free cancellation policies and other online guest ratings do not influence pricing. This research could potentially point to pricing errors or unrealistic expectations, which all align with the notion of imperfect information conditions.

KEYWORDS: hedonic pricing, hospitality industry, electronic word of mouth (*e-WOM*), service quality

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1. UVOD

O kompleksnosti određivanja cijena poslovnih subjekata u literaturi postoje opsežne rasprave (Kotler i Armstrong, 2010). Zbog utjecaja brojnih unutarnjih i vanjskih čimbenika na određivanje cijena, odluka o prikladnoj cijeni zahtjevna je zadaća koja se usložnjava kod određivanja cijena usluga s obzirom na njihove jedinstvene značajke kao što su neopipljivost, heterogenost, kratkotrajnost i neodvojivost (Wirtz i Lovelock, 2021). To isto vrijedi i za ugostiteljstvo koje ima visoke stalne troškove, nesigurnu potražnju i varirajuću cjenovnu osjetljivost zbog čega se preporučuju strategije određivanja cijena za upravljanje prihodima (vidi Smith, 2011; Wirtz i Lovelock, 2021).

U literaturi je opisana raznolika skupina atributa hotela koji utječu na cijene. Neki se odnose na sam hotel, poput bazena ili minibara (Mandić i Jurun, 2018), dok su drugi vezani za okoliš, kao na primjer blizina mora ili pogled na more (Latinopoulos, 2018). Čimbenici koji se odnose na reputaciju, poput broja zvjezdica ili mrežnih ocjena gostiju, upućuju na kvalitetu usluge (Castro i Ferreira, 2018; Mandić i Jurun, 2018), a imaju značajnu vrijednost za potencijalne goste budući da je kvalitetu usluga teško procijeniti. Elektronska usmena predaja (e-WOM) od posebnog je značaja za doživljajne industrije budući da se smatra vjerodostojnom, autentičnom i korisnom te time pojednostavljuje odluke o kupnji (Mauri i Minazzi, 2013).

S obzirom na to da se najučinkovitijom metodom čini ona koja je temeljena na vrijednosti, u literaturi su opisani mnogi pokušaji mjerenja spremnosti gostiju da plate atributa hotela (Chia-Jung i Pei-Chun, 2014; Kang *et al.*, 2012; Nelson, Partelow *et al.*, 2021). U novije vrijeme znanstvenici su počeli koristiti hedoničke modele određivanja cijena za ocjenjivanje utjecaja pojedinih atributa hotela na cijene (npr. Andersson, 2010; Chen i Rothschild, 2010; Soler i Gemar, 2018; Soler

1. INTRODUCTION

The complexity of pricing decisions in business is widely discussed in the literature (Kotler and Armstrong, 2010). Due to the influence of numerous internal and external factors on pricing, determining the appropriate price is a challenging task. The task is further compounded when setting service prices, given their unique characteristics such as intangibility, heterogeneity, perishability, and inseparability (Wirtz and Lovelock, 2021). The hospitality industry is no exception, with high fixed costs, uncertain demand, and variations in customer price sensitivity, making it suitable for revenue management pricing strategies (see Smith, 2011; Wirtz and Lovelock, 2021).

The literature reveals a diverse group of hotel attributes that influence their prices. Some are internal, such as the presence of a pool or minibar (Mandić and Jurun, 2018), while others are environmental factors, including proximity to the sea or a sea view (Latinopoulos, 2018). Reputation-related factors, such as star ratings and online guest ratings, serve as quality signals (Castro and Ferreira, 2018; Mandić and Jurun, 2018), which hold significant value for potential guests as the quality of services is difficult to assess. Electronic Word of Mouth (eWOM) is particularly important for experiential industries, as it is considered trustworthy, authentic and helpful, and therefore simplifies purchasing decisions (Mauri and Minazzi, 2013).

Given that value-based pricing appears to be the most efficient pricing method, numerous attempts in the literature have been made to measure guests' willingness to pay for hotel attributes (Chia-Jung and Pei-Chun, 2014; Kang *et al.*, 2012; Nelson, Partelow *et al.*, 2021). Recently, scholars have been employing hedonic pricing models to assess the impact of individual hotel attributes on prices (e.g. Andersson, 2010; Chen and Rothschild, 2010; Soler and Gemar, 2018; Soler *et al.*,

et al., 2019; Thrane, 2007). Hedonički model određivanja cijena temelji se na uvjerenju da je proizvod skup vlastitih svojstava (Lancaster, 1996). Stoga je cijena proizvoda zbroj cijena svih tih svojstava (Rosen, 1974). Tržišne cijene daju vrijedne informacije (Arora i Mathur, 2020) koje pomažu istraživačima u tumačenju regresijskih koeficijenata kao što je spremnost klijenta za plaćanje (npr. Kuminoff, Zhang i Rudi, 2010; Soler *et al.*, 2019). Međutim, hedonički cjenovni modeli oslanjaju se na nekoliko pretpostavki pa tako i na onu o potpunoj informiranosti. U ekonomiji pretpostavka o potpunim informacijama podrazumijeva da kupci znaju sve o proizvodima i uslugama koje namjeravaju kupiti i da menadžeri znaju sve o klijentima i njihovim preferencijama. Takvu pretpostavku često je teško održati jer zahtijeva promišljene alternativne interpretacije ovih modela (Kask i Maani, 1992). Kako nije uvijek moguće pretpostaviti da svi tržišni sudionici imaju potpune informacije, tumačenja se često ograničavaju na utjecaj pojedinih atributa na cijene. Stoga ova studija nastoji ispitati odražavanje znakova kvalitete drugih relevantnih hotelskih atributa na njihove cijene u nedovoljno istraženom kontekstu zemlje u razvoju, posebice jer ju karakterizira nepotpunost informacija i visoka nesigurnost (Quah i Ong, 2010).

Ova studija provedena je u kontekstu zemlje u razvoju uz korištenje podataka s platforme Booking.com. Koliko je nama poznato, ne postoje prethodne studije u kojima je ispitivan utjecaj znakova kvalitete hotela i ostalih atributa hotela na cijene u zemljama u razvoju na temelju podataka uzetih iz baze Booking.com. Rezultati predstavljaju doprinos postojećoj literaturi na temu utjecaja različitih atributa hotela na njihove cijene. Ovim se istraživanjem nastoji pomoći menadžerima hotela kako bi utvrdili moguće nedostatke u svojim cjenovnim strategijama i prilagodili cijene u skladu s postojećim tržišnim dinamikama. Ovo istraživanje ima za cilj otkriti za koje su attribute hotela klijenti

2019; Thrane, 2007). The hedonic pricing model is based on the rationale that a product is a bundle of its characteristics (Lancaster, 1996). Accordingly, the product's price is the sum of the implicit prices of these characteristics (Rosen, 1974). Market prices convey valuable information (Arora and Mathur, 2020), leading researchers to interpret regression coefficients as customers' willingness to pay (e.g. Kuminoff, Zhang and Rudi, 2010; Soler *et al.*, 2019). However, hedonic pricing models rely on several assumptions, including perfect information assumption. In economics, the assumption of perfect information means that buyers know everything about the products and services they intend to purchase, and managers know everything about the customers and their preferences. Such an assumption is often difficult to uphold, necessitating cautious and alternative interpretations of these models (Kask and Maani, 1992). Given that perfect information cannot always be assumed for all market participants, interpretation is often limited to the impact of individual attributes on prices. Therefore, this study aims to explore whether quality signals and other relevant hotel attributes are reflected in their prices in the insufficiently explored context of a developing country, keeping in mind that such a country is characterized by imperfect information and high uncertainty (Quah and Ong, 2010).

This study was conducted in the context of a developing country using data from Booking.com. To the best of our knowledge, no prior research studies have examined the influence of hotel quality signals and other hotel attributes on prices in developing countries based on data sourced from Booking.com. The results contribute to the existing body of literature on the influence of different hotel attributes on their prices. This research endeavors to assist hotel managers in identifying potential flaws in their pricing strategies and adjusting prices in line with existing market dynamics. This research aims to reveal which hotel attributes guests are requested to pay a

trebali platiti visoku cijenu, a za koje su dobili popust. Nadalje, studija može ponuditi vrijedne uvide u odlučivanje o budućim ulaganjima u hotelijerstvo. Na posljétku, u usporedbi s rezultatima iz zemalja u razvoju, rezultati ukazuju na potencijalne pogreške u određivanju cijena ili na nerealna očekivanja (Andersson, 2010).

2. TEORIJSKA PODLOGA I HIPOTEZE

Hedonički cjenovni modeli temeljeni su na objašnjenju da je cijena robe ili usluge zbir cijena povezanih s individualnim atributima. Autor ovog teoretskog okvira, Rosen (1974), tvrdi da promatrane cijene roba koje sadrže određene attribute odražavaju implicitne cijene tih atributa. Modelom se želi utvrditi višestruk doprinos svake značajke sveukupnoj cjenovnoj strukturi i posljedično tomu otkriti prikrivene mehanizme određivanja cijena koji vode tržišnu dinamiku. Sofisticiranim ekonometrijskim pristupom hedonički cjenovni model otkriva ulogu atributa proizvoda u oblikovanju konačne cijene te na taj način pruža dragocjene uvide u proces tržišnog vrednovanja. Hedonički cjenovni pristup omogućava tumačenje doprinosa svake posebne značajke cijeni proizvoda kao agregata cijena implicitnih atributa (Latinopoulos, 2018). Ovi se modeli široko koriste u raznorodnim industrijskim granama poput automobilske industrije, računalne, stanogradnje te u proizvodnji i pružanju mnogih drugih roba i usluga (Chen i Rothschild, 2010).

Iako je do danas bilo nekoliko pokušaja procjene modela određivanja cijena u ugostiteljskoj djelatnosti, pregled ovih studija s obzirom na prikladne regresijske funkcionalne obrasce pokazao je primjetno odsustvo jedinstvenog pristupa specifikaciji modela. Nadalje, modelu također nedostaje jedinstveni pristup odrednicama za formiranje cijena, a varijacije u specifikacijama modela i konačni rezultati proizlaze iz konteksta

premium price for and for which attributes a discount is given. Furthermore, it can offer valuable insights for making decisions about future investments in the hospitality industry. Finally, these results, when compared to those from developing countries, draw attention to potential pricing errors or unrealistic expectations (Andersson, 2010).

2. THEORETICAL BACKGROUND AND HYPOTHESES

The rationale behind hedonic pricing models is that the price of a commodity or service is a sum of the prices associated with its individual attributes. This theoretical framework was proposed by Rosen (1974), who argues that the observed prices of goods containing certain attributes reflect their implicit prices. It seeks to assess the multifaceted contribution of each characteristic to the overall pricing structure and consequently reveal the latent price-setting mechanisms governing the market dynamics. Using a sophisticated econometric approach, the hedonic pricing model unveils the role of the product attributes in forming the final price, thereby providing valuable insights into the market valuation process. This approach facilitates the understanding of the contribution of each distinct characteristic to the final price by seeing the product price as the aggregate of the implicit attribute prices (Latinopoulos, 2018). These models have been widely applied across industries such as automobiles, computers, housing, and many other goods and services (Chen and Rothschild, 2010).

So far, several attempts have been made to estimate hedonic pricing models in the hospitality industry. However, a conspicuous absence of a unified approach to model specification is apparent upon examining these studies in terms of appropriate regression functional forms. Additionally, studies lack a unique approach to room rate determinants included in the model, and variations in model specifications and final results emerge

istraživanja kao što je, na primjer, odabrana destinacija (Soler *et al.*, 2019).

Mogućnosti hedoničkog cjenovnog pristupa navele su znanstvenike na korištenje modela u različite svrhe uključivanjem mnogih različitih atributa kao nezavisnih varijabli. Pri uporabi hedoničkog određivanja cijena u istraživanju ugostiteljstva neki se znanstvenici usmjeravaju na posebne regije ili destinacije (Castro i Ferreira, 2018; Soler *et al.*, 2019; Thrane, 2007) dok uspoređuju različite gradove pa i regije (Arora i Mathur, 2020; Öğüt i Onur Taş, 2012). Istraživanja su se provodila s različitim namjerama: npr., analiziranje učinka posebnih značajki na cijene (Fleischer, 2012); analiziranje utjecaja na vrstu hotela (Öğüt i Onur Taş, 2012; Thrane, 2007); mjerenje značaja sezonalnosti, posebnih događaja te dana u tjednu (Herrmann i Herrmann, 2014; Schamel, 2012; Wang *et al.*, 2019) itd.

Hedonički cjenovni modeli sadržavaju nekoliko pretpostavki, jedna od kojih su potpune informacije, što znači da menadžeri hotela uvijek imaju cjelokupne podatke o preferencijama svojih gostiju i da gosti uvijek znaju što mogu očekivati (Quah i Ong, 2010). Osim drugih pretpostavki koje proizlaze iz spoznatog pristupa preferencija ocjene spremnosti na plaćanje, već spomenuta pretpostavka može biti odlučujuća u istraživanju koje je provedeno u zemljama u razvoju (Quah *et al.*, 2021) i hotelskim tržištima (Melián-Alzola *et al.*, 2020). U zemljama u razvoju česta je pojava nepotpunih podatka zbog nedostatka institucionalne podrške u određenim industrijama, što onemogućuje dobivanje relevantnih informacija pružateljima usluga ili dobavljačima roba. Deficitarna tržišta rada i siva ekonomija također mogu biti uzrokom nepotpune informacije. Osim toga, poznato je da kvaliteta pružatelja usluga u zemljama u razvoju varira i da se teško vrednuje, a to navodi klijente na odluke o kupovini u uvjetima nepotpune informiranosti (Bennett, 1999). Zbog pretpostavke potpuni informacija potrebnih za regresijske

due to the research context, such as the destinations considered (Soler *et al.*, 2019).

The potential of the hedonic pricing approach led scholars to use it for different purposes, with many different attributes included as independent variables. When using hedonic pricing in hospitality research, some scholars focus their attention on one specific region or destination (Castro and Ferreira, 2018; Soler *et al.*, 2019; Thrane, 2007), while others decide to compare different cities or even regions (Arora and Mathur, 2020; Öğüt and Onur Taş, 2012). Research was conducted for different purposes; e.g., analyzing the effect of a specific characteristic on price (Fleischer, 2012); analyzing the impact of hotel type (Öğüt and Onur Taş, 2012; Thrane, 2007); measuring the importance of seasonality, special events, and day during the week (Herrmann and Herrmann, 2014; Schamel, 2012; Wang *et al.*, 2019), etc.

Hedonic pricing models entail several assumptions, one of which pertains to perfect information, implying that hotel managers always possess complete knowledge of their guests' preferences and that guests always know what to expect (Quah and Ong, 2010). Along with other assumptions stemming from the revealed preference approach of assessing willingness to pay, the aforementioned assumption can be pivotal in the research conducted in developing countries (Quah *et al.*, 2021) and hotel markets (Melián-Alzola *et al.*, 2020). Imperfect information is common in developing countries because of the lack of institutional support for a specific industry, leaving suppliers without relevant information. The incompleteness of labor markets and the grey economy can also be the cause of imperfect information. Apart from that, developing countries are known for variations on the part of service providers that are hard to assess, leading to customers making purchase decisions in imperfect information conditions (Bennett, 1999). Because the assumption of perfect information required to refer to regression coefficients as customers' will-

koeficijente i moguće nespremnosti klijenata na plaćanje (Quah, Choa i Tan, 2006), neki znanstvenici smatraju da regresijski koeficijenti objašnjavaju percepciju menadžera o spremnosti klijenata na plaćanje ili ih vide kao utjecaj atributa na cijenu (Chen i Rothschild, 2010; Gibbs *et al.*, 2018; Solano-Sánchez *et al.*, 2021). Cilj istraživanja je mjerenje utjecaja različitih atributa na cijene soba vodeći se praksom i temeljeći se na navedenim raspravama o nepotpunim informacijama u zemljama u razvoju.

Budući da ne postoji jedinstveni postupak za izbor varijabli u modelu, moguće je razmatrati različite varijable. Pojedini istraživači predlažu razne klasifikacije atributa hotela, poput unutarnjih, vanjskih i reputacijskih, ili strukturnih, reputacijskih i lokacijskih (Wang i Rasouli, 2022). Nasuprot vanjskim atributima, internim atributima smatraju se oni za koje hoteli imaju određen stupanj kontrole. Prema dostupnoj literaturi može se zaključiti da sve tri kategorije atributa obično proizvode značajne učinke na cijene. Atributi koji su se pokazali značajnim prediktorima hotelskih cijena u prethodnim istraživanjima bili su kategorizacija zvjezdica (Espinete *et al.*, 2003), veličina hotela (White i Mulligan, 2002), ocjene zadovoljstva gostiju (Andersson, 2010; Castro i Ferreira, 2018; de Oliveira Santos, 2016), mnoštvo sadržaja (Thrane, 2007), održivost (Kuminoff *et al.*, 2010), besplatno otkazivanje (Tong i Gunter, 2022), itd.

Nekoliko atributa posebno je zanimljivo za ovaj rad: čimbenici koji ukazuju na kvalitetu (reputacijski čimbenici), oznaka održivosti te besplatno otkazivanje. U nastavku se ukratko objašnjavaju ovi zanimljivi atributi. Prvo, prema obilnoj literaturi, reputacijski čimbenici poput kategorizacije zvjezdica i mrežnog ocjenjivanja gostiju mogu poslužiti kao znakovi kvalitete (Aguiló, Alegre i Riera, 2001; Castro i Ferreira, 2018; Thrane, 2005, 2007; Yang, Mueller i Croes, 2016). Kategorizacije zvjezdica već dugo odražavaju strategije određivanja najviših cijena u hotelijerstvu (Israeli, 2002). Tako su stu-

ingness to pay is sometimes untenable (Quah, Choa and Tan, 2006), some scholars believe regression coefficients explain managers' perceptions of the customer's willingness to pay or interpret them as the influence of attribute on price (Chen and Rothschild, 2010; Gibbs *et al.*, 2018; Solano-Sánchez *et al.*, 2021). Following their practice and building on the argument of imperfect information in developing countries provided above, this research focuses on measuring the impact of a variety of attributes on room rates.

Since there is no unique approach to choosing variables in the model, different variable types can be considered. These include internal, external, and reputational hotel attributes, although some researchers classify them in different ways, e.g., structural, reputational, and locational attributes (Wang and Rasouli, 2022). Unlike external attributes, internal attributes are considered those over which the hotel has a certain degree of control. The available literature suggests that attributes from all three categories tend to exhibit significant effects on prices. The attributes that proved to be significant predictors of hotel prices in previous studies include star rating (Espinete *et al.*, 2003), hotel size (White and Mulligan, 2002), guest satisfaction ratings (Andersson, 2010; Castro and Ferreira, 2018; de Oliveira Santos, 2016), different amenities (Thrane, 2007), sustainability (Kuminoff *et al.*, 2010), free cancellation (Tong and Gunter, 2022), etc.

Several attributes are of particular interest for this study: signal quality factors (reputational factors), the sustainability label, and free cancellation. Here is a quick reasoning behind these intriguing attributes. First, according to a vast body of literature, reputational factors such as star rating and online guest rating serve as quality signals (Aguiló, Alegre and Riera, 2001; Castro and Ferreira, 2018; Thrane, 2005, 2007; Yang, Mueller and Croes, 2016). Star ratings have been reflective of premium pricing strategies in the hotel industry for a long time now (Israeli, 2002). Specifically, representing an overall

dije provedene u smještajnim kapacitetima u različitim područjima pokazale da bolja kategorizacija hotela značajno povećava cijene soba i time predstavlja opće jamstvo kvalitete (Andersson, 2010; Espinet *et al.*, 2003; Latinopoulos, 2018). Većina studija temeljenih na hedoničkom cjenovnom modelu ukazala je na kategorizaciju zvjezdicama kao značajnu eksplanatornu varijablu (npr. Coenders, Espinet i Saez, 2003; Thrane, 2005), što nije iznenađujuće jer je ovakvo ocjenjivanje jedan od glavnih čimbenika za odluke o pogodnosti hotela za dobivanje certifikata kvalitete (Abrate, Capriello i Fraquelli, 2011). Stoga su hipoteze sljedeće:

H1: Hoteli s kategorizacijom od tri (a), četiri (b) i pet zvjezdica (c) određuju više cijene za sobe nego hoteli s manje od tri ili bez zvjezdica.

Znakovi kvalitete u smislu elektronske usmene predaje (e-WOM) mogu smanjiti asimetriju informacije navodeći tako goste na donošenje informiranih odluka prije kupnje, što je najvažnije u industrijama doživljaja (Manes i Tchetchik, 2018). Poboljšanja ocjena gostiju povezuju se s povećanjem prihoda (Anderson, 2012). Pozitivan učinak mrežnog ocjenjivanja na cijene (Abrate *et al.*, 2011) ne iznenađuje zbog činjenice da mrežno ocjenjivanje može smanjiti asimetriju informacija. Na primjer, pokazalo se da su razne skupine dodatnih pogodnosti smještaja poput parkinga, vrtova te pogleda na more povezane s višim cijenama smještaja u obalnim destinacijama (Portolan, 2012). Kad gosti ocijene te i slične pogodnosti na mrežnim stranicama za rezervacije višim ocjenama, smanjuje se nesigurnost budućih gostiju o pogodnostima mjesta koje namjeravaju rezervirati za svoj boravak. Slijedom toga, cijene smještaja s bolje ocijenjenim pogodnostima rastu (Castro i Ferreira, 2018). Osim pogodnosti, i ostali elementi koje gosti ocjenjuju na mrežnim stranicama, poput lokacije i čistoće, također mogu povećati cijene (Zhang, Ye i Law, 2011). Slični se učinci mogu povezati također i s ocjenjivanjem od strane osoblja. Stoga predlažemo sljedeću hipotezu:

quality assurance proof, better hotel star ratings proved to significantly increase room prices in studies conducted on accommodations located in different regions (Andersson, 2010; Espinet *et al.*, 2003; Latinopoulos, 2018). Most of the studies that build their rationale on hedonic pricing modelling proved that star rating can serve as a significant explanatory variable (e.g. Coenders, Espinet and Saez, 2003; Thrane, 2005), which comes as no surprise considering that this rating is one of the main factors determining if hotels will hold quality certificates or not (Abrate, Capriello and Fraquelli, 2011). Therefore, the following hypotheses are:

H1: Hotels with three (a), four (b), and five-star (c) ratings set higher prices for their rooms than hotels with less than three or no-star ratings.

Quality signals in terms of e-WOM can lower information asymmetry, leading guests to make more informed decisions before purchase, which is most important in experiential industries (Manes and Tchetchik, 2018). Improvements in online guest ratings are associated with an increase in revenues (Anderson, 2012). The positive effect of online ratings on prices (Abrate *et al.*, 2011) comes as no surprise, considering the ability of online ratings to decrease information asymmetry. For example, a diverse group of accommodation facilities, including parking, gardens, and sea views, proved to be related to higher accommodation prices for the coastal destination (Portolan, 2012). When guests rate these and other facilities on booking websites with higher scores, they reduce future guests' insecurity about the facilities of the place they intend to book for their stay. Consequently, the price of accommodation with better-rated facilities increases (Castro and Ferreira, 2018). In addition to facilities, guest ratings for other elements on online websites, such as location and cleanliness, also increase prices (Zhang, Ye and Law, 2011). Similar effects might be associated with staff ratings as well. Therefore, the following hypothesis is proposed:

H2: Više ocjene znakova kvalitete na mrežnim stranicama u pogledu osoblja (a), pogodnosti (b), čistoće (c), udobnosti (d) i lokacije (e) povezuju se s višim cijenama hotela.

Pojam održivog turizma javio se prije nekoliko desetljeća (Hall, 2011) i cijelo vrijeme traje rasprava o indikatorima održivog turizma i kako se oni mogu uklopiti u širi okvir održivosti (Bundeanu *et al.*, 2016; Rasoolimanesh *et al.*, 2023). Iz perspektive potrošača, održive poslovne prakse povezane su s povećanom potrošnjom pa posljedično tomu i s lojalnosti (Yang *et al.*, 2023). Tako i u ugostiteljstvu zeleni imidž hotela može poboljšati percepcije gostiju i povećati namjere za ponovnu posjetu (Lee *et al.*, 2010). Održive prakse hotela povezuju se s boljim poslovnim rezultatima (Hathroubi, Peypoch, i Robinot, 2014) budući da su gosti voljni platiti više cijene za održive objekte ako su svjesni da tako pomažu okolišu i društvu u mjestu koje posjećuju (Kuminoff *et al.*, 2010). S obzirom na gore spomenuto predlaže se sljedeća hipoteza:

H3: Hoteli s oznakama održivosti određuju više cijene za svoje sobe nego hoteli bez takovih oznaka.

Mogućnost besplatnog otkazivanja ima psihološke učinke u odnosu na psihologiju odbojnosti prema gubitku (Tversky i Kahneman, 1991), što klijente upućuje na spremnost plaćanja premija za mogućnost otkazivanja napravljenih rezervacija (Tong i Gunter, 2022). Kad su potrošači svjesni mogućih neizvjesnosti, traže načine minimiziranja izloženosti riziku, biraju mogućnost besplatnog otkazivanja (Benítez-Aurioles, 2018) i manje su osjetljivi na cijene. Iako za pružatelje usluge smještaja fleksibilne mogućnosti otkazivanja povećavaju rizik korištenja usluga, nefleksibilna politika otkazivanja povećava rizik za potrošača (Benítez-Aurioles, 2018) pa stoga dopušta određivanje nižih cijena. Posljedično tomu, nije čudno da su prošla istraživanja povezivala povećanje cijena smještaja s mogućnošću besplatnog otkazivanja (Abrate i Viglia, 2016). S obzirom na gore navedeno predlaže se sljedeća hipoteza:

H2: Higher online ratings for quality signals in terms of staff (a), facilities (b), cleanliness (c), comfort (d), and location (e) are associated with higher hotel room prices.

The term sustainable tourism has emerged decades ago (Hall, 2011). A debate on indicators of sustainable tourism and how it fits into the wider range of sustainability has been active ever since (Bundeanu *et al.*, 2016; Rasoolimanesh *et al.*, 2023). From a consumer perspective, sustainable business practices have been linked with increased consumption and, consequently, loyalty (Yang *et al.*, 2023). Hospitality industry is no exception. A green hotel image can improve guests' perceptions and increase revisit intentions (Lee *et al.*, 2010). Hotel sustainable practices are associated with better performance (Hathroubi, Peypoch, and Robinot, 2014) because appreciating that they can help the local environment and society, guests are willing to pay premium prices for sustainable properties (Kuminoff *et al.*, 2010). Considering everything mentioned above, the following hypothesis is proposed:

H3: Hotels with sustainability labels set higher prices for their rooms than hotels without these labels.

Cancellation policy has psychological effects related to the psychology of loss aversion (Tversky and Kahneman, 1991), leading to customers being ready to pay premiums for having the option to cancel their reservation when booking in advance (Tong and Gunter, 2022). When aware that they face uncertainty, consumers want to minimize risks and opt for free cancellation policies (Benítez-Aurioles, 2018) and are less sensitive to prices. While the flexible cancellation policy increases the consumption risk on the side of accommodation providers, the strict policy increases consumer risks (Benítez-Aurioles, 2018) and, therefore, allows lower prices. Consequently, it is no wonder that past research associated the increase in accommodation prices with the free cancellation policy (Abrate and Viglia, 2016). Considering everything above, the following hypothesis is proposed:

H4: Hoteli koji nude mogućnost besplatnog otkazivanja određuju više cijene soba nego hoteli s nefleksibilnom politikom otkazivanja.

Nadalje, s obzirom na važnost brendiranja destinacije u drugim studijama hedoničkog određivanja cijena (Soler *et al.*, 2019), željeli smo ispitati kako razne destinacije utječu na cijene hotelskih usluga u Bosni i Hercegovini. Zato je, uz varijable iz postavljenih hipoteza, i destinacija uključena kao varijabla u modelu.

3. EMPIRIJSKI OKVIR

3.1. Podaci i varijable

Na osnovi postavljenih hipoteza slijedi popis eksplanatornih varijabli koje su uključene u istraživanje. To su kategorizacija zvjezdicama i mrežne ocjene kojima su gosti ocijenili udobnost, čistoću, pogodnosti, lokaciju i osoblje, a radi se o reputacijskim atributima koji su dokazano imali značajan učinak na cijene soba, oznake održivosti, mogućnosti besplatnog otkazivanja i destinacija hotela. Konačno, također je uvršten i lokacijski prediktor (Wang i Rasouli, 2022) koji je jedinstven zbog inherentne posebnosti i nepromjenjivosti (Soler i Gemar, 2018), jer destinacija hotela daje veliki broj informacija – naročito u svezi atributa specifičnih za destinaciju koje se inače teško uključuju u standardan regresijski okvir.

Svi podaci, uključujući i cijene soba, informacije o kategorizaciji zvjezdicama, mogućnosti besplatnog otkazivanja, oznakama održivosti i ocjenama gostiju prikupljeni su na platformi Booking.com početkom ožujka 2023. godine. Cijene smještaja za jednu noć u najjeftinijoj varijanti dvokrevetnih soba s doručkom prikupljene su na isti način kao što je opisano u prethodnim istraživanjima (Castro i Ferreira, 2018; Costa, 2013). Podaci su prikupljeni nekoliko mjeseci prije određenih dana u tjednu tijekom svibnja. Prikuplja-

H4: Hotels with a free cancellation policy set higher prices for their rooms than hotels with a strict cancellation policy.

Additionally, considering the importance of destination branding in other hedonic pricing studies (Soler *et al.*, 2019), the intention was to explore how different destinations affect hotel prices in Bosnia and Herzegovina. Therefore, in addition to variables from hypothesized paths, the destination was included as a variable in the model.

3. EMPIRICAL FRAMEWORK

3.1. Data and variables

Based on the stated hypotheses, here we provide the list of explanatory variables we included in the study. These are star ratings and online guest ratings for comfort, cleanliness, facilities, location, and staff, which are all reputational attributes that have proved to have a significant effect on room rates, sustainability labels, free cancellation policies, and hotel destinations. Finally, being a locational predictor (Wang and Rasouli, 2022), unique in terms of its inherent specificity and immutability (Soler and Gemar, 2018), a hotel's destination yields a wealth of information, chiefly concerning destination-specific attributes that are otherwise challenging to incorporate within a standard regression framework and is therefore included as well.

All data, including room rates, information on the star rating, cancellation policy, sustainability label, and guest ratings, were collected using Booking.com. Data collection was conducted at the beginning of March 2023. Room rates for a one-night stay in the cheapest version of a double room with breakfast were collected following a similar approach as previous studies (Castro and Ferreira, 2018; Costa, 2013). Data were gathered several months in advance, specifically for weekday stays in May. Collecting data for a one-night stay on weekdays for all ho-

nje podataka o smještaju za jednu noć u tjednu za sve hotele vrlo je bitno kako bi se osiguralo prikupljanje podataka u sličnim uvjetima potražnje i eliminirao utjecaj razlika u potražnji između dana u tjednu i vikenda (Schamel, 2012). Svibanj je odabran kako bi se umanjio utjecaj uvjeta visoke sezone potražnje ili učinci sezonalnosti, što je posebice relevantno za pokrivanje šireg područja regije, u skladu s praksama drugih istraživača (Chen i Rothschild, 2010; Soler i Gemar, 2018). Podacima prikupljenim samo u hotelima Federacije Bosne i Hercegovine dobiven je skup podataka koji se sastoji od 146 različitih elemenata cijena (hotela). Osim toga, kako što je ranije spomenuto, podaci za ostale varijable uvrštene u model preuzeti su s platforme Booking.com.

Varijabla „destinacija“ nedvojben je prediktor s četiri kategorije (0=Sarajevski kanton, 1=Neum, 2=Mostar, 3=Ostali). Ova kategorizacija destinacija od iznimne je važnosti zbog velikog broja različitih destinacija u Federaciji Bosne i Hercegovine što bi, u slučaju da se ne uzmu u obzir, spriječilo izvođenje detaljne statističke procjene. Kategorije nisu bile odabrane nasumice nego na temelju klasifikacije preuzete od Federalnog zavoda za statistiku koji koristi kategorizaciju destinacija u svojim mjesečnim biltenima Federacije Bosne i Hercegovine, posebice u dijelu koji se odnosi na turizam. Varijabla „dodijeljene zvjezdice“ kategorička je varijabla kodirana prema sličnom pristupu opisanom u literaturi (Masiero *et al.* 2015) kako slijedi: 0 se odnosi na hotele s manje od tri zvjezdice ili bez kategorizacije, 1 se odnosi na hotele s tri zvjezdice, 2 na hotele s četiri zvjezdice i 3 na hotele s pet zvjezdica. Varijable „oznaka održivosti“ i „mogućnost besplatnog otkazivanja“ binarne su i kodirane na sljedeći način: 0 predstavlja odsustvo, a 1 predstavlja prisustvo oznake održivosti ili mogućnosti besplatnog otkazivanja. Mrežno ocjenjivanje gostiju (osoblja, pogodnosti, komfora, čistoće i lokacije) kontinuirane su varijable izražene kao prosječne ocjene gostiju za svaku od navedenih značajki hotela s popisa Booking.com. Tablica 1 prikazuje opise varijabli.

tels is crucial to ensure data collection under similar demand conditions and to eliminate the influence of demand variations between weekdays and weekends (Schamel, 2012). May was selected to mitigate the impact of high-season demand conditions or seasonality effects, which are particularly relevant when covering a broader region, in line with the practices of other researchers (Chen and Rothschild, 2010; Soler and Gemar, 2018). The data were exclusively collected for the hotels in the Federation of Bosnia and Herzegovina, resulting in a dataset comprising information on 146 distinct price points (hotels). Additionally, data for other variables included in the model were sourced from Booking.com, as previously mentioned.

The ‘destination’ variable is a categorical predictor with four categories (0=Sarajevo Canton, 1=Neum, 2=Mostar, 3=Other). This categorization of destinations is vital due to the large number of diverse destinations in the Federation of Bosnia and Herzegovina, which would, if not accounted for, prevent us from performing any precise statistical estimation. Categories were not chosen randomly but adopted from the classification provided by the Federal Office for Statistics, which uses this destination categorization in its monthly bulletins on the Federation of Bosnia and Herzegovina, specifically in the tourism section. The ‘star rating’ variable is a categorical variable coded as follows: zero stands for hotels with less than three stars or unrated, one stands for hotels with three stars, two stands for hotels with four stars, and three stands for hotels with five stars, following a similar approach to Masiero *et al.* (2015). The ‘sustainability label’ and ‘free cancellation’ variables are dichotomous variables coded as follows: zero represents the absence, and 1 represents the presence of a sustainability label or free cancellation policy. Online guest ratings (staff, facilities, comfort, cleanliness, and location) are continuous variables expressed as the averages of the ratings guests provide for each of the characteristics for the hotels listed on Booking.com. Table 1 provides variable descriptions.

Tablica 1: Značajke varijabli

Naziv varijable	Vrsta varijable	Opis	Bilješke
Cijena sobe	Kvantitativna	Cijena za najmanje skupu varijantu je dvokrevetna soba s doručkom	Uobičajeni postupak kao kod Castro i Ferreira (2015, 2018)
Osoblje	Kvantitativna	Ocjena Booking.com-a	
Pogodnosti	Kvantitativna	Ocjena Booking.com-a	
Čistoća	Kvantitativna	Ocjena Booking.com-a	
Komfor	Kvantitativna	Ocjena Booking.com-a	
Lokacija	Kvantitativna	Ocjena Booking.com-a	
Oznaka održivosti	Dummy	0=Ne, 1=Da	Booking.com-ov program prepoznavanja održivosti
Mogućnost besplatnog otkazivanja	Dummy	0=Ne, 1=Da	
Destinacija	Kvalitativna	0=Sarajevski kanton, 1=Neum, 2=Mostar, 3=Ostali	Kategorizacija destinacija prema Federalnom statističkom zavodu
Kategorizacija zvjezdica	Kvalitativna	0=ispod tri ili bez zvjezdica, 1=tri zvjezdice, 2=četiri zvjezdice, 3=pet zvjezdica	

Table 1: Variable characteristics

Variable name	Type of variable	Description	Note
Room rate	Quantitative	Price for the least expensive version is a double room with breakfast included	A common procedure, similar to Castro and Ferreira (2015, 2018)
Staff	Quantitative	Booking.com score	
Facilities	Quantitative	Booking.com score	
Cleanliness	Quantitative	Booking.com score	
Comfort	Quantitative	Booking.com score	
Location	Quantitative	Booking.com score	
Sustainability label	Dummy	0=No, 1=Yes	Booking.com's sustainability recognition program
Free cancellation	Dummy	0=No, 1=Yes	
Destination	Qualitative	0=Sarajevo Canton, 1=Neum, 2=Mostar, 3=Other	Destination classification provided by the Federal Office of Statistics
Star rating	Qualitative	0=Below three or no stars, 1=Three stars, 2=Four stars, 3=Five stars	

3.2. Deskriptivna statistika

Prije interpretacije regresijskih funkcija, tj. hedoničkih cjenovnih modela, prezentirat će se osnovna deskriptivna statistika kako bi se lakše približili podaci. Tablice 2 i 3 prikazuju pregled deskriptivne statistike za kontinuirane i kategoričke varijable korištene u regresijskom modelu. U Tablici 4 vidljiva je korelacijska matrica za sve kontinuirane varijable.

3.2. Descriptive statistics

Before specifying the regression functions, i.e., hedonic pricing models, we provide basic descriptive statistics to enhance familiarity with the data. Tables 2 and 3 present an overview of the descriptive statistics for the continuous and categorical variables employed in the regression model. Table 4 represents the correlation matrix for all continuous variables.

Tablica 2: Deskriptivna statistika za kontinuirane podatke

Naziv varijable	Oznaka varijable	N	Srednja vrijednost	SD	Min	Max
Cijena sobe	P	146	141,25	49,91	46	313
Osoblje	SF	146	9,29	0,45	7,4	10
Pogodnosti	FS	146	8,59	0,60	6,9	9,7
Čistoća	CL	146	9,00	0,56	7,3	10
Komfor	CF	146	8,95	0,59	6,7	10
Lokacija	LC	146	9,20	0,53	7,6	9,9

Table 2: Descriptive statistics for continuous data

Variable name	Variable mark	N	Mean	SD	Min	Max
Room rate	P	146	141.25	49.91	46	313
Staff	SF	146	9.29	0.45	7.4	10
Facilities	FS	146	8.59	0.60	6.9	9.7
Cleanliness	CL	146	9.00	0.56	7.3	10
Comfort	CF	146	8.95	0.59	6.7	10
Location	LC	146	9.20	0.53	7.6	9.9

Tablica 3: Deskriptivna statistika za kategorijske podatke

Naziv varijable (dummies)	Oznaka varijable	Frekvencija	Postotak	Kumulativni postotak
Oznaka održivosti (Ne)	SSNO	82	56,16	56,16
Oznaka održivosti (Da)	SSYES	64	43,84	100,00
Besplatno otkazivanje (Ne)	FCNO	24	16,44	16,44
Besplatno otkazivanje (Da)	FCYES	122	83,56	100,00
Destinacija (Sarajevski kanton)	DSAR	54	36,99	36,99
Destinacija (Neum)	DNE	7	4,79	41,78
Destinacija (Mostar)	DMO	20	13,70	55,48
Destinacija (ostale)	DOTH	65	44,52	100,00
Kategorizacija (manje od tri ili bez zvjezdica)	STNO	28	19,18	19,18
Kategorizacija (tri zvjezdice)	STTHREE	38	26,03	45,21
Kategorizacija (četiri zvjezdice)	STFOUR	75	51,37	96,58
Kategorizacija (pet zvjezdica)	STFIVE	5	3,42	100,00

Table 3: Descriptive statistics for categorical data

Variable name (dummies)	Variable mark	Frequency	Percentage	Cumulative percentage
Sustainability label (No)	SSNO	82	56.16	56.16
Sustainability label (Yes)	SSYES	64	43.84	100.00
Free cancellation (No)	FCNO	24	16.44	16.44
Free cancellation (Yes)	FCYES	122	83.56	100.00
Destination (Sarajevo Canton)	DSAR	54	36.99	36.99
Destination (Neum)	DNE	7	4.79	41.78
Destination (Mostar)	DMO	20	13.70	55.48
Destination (Other)	DOTH	65	44.52	100.00
Star rating (Below three or no stars)	STNO	28	19.18	19.18
Star rating (Three stars)	STTHREE	38	26.03	45.21
Star rating (Four stars)	STFOUR	75	51.37	96.58
Star rating (Five stars)	STFIVE	5	3.42	100.00

Tablica 4: Korelacijska matrica

Oznaka varijable	P	SF	FS	CL	CF	LC
P	1,00					
SF	0,05	1,00				
FS	0,17*	0,79***	1,00			
CL	0,10	0,77***	0,89***	1,00		
CF	0,13	0,80***	0,91***	0,94***	1,00	
LC	0,24**	0,56***	0,42***	0,44***	0,45***	1,00

Bilješka: * znači <0,05. ** znači $p < 0.01$. *** znači $p < 0.001$

Table 4: Correlation matrix

Variable mark	P	SF	FS	CL	CF	LC
P	1.00					
SF	0.05	1.00				
FS	0.17*	0.79***	1.00			
CL	0.10	0.77***	0.89***	1.00		
CF	0.13	0.80***	0.91***	0.94***	1.00	
LC	0.24**	0.56***	0.42***	0.44***	0.45***	1.00

Note: * indicates $p < 0.05$. ** indicates $p < 0.01$. *** indicates $p < 0.001$

3.3. Specifikacije preliminar­nog modela

U analizi je korištena regresija metodom najmanjih kvadrata (OLS) prema ustaljenoj praksi opisanoj u literaturi o hedoničkom određivanju cijena. Jedan od najvećih opisanih problema hedoničkog određivanja cijena je identifikacija prikladnog funkcionalnog oblika regresijskog modela. Teorijsko objašnjenje hedoničkog određivanja cijena vrlo je jednostavno – cijena je zbir cijena značajki hotela/sobe. Međutim, kako su značajke mnogobrojne, neke se mogu previdjeti. Stoga je pitanje izbora adekvatnog oblika od iznimne važnosti. S obzirom na ograničenja hedoničkog cjenovnog modela, Cropper *et al.* (1988) dokazali su da jednostavni oblici (linearni, *semi-log*, i *double-log*) obično daju najbolje rezultate. Međutim, znanstvenici se ne slažu oko izbora između ovih modela. Većina cijeni log-linearni model (npr. Lati-

3.3. Preliminary model specifications

According to the common practice in hedonic pricing literature, OLS (Ordinary Least Square) regression was used for this analysis. One of the major problems in hedonic pricing literature is finding the appropriate functional form for the regression model. The reasoning behind the hedonic pricing is quite simple – price is the sum of the prices for hotel/room characteristics. Still, there are numerous characteristics, and scholars can omit some of them. The question of choosing the right form, therefore, becomes crucial. Considering the limitations of the hedonic pricing model, Cropper *et al.* (1988) proved that simple forms (linear, semi-log, and double-log) usually perform the best. However, when choosing between these models, scholars seem to disagree. Most of them estimate log-lin (e.g. Latinopoulos, 2018; Zhang *et*

nopoulos, 2018; Zhang *et al.*, 2011), dok neki još uvijek biraju lin-lin modele (npr. Solano-Sánchez *et al.*, 2021) ili funkcionalni model (npr. Agmapisarn, 2014). Model log-lin daje najbolje rezultate u većini studija, ali znanstvenici obično provode nekoliko testova uspoređivanja modela te donose odluke temeljene na tim podacima (Yim *et al.*, 2014).

Slijedom uvjerenja da nema jedinstvenog oblika koji daje najbolje rezultate u bilo kojem slučaju i na bilo kojem skupu podataka (Fleischer, 2012), izdvojena su četiri različita najčešća regresijska oblika u literaturi o hedoničkom određivanju cijena. Ti modeli su:

$$P = f(\text{DNE}, \text{DMO}, \text{DOTH}, \text{STTHREE}, \text{STFOUR}, \text{STFIVE}, \text{FCYES}, \text{SSYES}, \text{SF}, \text{FS}, \text{CF}, \text{CL}, \text{LC})$$

(Lin-lin model) (1)

$$LP = f(\text{DNE}, \text{DMO}, \text{DOTH}, \text{STTHREE}, \text{STFOUR}, \text{STFIVE}, \text{FCYES}, \text{SSYES}, \text{SF}, \text{FS}, \text{CF}, \text{CL}, \text{LC})$$

(Log-lin model) (2)

$$LP = f(\text{DNE}, \text{DMO}, \text{DOTH}, \text{STTHREE}, \text{STFOUR}, \text{STFIVE}, \text{FCYES}, \text{SSYES}, \text{ISF}, \text{IFS}, \text{ICF}, \text{ICL}, \text{ILC})$$

(Log-log model) (3)

$$P = f(\text{DNE}, \text{DMO}, \text{DOTH}, \text{STTHREE}, \text{STFOUR}, \text{STFIVE}, \text{FCYES}, \text{SSYES}, \text{ISF}, \text{IFS}, \text{ICF}, \text{ICL}, \text{ILC})$$

(Model Lin-log) (4)

Nakon što je odabran prvo lin-lin model, regresijska dijagnostika pokazala je da pretpostavka linearnosti nije ispunjena. Zbog toga je provedena regresijska analiza Box-Cox prema standardnom postupku opisanom u literaturi o hedoničkom određivanju cijena (Cameron i Trivedi, 2010; Fleischer, 2012; Yim *et al.*, 2014). Vrijednosti od θ bliže 0 ukazuju na prikladnost logaritmičke transformacije zavisne varijable, dok se linearni model pokazao pogodniji za vrijednosti bliže 1. Ovo je istraživanje utvrdilo da je vrijednost θ bliža 0, tj. 0,348, što je uputilo na potrebu za logaritmičkom transformacijom zavisne varijable koja je pokazala sukladnost s većinom rezultata opisanih u literaturi o

al., 2011), while some still estimate lin-lin models (e.g. Solano-Sánchez *et al.*, 2021) or choose the log-log functional form (e.g. Agmapisarn, 2014). The log-lin form performs the best in most studies, but scholars usually conduct several tests to compare models and make decisions based on their data (Yim *et al.*, 2014).

Building on the argument that there is no unique form that performs the best in any case and on any data set (Fleischer, 2012), we specified four different, most common regression forms in hedonic pricing literature. These models are:

After the initial (lin-lin) model was specified, regression diagnostic indicated a violation of the linearity assumption. Upon noticing deviation from linearity, Box-Cox regression was performed following a standard procedure in hedonic pricing literature (Cameron and Trivedi, 2010; Fleischer, 2012; Yim *et al.*, 2014). Values of θ closer to 0 indicate the appropriateness of the logarithmic transformation of the dependent variable, while values closer to 1 favor the linear model. In this study, θ value is 0.348, which is closer to 0, indicating the need for logarithmic transformation of the dependent variable, which is in accordance with the majority of hedonic pricing literature (Wooldridge, 2015).

hedoničkom određivanju cijena (Wooldridge, 2015).

Začetnici istraživanja hedoničkog cjenovnog modela i ekonometričari preferiraju modele s algoritamskom transformacijom zavisne varijable log-lin modela jer pojačavaju eksplanatornu snagu modela (Rosen, 1974; Wooldridge, 2015). To znači da log-lin model učinkovitije obuhvaća učinak značajki proizvoda na njegovu cijenu, što također vrijedi i za ovaj sektor prema praksi i argumentaciji istraživanja (Schamel, 2012; Soler *et al.*, 2019). Jedna od prednosti ovog oblika modela u usporedbi s drugim modelima je da pomaže tumačenje. Na primjer, koeficijent u modelu se tumači kao očekivana postotna promjena zavisne varijable po jedinici promjene nezavisne varijable, što odgovara tipu eksplanatornih varijabli hedoničkih cjenovnih modela u ugostiteljstvu. K tomu, usmjeravanje multiplikativnog učinka značajki proizvoda (hotela) na cijenu također daje prednost dodjeljivanju ovog modela (Malpezzi, 2003). Nadalje, Wooldridge (2015) smatra da ova transformacija može riješiti probleme heteroskedastičnosti koji su opaženi u netransformiranim modelima. Stoga je zaključeno na temelju tumačenja iz literature i rezultata provedenog testiranja da je log-linearni model u ovom slučaju najprikladniji. Drugi veliki problem koji se pojavio nakon što su provedene prikladne transformacije bila je multikolinearnost koja je dijagnosticirana uporabom faktora varijacije inflacije (VIF) i nakon ispitivanja koeficijenata korelacije prikazanih u korelacijskoj matrici (Table 4). Problematične varijable bile su udobnost (U) i čistoća (ČS), s time da su oba faktora varijacije inflacije (VIF) bila iznad granične vrijednosti 10 (Bowerman i O'Connell, 1990), tj. 13,92 i 10,09. Korelacijska matrica otkrila je dva vrlo visoka koeficijenta (iznad 0,9). Prethodna istraživanja dokazala su visoke korelacije ovih varijabli s drugim ocjenama zadovoljstva gostiju, što je podiglo faktore varijacije (VIF) u početnim modelima (Castro i Ferreira, 2018).

The pioneering scholars in hedonic pricing modelling and econometricians favor models with a logarithmic transformation of a dependent variable (log-lin models) because they improve the explanatory power of the model (Rosen, 1974; Wooldridge, 2015). This means that the log-lin model better captures the effect of product characteristics on its price, which, according to the practice and argumentation in the research in the hospitality industry, holds in this specific sector as well (Schamel, 2012; Soler *et al.*, 2019). One of the advantages of this model form, compared to other models, is that it aids interpretation. For example, the coefficient in the model is interpreted as the expected percentual change in the dependent variable for a one-unit change in the independent variable, which is appropriate for the type of explanatory variables in hedonic pricing models in the hospitality industry. Additionally, addressing the multiplicative effect of product (hotel) characteristics on price gives an advantage to this model specification, too (Malpezzi, 2003). Furthermore, Wooldridge (2015) believes that this transformation can help solve heteroscedasticity problems observed in a non-transformed model. Therefore, based on the explanations in the literature and the results of our test, we concluded that the log-lin form is the most appropriate for our model. Another major problem, even after appropriate transformations were performed, was multicollinearity. It was diagnosed using the Variance Inflation Factor (VIF) and by looking at correlation coefficients shown in the correlation matrix (Table 4). The problematic variables were Comfort (CF) and CL (Cleanliness), with VIF of 13.92 and 10.09, both above the VIF threshold of 10 (Bowerman and O'Connell, 1990). The correlation matrix revealed two very high coefficients (above 0.9). Previous research proved the high correlation of these variables with other guest satisfaction ratings, leading to them having high VIF in initial models (Castro and Ferreira, 2018).

Postoji nekoliko načina rješavanja problema multikolinearnosti. Budući da transformacije varijabli nisu mogle riješiti problem, slijedom standardnog postupka za obradu multikolinearnosti u modelima hedoničkog određivanja cijena (npr. Belcher i Chisholm, 2018; Castro i Ferreira, 2018), izostavljena je varijabla s najvišim faktorom varijacije inflacije (VIF). To znači da varijabla ugodnosti nije uključena u model, što nije neuobičajeno u modelima hedoničkog određivanja cijena, kao što je već navedeno za eksploratorne varijable koje izazivaju probleme multikolinearnosti. Treba napomenuti da multikolinearnost nije rijetka u analizama ocjenjivanja gostiju. Castro i Ferreira (2018) navode da je mogući razlog tzv. *halo effect* (Borges *et al.*, 2015) ili jednostavno generalizacija doživljaja koji se nalaze u hotelskim evaluacijama. Nakon izbacivanja udobnosti (U), faktor varijacije inflacije (VIF) bio je ispod 10 s tolerancijom iznad 0,1 (Field, 2013), a niti jedan koeficijent korelacije iznad 0,9 nije ostao u korelacijskoj matrici.

Testiranjem modela na prisutnost potencijalnih netipičnih vrijednosti korištenjem standardnog postupka, one su utvrđene izračunom studentiziranih ostataka, Cookove udaljenosti i pomaka. Potvrđeno je pet netipičnih vrijednosti korištenjem općeprihvaćenih granica (Cookova udaljenost iznad $4/N$, apsolutni pomak iznad $2\sqrt{k/n}$, najviše 1% opažanja sa studentiziranim rezidualima iznad apsolutnog tri i ne više od 5% opažanja sa studentiziranim rezidualima iznad apsolutnog dva). Za obradu potencijalnih netipičnih vrijednosti, uključene su u regresijski model kao dummy varijable (označene ID). Za razliku od izbacivanja primjedbi koje su bile utvrđene kao netipične vrijednosti, ovim postupkom ublažava se potencijalno odstupanje zbog njihovog prisustva uz zadržavanje ostalih informacija dobivenih od netipičnih vrijednosti i uvažavanje njihovog utjecaja. U modelu u kojem su varijable bile tretirane kao netipične vrijednosti, regresijski koeficijenti nisu pokazivali nikakve zna-

There are several ways a researcher can deal with multicollinearity. Since variable transformations could not solve the problem, following a standard procedure for dealing with multicollinearity in hedonic pricing models (e.g. Belcher and Chisholm, 2018; Castro and Ferreira, 2018), we dropped the variable with the highest VIF. This means that variable comfort was excluded from the model, which, as mentioned above, is not uncommon for explanatory variables in hedonic pricing models that cause multicollinearity problems. It is worth mentioning that multicollinearity is not rare in studies with guest ratings. Castro and Ferreira (2018) note that the reason can be the halo effect (Borges *et al.*, 2015) or simply the generalization of experience present in hotel evaluations. After Comfort (CF) was dropped, all remaining variables had VIF below 10, tolerance above 0.1 (Field, 2013), and no correlation coefficients above 0.9 remained in the correlation matrix.

Later, we checked the model for the presence of potential outliers. Outliers were detected using a standard procedure by calculating studentized residuals, Cook's distance, and drifts. We identified five outliers using widely accepted thresholds (Cook's distance above $4/N$, absolute drifts above $2\sqrt{k/n}$, no more than 1% observations with studentized residuals above absolute three and no more than 5% observations with studentized residuals above absolute two). To treat potential outliers, we included them as dummy variables (marked as IDs) in our regression model. Unlike dropping observations identified as outliers, this treatment helps mitigate the potential bias caused by their presence while remaining information obtained by outliers and acknowledging their influence. In the model with dummy variables treated as outliers, regression coefficients did not exhibit any significant change, meaning that p values did not change in a way that would lead to a different conclusion.

čajne promjene, što znači da se vrijednosti p nisu promijenile tako da bi navele na drugačiji zaključak.

Osim toga, model sa specifikacijom log-lin dokazao je bolju prikladnost od modela log-log od samog početka. Zaključno, slijedeći preporuke iz literature i nakon ispunjavanja svih pretpostavki višestruke regresijske analize prema R^2 , Akaikeovom informacijskom kriteriju (AIC) i Bayesovom informacijskom kriteriju (BIC), čini se da log-lin model (Model 3) najbolje odgovara te je stoga i uvršten u studiju. Tablica 6 prikazuje usporedbu regresijskih modela.

Furthermore, the model with log-lin specification proved to be a better fit from the start than the log-log model. To conclude, following recommendations from the literature and after meeting all assumptions of multiple regression, following R^2 , Akaike Information Criterion (AIC), and Bayesian Information Criterion (BIC), the log-lin model (Model 3) seems to fit the data best and is therefore reported. Table 6 provides a comparison of regression models.

Tablica 6: Usporedba regresijskih modela

Varijable	Model 1 (Log-Lin)	Model 2 (Log-log)	Model 3 (Log-Lin)	Model 4 (Log-Log)
DNE	0,02	0,02	0,01	0,00
DMO	0,18*	-0,18*	-0,19**	-0,19**
DOTH	-0,24***	-0,24***	-0,24***	-0,24***
STTHRE	0,10	0,10	0,07	0,07
STFOUR	0,33***	0,33***	0,28***	0,28***
STFIVE	0,70***	0,69***	0,64***	0,64***
FCYES	0,02	-0,02	-0,03	-0,03
SSYES	0,11*	0,11*	0,12**	0,11**
SF	-0,10		-0,14	
FS	0,13		0,12	
CL	-0,06		-0,03	
LC	0,16**		0,15***	
ID7			-0,68**	-0,69**
ID32			-0,75**	-0,76**
ID46			-0,47*	-0,47*
ID105			0,61**	0,62**
ID112			-0,75**	-0,75**
ISF		-0,91		-1,27
IFS		1,12		1,05
ICL		-0,56		-0,22
ILC		1,40**		1,31**
cons.	3,67***	2,53*	3,91***	2,98**
N	146	146	146	146
R^2	0,5295	0,5280	0,6476	0,6470
aic	22,07	22,55	-10,12	-9,88
Bic	60,86	61,33	43,59	43,83

Bilješka: * označava $p < 0,05$. ** označava $p < 0,01$. *** označava $p < 0,001$.

ID obilježava hotele s netipičnim vrijednostima

Table 6: Comparison of regression models

Variables	Model 1 (Log-Lin)	Model 2 (Log-log)	Model 3 (Log-Lin)	Model 4 (Log-Log)
DNE	0.02	0.02	0.01	0.00
DMO	0.18*	-0.18*	-0.19**	-0.19**
DOTH	-0.24***	-0.24***	-0.24***	-0.24***
STTHRE	0.10	0.10	0.07	0.07
STFOUR	0.33***	0.33***	0.28***	0.28***
STFIVE	0.70***	0.69***	0.64***	0.64***
FCYES	0.02	-0.02	-0.03	-0.03
SSYES	0.11*	0.11*	0.12**	0.11**
SF	-0.10		-0.14	
FS	0.13		0.12	
CL	-0.06		-0.03	
LC	0.16**		0.15***	
ID7			-0.68**	-0.69**
ID32			-0.75**	-0.76**
ID46			-0.47*	-0.47*
ID105			0.61**	0.62**
ID112			-0.75**	-0.75**
ISF		-0.91		-1.27
IFS		1.12		1.05
ICL		-0.56		-0.22
ILC		1.40**		1.31**
cons.	3.67***	2.53*	3.91***	2.98**
N	146	146	146	146
R ²	0.5295	0.5280	0.6476	0.6470
aic	22.07	22.55	-10.12	-9.88
bic	60.86	61.33	43.59	43.83

Note: * indicates $p < 0.05$. ** indicates $p < 0.01$. *** indicates $p < 0.001$. IDs are marks for outlier hotels.

Formula za konačni model je sljedeća:

The formula for the final model is:

$$\begin{aligned}
 IP = & \beta_0 + \beta_1 DNE + \beta_2 DMO + \beta_3 DOTH + \beta_4 STTHREE + \beta_5 STFOUR \\
 & + \beta_6 STFIVE + \beta_7 FCYES + \beta_8 SSYES + \beta_9 SF + \beta_{10} FS + \beta_{11} CL \\
 & + \beta_{13} LC + \beta_{15} ID7 + \beta_{16} ID32 + \beta_{17} IDI46 + \beta_{18} ID105 \\
 & + \beta_{19} ID112 + \varepsilon
 \end{aligned}$$

Tablica 7 sažima rezultate hedoničkog modela određivanja cijena. Destinacija (Ostali) i destinacija (Mostar) značajne su na razinama 0,1% odnosno 1%. Koeficijenti su negativni, što znači da su cijene soba u ho-

Table 7 summarizes the results of the hedonic pricing model. Destination (Other) and Destination (Mostar) are significant at 0.1% and 1% levels, respectively. The coefficients are negative, meaning that the room rates in

telima u ostalim destinacijama i u Mostaru niže nego cijene u hotelima u Sarajevskom kantonu, uz zadržavanje ostalih stavki. Na-ročito hotel u Mostaru naplaćuje 19% manje za najjeftiniju dvokrevetnu sobu s doručkom u usporedbi s hotelom u Sarajevskom kantonu. Hoteli u ostalim destinacijama (osim u Mostaru i Neumu) naplaćuju 24% manje za istu kategoriju sobe s doručkom u usporedbi s hotelima u Sarajevskom kantonu. Kategorizacije zvjezdica (četiri) i (pet) značajne su na razini od 0,1% s pozitivnim koeficijentom, što pokazuje da su cijene soba u hotelima s četiri ili pet zvjezdica više od cijena soba u hotelima s manje od tri zvjezdice ili bez zvjezdica, uz zadržavanje ostalih stavki. Ovi rezultati **potvrđuju hipoteze H1(b) i H1(c)**. Hotel s četiri zvjezdice određuje cijenu višu od 28%, dok hotel s pet zvjezdica postavlja cijenu na 64% u usporedbi s hotelom koji ima tri zvjezdice ili ih nema, uz zadržavanje ostalih stavki. Lokacija je značajna na razini od 0,1% s pozitivnim koeficijentom, što znači da viša razina zadovoljstva s lokacijom hotela (bolja lokacija) vodi k višim cijenama hotela, uz zadržavanje ostalih stavki čime se **potvrđuje hipoteza H2(e)**. Točnije, lokacija koja je za 1 stupanj viša vodi k povišenju cijene od 15%. Oznaka održivosti (Da) značajna je na razini od 1% s pozitivnim koeficijentom, što znači da hoteli s oznakom održivosti naplaćuju više cijene za sobe u usporedbi s hotelima bez te ocjene, uz zadržavanje ostalih stavki. Ovime se **potvrđuje hipoteza H3**. Konkretno, hoteli s oznakom održivosti naplaćuju 12% više od najjeftinijih verzija dvokrevetnih soba s doručkom. Osim ovih varijabli, nekoliko dummy varijanti za netipične vrijednosti pokazuju značajan učinak na cijene soba. Ostali učinci nisu značajni, što znači da hipoteze H1(a), H2(a), H2(c), H2(d) i H4 nisu potvrđene.

hotels in other destinations and Mostar are lower than in hotels in the Sarajevo Canton, keeping all other things equal. Specifically, the hotel in Mostar charges 19% less for the cheapest version of a double room with breakfast compared to the hotel in Sarajevo Canton. Hotels in other destinations (excluding Mostar and Neum) charge 24% less for the same room with breakfast compared to hotels in Sarajevo Canton. Star rating Four and Star rating Five are significant at a 0.1% level with a positive coefficient, meaning that the room rates in hotels with four and five stars are higher than the room rates in hotels with below three stars or without stars, keeping all other things equal. These findings provide **support for H1(b) and H1(c)**. A hotel with four stars sets a 28% higher price, while a hotel with five stars sets a 64% higher price compared to a hotel with below three or without stars, keeping all other things equal. Location is significant at a 0.1% level with a positive coefficient, meaning that a higher level of satisfaction with a hotel's location (better location) leads to higher room rates, keeping all other things equal, which provides **support for our H2(e)**. To be precise, a location rating higher by 1 point leads to 15% higher prices. The Sustainability label (Yes) is significant at a 1% level, with a positive coefficient, meaning that hotels with the sustainability label charge higher prices for their rooms compared to hotels without that label, keeping all other things equal. This result **supports our H3**. Specifically, hotels with the sustainability label charge 12% more for their cheapest version of a double room with breakfast. Apart from these variables, several dummies for outliers exhibit a significant effect on the room rate. Other effects are not significant, meaning that our H1(a), H2(a), H2(c), H2(d) and H4 are not supported.

Tablica 7: Regresijski model

Nezavisne varijable	B	SE	T	P	VIF
DNE	0,01	0,09	0,07	0,945	1,22
DMO	-0,19	0,062	-3,06	0,003	1,34
DOTH	-0,24	0,05	-4,68	0,000	1,90
STTHREE	0,07	0,06	1,22	0,225	2,08
STFOUR	0,28	0,05	5,21	0,000	2,13
STFIVE	0,64	0,11	5,55	0,000	1,30
FCYES	-0,03	0,05	-0,57	0,569	1,13
SSYES	0,12	0,04	2,67	0,009	1,37
SF	-0,14	0,08	-1,76	0,081	3,75
FS	0,12	0,08	1,63	0,105	6,16
CL	-0,03	0,08	-0,34	0,736	5,69
LC	0,15	0,04	3,37	0,001	1,66
ID7	-0,68	0,23	-2,97	0,004	1,07
ID32	-0,75	0,23	-2,97	0,001	1,06
ID46	-0,47	0,24	-1,99	0,049	1,13
ID105	0,61	0,23	2,62	0,010	1,13
ID112	-0,75	0,23	-3,29	0,000	1,06

Bilješka: (P) cijena sobe je zavisna varijabla, Konstanta=3,91, $F(17, 128)=13,84$, $p<0,01$, $R^2=0,6476$, Adj. $R^2=0,6008$

Table 7: Regression model

Independent variables	B	SE	t	P	VIF
DNE	0.01	0.09	0.07	0.945	1.22
DMO	-0.19	0.062	-3.06	0.003	1.34
DOTH	-0.24	0.05	-4.68	0.000	1.90
STTHREE	0.07	0.06	1.22	0.225	2.08
STFOUR	0.28	0.05	5.21	0.000	2.13
STFIVE	0.64	0.11	5.55	0.000	1.30
FCYES	-0.03	0.05	-0.57	0.569	1.13
SSYES	0.12	0.04	2.67	0.009	1.37
SF	-0.14	0.08	-1.76	0.081	3.75
FS	0.12	0.08	1.63	0.105	6.16
CL	-0.03	0.08	-0.34	0.736	5.69
LC	0.15	0.04	3.37	0.001	1.66
ID7	-0.68	0.23	-2.97	0.004	1.07
ID32	-0.75	0.23	-2.97	0.001	1.06
ID46	-0.47	0.24	-1.99	0.049	1.13
ID105	0.61	0.23	2.62	0.010	1.13
ID112	-0.75	0.23	-3.29	0.000	1.06

Note: P (Room rate) is the dependent variable, Constant=3.91, $F(17, 128)=13.84$, $p<0.01$, $R^2=0.6476$, Adj. $R^2=0.6008$

3.4. Regresijska dijagnostika konačnog modela

U prethodnom dijelu članka opisan je postupak provedbe i obrade netipičnih vrijednosti. Stoga ovaj konačni model zadovoljava te dvije pretpostavke.

Ramseyjev RESET test za linearnost pokazao je empirijsku značajnost od 0,93, što znači da je funkcionalni oblik modela prikladan. Budući da je empirijska p vrijednost (0,68), a Breauš-Paganov test pokazao je vrijednost iznad granične vrijednosti (0,05), ne postoji dovoljno dokaza za odbijanje nulte hipoteze homoskedastičnosti ili konstantne varijance. Empirijska p vrijednost dobivena Breusch-Godfreyjevim testom (0,66) viša je od granične vrijednosti (0,05) pa tako nema dovoljno dokaza za odbijanje nulte hipoteze o nepostojanju serijske autokorelacije. Durbin-Watsonov test pokazao je da je vrijednost 2,05 zadovoljena pretpostavka izostanka serijske autokorelacije.

Testovi korišteni za procjenu mogućeg narušavanja pretpostavke normalno distribuiranih reziduala pokazali su da je pretpostavka zadovoljena. Empirijsko značenje dobiveno testom nagnutosti i spljoštenosti (0,80) i empirijsko značenje na osnovi Jarque-Beraovog testa (0,75) prelaze graničnu vrijednost te ukazuju na nedostatak dokaza za odbijanje nulte hipoteze o normalno distribuiranim rezidualima.

4. RASPRAVA

Rezerviranje smještaja putem interneta ustaljena je praksa već dugo vremena. U istraživanju odrednica cijena soba znanstvenici su usmjerili djelovanja na prikupljanje podataka s raznih mrežnih stranica za rezervacije, kao što su Booking.com (npr. Viglia *et al.*, 2016), Airbnb (npr. Magno *et al.*, 2018; Teubner *et al.*, 2017), te mrežne stranice koje nude informacije o putovanjima, uključujući Tripadvisor.com (npr. Xie *et al.*, 2016). Istraživanja o odrednicama cijena soba polučila

3.4. Regression diagnostics of the final model

In the previous part of the text, we described how we handled multicollinearity and treated outliers. So, this final model met these two assumptions.

Ramsey Reset test for linearity showed an empirical significance of 0.93, meaning that the model's functional form is appropriate. Since the empirical p-value (0.68) for Breauš Pagan's test is above the threshold value (0.05), there is not enough evidence to reject the null hypothesis of homoscedasticity or constant variance. The empirical p-value provided by the Breusch-Godfrey test (0.66) is higher than the threshold value (0.05), so there is not enough evidence to reject the null hypothesis that there is no serial autocorrelation. The value calculated by the Durbin-Watson test is 2.05, proving that the assumption of the absence of serial autocorrelation was met.

Tests used to assess if there was a violation of the assumption of normally distributed residuals proved that the assumption was met. Empirical significance obtained with the SK test (Skeness Kurtosis test) (0.80) and empirical significance obtained with the Jarque-Bera test (0.75) are both above the threshold value, indicating that there is not enough evidence to reject the null hypothesis of normally distributed residuals.

4. DISCUSSION

Online booking has been a common practice for accommodation booking for a long time. While studying determinants of room rates, scholars focused their effort on collecting data from various online booking sites, including Booking.com (e.g. Viglia *et al.*, 2016), Airbnb (e.g. Magno *et al.*, 2018; Teubner *et al.*, 2017), as well as online travel information websites such as Tripadvisor.com (e.g. Xie *et al.*, 2016). Research on the

su proturječne rezultate zbog mnogih, ali najviše zbog metodoloških razloga; npr. podaci su prikupljeni na različitim lokacijama, podaci su sakupljeni u različitim vremenskim razdobljima, geografski fokus istraživanja i ekonometrijska specifikacija modela budući da je meta analiza dokazala da hedonički cjenovni modeli nisu otporni na spomenute podatke (Kuminoff *et al.*, 2010).

Prema očekivanjima, hoteli u kategoriji četiri ili pet zvjezdica određuju više cijene soba nego hoteli s manje od tri ili bez zvjezdica. Međutim, kategorizacija od tri zvjezdice ne predstavlja veliku cjenovnu razliku, što bi moglo biti zbog percepcije gostiju da hoteli s tri zvjezdice ne mogu ponuditi ništa više od onih s manje od tri ili bez zvjezdica pa se stoga tri zvjezdice ne smatraju dovoljnim jamstvom kvalitete. Suprotno tomu, ako ova niža percepcija gostiju ne vrijedi, taj neznatajan učinak može poslužiti kao greška u određivanju od strane hotela (Adresson, 2010). Dakako, sve su to još pretpostavke koje zahtijevaju detaljnije ispitivanje.

U ovoj studiji samo jedna od četiri varijable zadovoljstva gosta – lokacija – značajno utječe na cijenu sobe. Učinak lokacije očekivan je budući da Bosna i Hercegovina oskudijeva adekvatnom turističkom infrastrukturom. Naime, ima loše ceste i brojne druge infrastrukturne probleme. Ako hotel nije smješten na dobroj lokaciji (npr., nalazi se daleko od turističkih atrakcija u tom dijelu zemlje), udaljenost može predstavljati problem za turiste koji moraju putovati oštećenim cestama i probijati se kroz prometne gužve. Varijable poput ocjena pogodnosti, osoblja i čistoće nisu se pokazale značajnima. Ti rezultati upućuju na zaključak da boravak u hotelu s boljim ocjenama u odnosu na pogodnosti, osoblje i čistoću ne zahtijeva dodatno plaćanje (Chen i Rothschild, 2010).

Budući da se hotelske usluge smatraju iskustvenim dobrima i da se određene značajke njihove kvalitete ne mogu ocijeniti prije konzumacije, elektronička usmena predaja (e-WOM) u obliku ocjene gostiju na interne-

room rate's determinants yields conflicting results due to many reasons, mostly methodological: data collected from different sites, data collected during unequal time horizons, the geographical focus of the research, as well as the econometric specification of the model since meta-analysis proved that hedonic pricing models are not robust to these specifications (Kuminoff *et al.*, 2010).

As expected, hotels with four or five-star ratings set higher room prices than hotels with less than three or no stars. However, having a three-star rating does not make a significant difference. This can be due to guests' perceptions that hotels with three stars can not offer anything more than those with less than three or no stars, therefore considering three stars as insufficient quality assurance. On the contrary, if this lower perception on the guests' side does not hold, this insignificant effect might serve as a pricing error on the hotels' side (Adresson, 2010). However, this is still a matter of speculation and requires further research.

In our study, only one of four guest satisfaction variables – location, significantly affects the room rate. The effect regarding location is expected. Bosnia and Herzegovina lacks adequate tourist infrastructure; it has poor roads and numerous other infrastructural issues. If a hotel is not in a good location (e.g., it is far away from tourist attractions in that part of the country), the distance can pose a problem for tourists who have to travel on damaged roads and often encounter traffic congestion. Insignificant variables include facilities, staff, and cleanliness ratings. These findings indicate that staying in a hotel with better facilities, staff, and cleanliness ratings doesn't require an extra payment (Chen and Rothschild, 2010).

Since hotel services are experiential goods and particular aspects of their quality cannot be assessed before consumption, e-WOM in the form of online guest rating can be helpful to reduce information asymmetry (Manes and Tchetchik, 2018), mean-

tu može pridonijeti smanjenju informacijske asimetrije (Manes i Tchetchik, 2018). Time bi potencijalni gosti mogli znati što mogu očekivati i mogu donijeti informiranije odluke o kupnji. S obzirom na elektroničku usmenu predaju (e-WOM), postoji nekoliko mogućih objašnjenja za nisku značajnost učinka ocjena pogodnosti, osoblja i čistoće na cijene. Prvo, čini se da neki aspekti kvalitete usluge omogućavaju osnovne usluge i percipirani su kao zadani, što znači da menadžeri i gosti ne misle da ti aspekti obogaćuju doživljaj i uvećavaju vrijednost (vidi Wirtz i Lovelock, 2021). Čistoća može biti očekivani element ponude, što je u skladu s prethodnim istraživanjima (Zhang *et al.*, 2011).

Rezultati koji se odnose na beznačajan učinak ocjene osoblja na cijene soba su neložični, ali su u skladu s prethodnim studijama (Thrane, 2007; Zhang *et al.*, 2011). Najveće iznenađenje je beznačajan učinak ocjena pogodnosti hotela na cijene soba. Prethodna istraživanja pokazala su da su gosti voljni platiti više cijene za bolje pogodnosti i ljubaznije osoblje (npr. Castro i Ferreira, 2018; Goldberg *et al.*, 1984).

Uvjeti nepotpunih informacija o potražnji ili ponudi koji su imanentni tržištima mogli bi objasniti razlike od prethodnih istraživanja. Ako se pretpostavi da je na strani ponude uočena nepotpuna informacija, menadžerima hotela bi mogla nedostajati mogućnost prilagodbe cijena na više i to bi prouzročilo određivanje cijena prema manje učinkovitim metodama od onih koje se temelje na preferencijama potrošača (Kotler i Armstrong, 2010). Nasuprot tomu, postoji mogućnost da internetsko ocjenjivanje gostiju ne pomogne učinkovito potencijalnim gostima u dobivanju pouzdanih informacija o kvaliteti hotela. Andersson (2010) tvrdi da nepotpune informacije ne sprječavaju provođenje hedoničke regresije i oslanjanje na njezine rezultate. Ipak, neznačajni koeficijenti se onda vjerojatno interpretiraju kao greške hotela u određivanju cijena ili kao nerealistična očekivanja gostiju. Međutim, treba

ing that potential guests know what they can expect and make more informed purchase decisions. With the potential of e-WOM in mind, there are several possible explanations for the nonsignificant effects of staff, facilities, and cleanliness ratings on prices. First, some aspects of service quality seem to facilitate the core service and are perceived as required, meaning that managers and guests do not think they enhance the experience and increase value (see Wirtz and Lovelock, 2021). Cleanliness could be an expected element of the offer, which aligns with previous research (Zhang *et al.*, 2011).

Findings on the insignificant effect of staff rating on room rates are counterintuitive but in correspondence to some prior studies (Thrane, 2007; Zhang *et al.*, 2011). The most surprising finding is an insignificant effect of the facilities' rating on room rates. Previous research shows guests are willing to pay premium prices for better facilities and friendlier staff (e.g. Castro and Ferreira, 2018; Goldberg *et al.*, 1984).

Imperfect information conditions on the demand or supply side inherent to developing markets could explain deviations from previous research. If one supposes that imperfect information is observed on the supply side, hotel managers might lack the opportunity to adjust their prices upwards and end up determining their prices using less efficient pricing methods than the ones based on consumers' preferences (Kotler and Armstrong, 2010). Conversely, there is a possibility that online guest ratings do not effectively aid potential guests in acquiring reliable information about hotel quality. As Andersson (2010) stated, imperfect information does not prevent us from performing hedonic regression and relying on its results. Still, insignificant coefficients are then likely interpreted as pricing errors on the part of the hotel or unrealistic guests' expectations. However, it is worth noting that previous studies proved the greatest effect of hotel ratings and reputation on prices in the case of high uncertainty

spomenuti da su prethodne studije dokazale da je najveći učinak ocjenjivanja hotela i reputacije na cijene postojanje velike nesigurnosti i nepotpunih informacija na strani potražnje (Manes i Tchetchik, 2018; Shapiro, 1983). Slijedom te logike, vjerojatnija je nepotpuna informacija u korist hotela, iako je to još uvijek u sferi nagađanja.

Rezultati o pozitivnom učinku oznake održivosti na cijene hotela u skladu su s rezultatima iz prethodnih studija. Iako su razni znanstvenici razmatrali razne vrste oznaka održivosti, što je uglavnom bilo rezultat prikupljanja podataka iz različitih internetskih izvora, zaključili su da posjedovanje oznaka održivosti pozitivno utječe na povećanje cijena plaćanjem dodatka na cijenu (Bello *et al.*, 2022). Ovaj učinak može biti rezultatom povećanog broja međunarodnih turista koji su tijekom godina razvili čvrste preferencije u odnosu na okoliš (Kuminoff *et al.*, 2010). Povrh toga, održive djelatnosti općenito imaju veće troškove poslovanja i, stoga, podižu cijene. Posljedično tomu, nije iznenađujuće da hoteli koji provode programe održivosti postavljaju više cijene.

S obzirom na to da odnosi prema riziku određuju preferencije potrošača (Kim *et al.*, 2023), česta je praksa u ugostiteljstvu omogućavanje potencijalnim posjetiteljima otkazivanje rezervacije do određenog datuma uz potpun ili djelomičan povrat novca. Rezultati ove studije ukazuju na to da mogućnost besplatnog otkazivanja nije značajan čimbenik u formiranju većih cijena smještaja, što je u suprotnosti s rezultatima nekih prethodnih studija (Masiero *et al.*, 2015; Tong i Gunter, 2022). To može biti posljedicom nepotpunih informacija, ali to je za sada samo pretpostavka. Dok mogućnost besplatnog otkazivanja ne nameće različite cijene soba u različitim hotelima, na razini pojedinih hotela mogu se primijetiti neke nedosljednosti u cijenama soba sa ili bez mogućnosti besplatnog otkazivanja (na primjer na stranici Booking.com). Ova pojava svojstvena je za određivanje cijena za upravljanje prihodom, tj. pristup koji koriste menadžeri hotela kako

and imperfect information on the demand side (Manes and Tchetchik, 2018; Shapiro, 1983). Following that logic, imperfect information on behalf of hotels is more probable, although still a matter of speculation.

Findings on the positive effect of the sustainability label on hotel prices are consistent with the findings from previous studies. Even though different scholars considered different types of sustainability labels, mainly due to data being sourced from various sites, they have concluded that having sustainability labels positively influences prices, resulting in price premiums (Bello *et al.*, 2022). This effect may be due to the increasing number of international tourists who have developed strong environmental preferences over the years (Kuminoff *et al.*, 2010). In addition, sustainable businesses generally incur higher operating costs and, therefore, elevate their prices. Consequently, it is unsurprising that hotels implementing sustainability programs command higher rates.

Given that risk attitudes determine consumer preferences (Kim *et al.*, 2023), allowing potential visitors to cancel their reservations until a specific date with either a full or partial refund is a common practice in the hotel industry. The findings from this study indicate that having a free cancellation policy does not significantly increase the price of accommodations, which contrasts with the results of some previous studies (Masiero *et al.*, 2015; Tong and Gunter, 2022). This can be the case due to imperfect information, too, but at this point, the reason for such a result is a matter of speculation. While the free cancellation policy does not impose differences in room rates between hotels, some inconsistencies in room prices with and without the free cancellation policy can be observed at the level of individual hotels (for example, on Booking.com). This phenomenon is inherent to revenue management pricing, an approach that hotel managers utilize to offer identical rooms at different prices based on customers' willingness to pay, thus

bi ponudili istovjetne sobe po različitim cijenama na osnovu spremnosti potrošača na plaćanje da bi postupno s vremenom smanjili broj soba s popustom (Smith, 2011).

5. ZAKLJUČAK

Ovim istraživanjem, koje je provedeno u novom još neistraženom kontekstu, proširuje se literatura o utjecaju znakova kvalitete i ostalih atributa hotela na cijene. Nema jasnih empirijskih dokaza za tvrdnju da su nesignifikantni koeficijenti posljedica nepotpunih informacija u slučajevima kad se njihov značajan utjecaj teoretski očekuje. Ovi bi rezultati mogli motivirati znanstvenike na daljnja istraživanja o čimbenicima koji odlučuju o cijenama hotela u zemljama u razvoju i na pronalaženje alternativnih načina mjerenja spremnosti potrošača na plaćanje – posebice u zemljama u razvoju gdje postoji rizik iskrivljenih pretpostavki o potpunim informacijama. U suprotnom, potrebno je oprezno tumačiti rezultate hedoničkih cjenovnih regresija. Važno je spomenuti da analiziranje spremnosti na plaćanje nikad nije lagan zadatak jer pristupi balansiranih izrečenih preferencija, poput metode uvjetne procjene vrijednosti, mogu polučiti izrazitije učinke na ponašanje u zemljama u razvoju (Kahneman i Knetsch, 1992; Quah *et al.*, 2021).

Ovo istraživanje može koristiti menadžerima za prepoznavanje i uvid u moguće nedostatak strategija određivanja cijena. Espinet *et al.* (2003) preporučuju investitorima korištenje ovih informacija prilikom investiranja u nove hotele. K tomu, ti rezultati mogu biti od interesa za menadžere s obzirom na poboljšanja u smislu aktualne tržišne dinamike (Thrane, 2007). Rezultati istraživanja također mogu koristiti turistima na način da im se u buduću olakša informiranje odlučivanje o kupnji, jer rezultati pokazuju one atribute koji jamče vrhunske cijene te lokacije gdje se nude popusti (Thrane, 2007).

Ovo istraživanje ima određena ograničenja. Glavno ograničenje odnosi se na

gradually reducing the number of discounted rooms over time (Smith, 2011).

5. CONCLUSION

This research, conducted in a new, unexplored context, enriches the literature on the impact of quality signals and other hotel attributes on prices. There is no clear empirical evidence that insignificant coefficients are the result of imperfect information where significant impact is theoretically expected. These results might motivate scholars to further investigate hotel room rate determinants in developing countries and explore alternative ways of measuring consumer willingness to pay, especially in developing countries where there is a risk of distorted assumptions of perfect information. Otherwise, the results of hedonic pricing regressions must be cautiously interpreted. It is worth noting that analyzing willingness to pay is never an easy endeavor because even stated preference approaches, such as the contingent valuation method, may result in even more pronounced behavioral effects in developing countries (Kahneman and Knetsch, 1992; Quah *et al.*, 2021).

This research can help managers acknowledge and understand potential flaws in their pricing strategies. Following the recommendations of Espinet *et al.* (2003), investors can use this information when investing in new hotels. Additionally, these findings can be of interest to managers considering quality improvements with respect to the current market dynamics (Thrane, 2007). The research findings can also benefit tourists, enabling them to make more informed purchasing decisions in the future, as the results reveal which attributes warrant premium prices and where discounts are offered (Thrane, 2007).

This research comes with some limitations. The main limitation relates to the reduced generalizability of the research results

smanjenu mogućnost generalizacije rezultata istraživanja zbog ograničenog geografskog konteksta. Dakako, hedonički modeli određivanja cijena u ugostiteljstvu gotovo su uvijek limitirani. Stoga se slične studije potiču u zemljama u razvoju kako bi se prikupilo više saznanja o cijenama u tim zemljama. Kako se hedonički cjenovni modeli odnose na podatke prikupljene u određenom geografskom području, teško je uspoređivati rezultate. Primjerice, studija koja je provedena na uzorku smještaja u Dubrovniku (Hrvatska) dokazala je da su signifikantni prediktori cijena soba lokacija, udaljenost od plaže, mjesto za parkiranje i vrt/balkon (Portolan, 2012). S druge strane, istraživanje provedeno na uzorku smještajnih kapaciteta u drugom hrvatskom gradu nije pokazalo varijacije u cijenama hotela u odnosu na rečene pogodnosti (Nikolić i Čavar, 2020). I ovo dokazuje nemogućnost poopćavanja kao glavno ograničenje ovih studija.

Još jedno značajno ograničenje ovog istraživanja odnosi se na potencijalne metodološke nesavršenosti. Za razliku od mnogih studija o odrednicama cijena soba koje su usmjerene na određeni grad, ovo istraživanje analizira podatke u Federaciji Bosne i Hercegovine. Uključivanje hotela Federacije Bosne i Hercegovine u uzorak podrazumijevalo je potrebu kontroliranja potencijalnih razlika između vrlo različitih destinacija u regiji. Za rješavanje ovog problema korištena je službena kategorizacija destinacija Federalnog zavoda za statistiku BiH. Međutim, to ne znači da je ova kategorizacija obavezno obuhvatila sve faktore koji su svojstveni za destinaciju. Nadalje, moglo se razmišljati o drugim metodama za rješavanje multikolinearnosti, naročito analiza glavnih komponenti ocjena zadovoljstva gostiju. Još jedno potencijalno metodološko ograničenje moglo bi predstavljati način na koji se mogla tretirati sezonalnost u našem istraživanju. Naime, za ocjenjivanje utjecaja elektronskom usmenom predajom (e-WOM) (ocjenjivanja zadovoljstva gostiju) bilo bi dobro prikupiti longitudinalne podatke zbog nekih prednosti u us-

because of the limited geographical context. However, hedonic pricing models in the hospitality industry almost always have this limitation. Therefore, similar studies in developing countries are encouraged to gain more insights into the prices in these countries. Because hedonic pricing models rely on the data collected for a specific geographical region, it becomes interesting to compare results. For example, a study conducted on a sample of accommodations located in Dubrovnik (Croatia) proved location, distance from the beach, parking, and garden/balcony as significant predictors of room rates (Portolan, 2012). On the contrary, research conducted on a sample of accommodations from another Croatian city proved no varieties in room rates depending on these facilities (Nikolić and Čavar, 2020). Once again, this draws attention to the lack of generalizability as the main limitation of these studies.

Another important limitation of this research refers to potential methodological imperfections. Unlike most other studies on room rate determinants that are focused on a specific city, this research analyses data for the Federation of Bosnia and Herzegovina. The inclusion of hotels from the Federation of Bosnia and Herzegovina in the sample implied the need to control for potential differences between quite diverse destinations within the region. The official destination categorization from the Federal Office of Statistics was used to address this problem. However, this does not necessarily mean that the categorization captures all destination-specific factors. Furthermore, other methods to deal with multicollinearity might have been considered, especially the principal component analysis of guest satisfaction ratings. Another potential methodological limitation might be the way we treated seasonality in our research. When assessing the influence of e-WOM (guest satisfaction ratings), it would be good to collect longitudinal data since it has some advantages over cross-sectional data, main-

poredbi s prosječnim podacima, koji su prikladniji za analize slučajnih odnosa (Yang, Park i Hu, 2018) i za rješavanje problema sezonalnosti (Sanchez-Lozano *et al.*, 2021). Osim prelaska s prosječnih na longitudinalne podatke, buduća bi istraživanja mogla proširiti veličinu uzorka na druge vrste smještaja (npr. apartmane).

Također, jedno od glavnih pitanja u literaturi o hedoničkom određivanju cijena odnosi se na odlučivanje o varijablama koje bi se mogle uključiti u model. Ova studija uglavnom se fokusirala na utjecaj ocjena gostiju kao čimbenika koji ukazuju na kvalitete usluga, na cijene hotela. Međutim, nije bilo moguće uvrstiti neke važne prediktore. S obzirom na važnost i složenost teme, bilo bi korisno istražiti ostale relevantne prediktore. K tomu, treba naglasiti da na hedoničke cjenovne modele u ugostiteljstvu mogu utjecati vanjski čimbenici poput programa poticaja (Mitsis, 2024), što ukazuje na potrebu budućih istraživanja kojima bi se objasnili ti čimbenici ili bi se pak istražio njihov utjecaj.

Konačno ograničenje ovog istraživanja leži u inherentnoj nemogućnosti testiranja posebnih objašnjenja empirijskim sredstvima, koja se oslanjaju isključivo na raspravu temeljenu na postojećoj literaturi. Ipak, doprinos istraživanja nalazi se u mjerenju utjecaja atributa na cijene u novom kontekstu poklanjajući pozornost potencijalnim izazovima u primjeni modela hedoničkog određivanja cijena na tržištima zemalja u razvoju i usmjeravanju budućih istraživanja. Budući istraživači mogli bi razmotriti uporabu pristupa usporedbi u parovima za mjerenje spremnosti gostiju na plaćanje budući da je to dokazano dalo najbolje rezultate u nekim drugim područjima proučavanja u zemljama u razvoju (Quah *et al.*, 2006). Ovaj pristup mogao bi pomoći u rješavanju problema prema kojem metoda hedoničkog određivanja cijena ne može dati procjenu spremnosti plaćanja različitih segmenata turista te, stoga, nije primjenjiv način za odlučivanje o tržišnoj segmentaciji.

ly being better suited for analyzing causal relationships (Yang, Park and Hu, 2018) and addressing the problem of seasonality (Sanchez-Lozano *et al.*, 2021). Apart from shifting from cross-sectional to longitudinal data, future research could extend the sample size by considering other accommodation types (apartments, for example).

Again, one of the major issues in hedonic pricing literature refers to deciding on variables that could be included in the model. This study focused mainly on the impact of guest ratings as signaling factors of service quality on hotel prices. However, some important predictors might not have been included. Considering the importance and complexity of the topic, exploring other relevant predictors in future research studies could be beneficial. Additionally, it is worth noting that hedonic pricing models in hospitality might be affected by external factors such as subsidy schemes (Mitsis, 2024), which poses a need for future research to account for such factors or even try to explore their influence.

Finally, the limitation of this research lies in the inherent non-testability of specific explanations through empirical means, relying solely on discussion grounded in the existing literature. Nevertheless, its contribution lies in measuring the impact of attributes on prices in a new context, drawing attention to potential challenges in applying hedonic pricing models in developing markets and directing future research endeavors. Future researchers could consider the use of a paired comparison approach for measuring willingness to pay since it proved to perform best in some other study areas in developing countries (Quah *et al.*, 2006). This approach could help address the problem of the hedonic pricing method not being able to estimate the willingness to pay of different tourist segments and, therefore, not being an applicable approach preceding decisions on market segmentation.

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