

PERMANENT INVOLVEMENT OF DIGITIZATION AND MODERN TECHNOLOGY IN THE DIRECTION OF SUSTAINABLE GROWTH IN THE TOURISM AND HOTEL INDUSTRY OF SERBIA

Tamara Gajić¹ [0000-0003-3016-8368], Filip Đoković²

Abstract

In this research, we focused on researching the perception of hotel managers and directors of tourism organizations in Serbia about the impact of digitization and modern technology on sustainable business. Empirical evidence strongly supports the key role of data security and privacy in promoting sustainable business, while the impact of marketing strategies and sales and customer experience, although statistically significant, appears to be marginal. Operational efficiency does not significantly affect sustainability, indicating a more complex relationship than originally assumed. This research makes an innovative contribution to the understanding of the connection between technological adaptation and sustainable development in the tourism and hotel industry of Serbia, highlighting the specific ways in which digital technologies can maintain a sustainable business. Its significance lies in the identification of practical steps that hotel managers can take to harness the potential of technological innovation, thereby contributing not only to improving competitiveness and profitability, but also to promoting sustainability as a key element of business strategy in the tourism and hospitality sector.

Key words: *tourism and hospitality, sustainability, digitization, modern technology, Serbia.*

1. Introduction

The introduction of digital innovations and modern technologies into the Serbian tourism and hotel industry is crucial for empowering sustainable

¹ Geographical Institute "Jovan Cvijić" SASA, Belgrade 11000, Serbia; RUDN University, Moscow, Russia, tamara.gajic.1977@gmail.com

² Faculty of Organizational Studies EDUKA, Belgrade 11000, Serbia, fdjokovic@vos.edu.rs

development in this sector. The goal of this research is to examine the permanent involvement of digitization and modern technology in shaping the trajectory of sustainable development within Serbia's tourism and hotel sector. The necessity for such research arises from the recognition that the tourism and hotel industry stand at a critical juncture where traditional practices must align with contemporary demands for sustainability. Although there is increasing recognition of the role of digitization and technology, there remains a need to rigorously investigate the degree of their impact on sustainable business practices in this sector.

Existing gaps in the literature primarily lie in the depth of understanding regarding how specific aspects such as data security and privacy, marketing strategies and sales, operational efficiency, and user experience intersect with the comprehensive goal of sustainable business practices. While anecdotal evidence points to a positive relationship, empirical data supporting these claims are lacking. This research aims to offer innovation in its approach by not only analyzing the isolated impact of digitization and modern technology but also by synthesizing their effects on various dimensions of sustainability. By doing so, it seeks to provide a realistic path that can guide managers and stakeholders in the industry toward informed decision-making.

Given that tourism and hospitality are vital components of the Serbian economy, understanding how digitization and modern technology can drive sustainable growth is of utmost importance. The results of this study will not only fill existing gaps in the literature but also offer insights that can shape strategies, investments, and policies aimed at nurturing a more resilient, environmentally conscious, and economically sustainable tourism and hospitality sector in Serbia.

2. Literature review

Digitization and modern technology continually reshape the global environment, altering lifestyles, work, and communication. The digital revolution has enabled the development of innovative solutions ranging from the Internet of Things (IoT) and artificial intelligence (AI) to blockchain technology and advanced data analytics, resulting in smarter, more efficient, and interconnected societies (Peeters & Dubois, 2010; Barry et al., 2017; Ja Kim et al., 2020). These technologies have accelerated processes, increased access to information, and facilitated new forms of digital interaction. Over the past years, the time spent using applications has increased by 20%, with 27% of the global population making online purchases, and the number of Amazon Alexa users has grown by 11% (Ja Kim et al., 2020). Time spent watching YouTube videos has increased by up to 80%, while the sale of AR and VR products has surged by 94% (Ja Kim et al., 2020). Regarding tourism-specific services, demand for virtual tours has skyrocketed by up to 500%. As a result, it is clear that the development and implementation of new technologies are accelerating, and the tourism industry must adapt to stay abreast (Azariah, 2016; Guzman et al., 2018; Horváth & Szabó, 2019).

Researchers note that digitization encompasses the application of information and communication technologies (ICT) not only in communication and marketing domains but also in production, sales, customer interaction, and many other sectors (Buhalis & Amaranggana, 2015; Kounavis et al., 2012; Lam & Law, 2019). They emphasize how digital technologies have the potential to facilitate users' lives while simultaneously fueling our increasing desire for this insatiable way of life. With advancements in automation and digitization, as well as growing technical literacy among guests, many authors argue that touchpoints throughout the hospitality industry are embracing new digital trends and smart technologies to ensure a smoother and more enjoyable customer experience (Buhalis & Law, 2008; Tung & Ritchie, 2011; Car et al., 2019). It is emphasized that the introduction of digital technologies into the operational context brings significant changes for businesses.

The hotel sector is characterized by a high degree of diversity, with the presence of both extensive multinational chains and numerous independent operators (Wang et al., 2012; Jung et al., 2017). However, it also exhibits considerable concentration, where a small number of large corporations often play key roles in the industry. The industry is constantly evolving, especially in adapting to digital changes, where online price comparison services contribute to strengthening competitiveness and improving occupancy rates (Farber & Hall, 2007; Scarles, 2009; Kuo et al., 2017). In the international context, the hotel industry consists of three main segments: brands, owners, and managers. Large branded companies such as Marriott International, Hilton Worldwide, Accor, and International Hotel Group do not directly own hotels but license their brands to hotels, setting standards and guaranteeing guest uniformity and quality while providing reservation systems (Greg, 2020). Hotel owners are often investment funds that use investor funds to acquire hotel properties, while management companies manage hotels under different brands (Martins et al., 2017; Tussyadiah et al., 2018; Skoultos & Papayiannis, 2019). With the deepening of digitization across all segments of society, these companies face challenges in forming and implementing their information strategies. Digital technologies offer opportunities for efficient compression and storage of large amounts of information on compact devices and rapid data transfer (Choi et al., 2018; Lam & Law, 2019; Islam et al., 2020).

A significant shift has occurred in the mobile payment segment, which has tripled compared to desktop payments in the last two years, and this development will continue unabated (Wirtz et al., 2018; Yung & Khoo-Lattimore, 2019; Greg, 2020). Ninety-seven percent of hotel guests use social media to share photos while traveling, and 40% of millennials (who are becoming a key demographic) make hotel booking decisions based on photos from social media. In the contemporary world, digitization and technological development are constantly changing, providing a wide range of opportunities for action in various sectors, including hospitality and tourism (Tung & Ritchie, 2011; Guzman et al., 2018; Gu, Y. et al., 2021). The main challenge lies in identifying technologies that can have a significant

impact on improving guest experiences, increasing productivity and business efficiency, compared to those that are additive and can increase costs without significant contributions (Scarles, 2009; Guzman et al., 2018; Islam et al., 2020). Prioritizing key technological investments requires an understanding of what is essential for a particular organization, industry, or even country (Wang et al., 2012; Buhalis & Amaranggana, 2015). The foundation for digital innovations in hospitality often includes the integration of artificial intelligence, covering a wide range of applications from machine learning to expert systems, with hyperconnectivity enabling advanced communication and transaction platforms, and spatial computing offering revolutionary ways of interacting with users through virtual and augmented reality, all supported by security and transparency through blockchain technology and cryptocurrencies (Peeters & Dubois, 2010; Guzman et al., 2018; Skoultos & Papayiannis, 2019). In the hospitality and tourism sector, digitization permeates through various aspects of business, from operational functions, revenue management, sales, and marketing strategies to guest-focused technologies (Farber & Hall, 2007; Azariah, 2016; Car et al., 2019). Guests most often have their first encounter with digitization through technologies such as digital check-in or electronic locks, which are directly visible and of great importance to their experience (Barry et al., 2017; Choi et al., 2018; Ja Kim et al., 2020). On the other hand, hotel management and tourism facilities often show greater interest in the first three spheres that are crucial for improving efficiency and operational excellence (Buhalis & Law, 2008; Martins et al., 2017; Tussyadiah et al., 2018). Most hotels have already adopted digital tools in financial management and sales and marketing, but significant opportunities for optimization still exist in the use of business intelligence and analytics (Kuo et al., 2017; Jung et al., 2017; Horváth & Szabó, 2019). In the context of tourism, the most prominent contribution of digitization lies in empowering direct sales channels, which encompass strategies to improve market positioning, efficient reputation management, coherent pricing policies, and proactive communication via online platforms (Tung & Ritchie, 2011; Lam & Law, 2019; Greg, 2020). This integration of digital solutions enables better resource utilization, personalized guest approaches, and the creation of a stronger bond between hotels and tourist destinations with end-users (Wang et al., 2012; Barry et al., 2017; Yung & Khoo-Lattimore, 2019).

In today's Serbian tourism and hotel industry, data security and privacy are critical considerations. With the growing digitization of operations and reliance on data-driven decision-making processes, businesses in this sector are increasingly concerned about the security of sensitive information. In this context, implementing robust data security measures and ensuring privacy not only reduces the risk of data breaches, but also helps to build trust among stakeholders. Furthermore, prioritizing data security and privacy aligns with the principles of sustainable development, which can foster a culture of responsibility and accountability within the industry, positively influencing sustainable business practices (Gajić et al., 2023).

H1: Data security and privacy positively affect sustainable business practices.

Marketing strategies and sales tactics have a significant impact on consumer behavior and perceptions in the Serbian tourism and hotel industry. In a competitive market where differentiation is critical, businesses frequently rely on innovative marketing strategies and effective sales techniques to attract and retain customers (Kounavis et al., 2012; Guzman et al., 2018; Islam et al., 2020). Furthermore, as sustainability becomes more important in consumer decision-making, aligning marketing efforts with sustainable practices has significant implications. Businesses that communicate sustainability initiatives and promote eco-friendly offerings can not only improve their brand reputation but also shift consumer preferences toward more sustainable options (Farber & Hall, 2007; Azariah, 2016; Tussyadiah et al., 2018). Thus, implementing strategic marketing and sales initiatives can help to foster sustainable business practices in the industry.

H2: Marketing strategies and sales positively affect sustainable business practices.

Operational efficiency is critical to the long-term development of Serbia's tourism and hotel industries (Gajić et al., 2023). Efficient resource utilization, waste reduction, and streamlined operations not only increase cost effectiveness, but also reduce environmental impact. Businesses can improve their bottom line while also lowering their environmental footprint by optimizing processes and implementing sustainable practices in their day-to-day operations (Kounavis et al., 2012; Buhalis & Amaranggana, 2015; Lam & Law, 2019). Furthermore, operational efficiency promotes resilience and adaptability, allowing businesses to navigate challenges while maintaining sustainability goals. As a result, investing in measures to improve operational efficiency holds promise for promoting sustainable business practices in the industry (Buhalis & Law, 2008; Tung & Ritchie, 2011; Car et al., 2019).

H3: Operational efficiency positively affects sustainable business practices.

The user experience is critical in shaping consumer perceptions and loyalty in Serbia's tourism and hotel industries. Every interaction, from the initial booking to the post-stay experience, has an impact on overall satisfaction and the likelihood of repeat business (Wang et al., 2012; Jung et al., 2017). Furthermore, as consumers become more aware of sustainability, their expectations for environmentally friendly practices and ethical considerations have increased (Martins et al., 2017; Skoultzos & Papayiannis, 2019). Businesses that prioritize a positive user experience, as evidenced by sustainability initiatives and personalized service, are better positioned to cultivate customer loyalty and encourage repeat visits (Choi et al., 2018; Lam & Law, 2019; Islam et al., 2020). As a result, investing in improving the user experience can act as a catalyst for promoting sustainable business practices in the industry (Wirtz et al., 2018; Yung & Khoo-Lattimore, 2019; Gu, Y. et al., 2021).

H4: User experience positively affects sustainable business practices.

3. Methodology

3.1 Data collection and questionnaire construction

This study surveyed 104 managers of all levels in hotels and tourism organizations in various cities, including Belgrade, Novi Sad, Vrnjačka Banja, Zlatibor, Kopaonik and Divčibare. Data collection took place through direct sampling from November 2023 to April 2024. Data was collected through a structured questionnaire that consisted of items related to five factors: operational efficiency, customer experience, marketing and sales strategies, data security and privacy, and sustainable business. Each factor contained specific questions aimed at assessing different aspects of digitization and modern technology in the hospitality and tourism industry.

3.2 Data analysis

The collected data were subjected to a thorough analysis using the SPSS (Statistical Package for the Social Sciences) and Smart PLS (Partial Least Squares) programs. Descriptive statistics determined basic descriptive values such as arithmetic mean and standard deviation, as well as Cronbach's alpha for each item and factor. The Smart PLS software enabled the application of various statistical techniques to assess the validity and reliability of the measurement model, as well as to test the proposed hypotheses. To ensure the validity of the measurement model, several analyzes were conducted, including the Kaiser-Meier-Olkin (KMO) measure and Bartlett's test of sphericity (Savalei, 2012). Factor analysis was used to examine the underlying structure of the data, while discriminant validity and convergent validity were assessed via the heterotrait-monoline ratio (HTMT), variance inflation factor (VIF) and standardized root mean square residual (SRMR) (McDonald & Ho, 2002). The analysis used values that included rho_A to assess the reliability of the measurement and Composite Reliability (CR) to assess the internal consistency of the measurement (Kenny & McCoach, 2003). Also, Average Variance Extracted (AVE) values were used to assess convergent validity, i.e. to what extent construct variances exceed measurement error variances (Browne & Cudek, 1992). Heterotrait-Monotrait Ratio (HTMT) values were used to assess the discriminant validity between factors (Kline, 2016). The significance of the effect of each factor was determined using the original sample (O), sample mean (M), standard deviation (STDEV), T statistic ($|O/STDEV|$) and P value (Xia & Yang, 2018). Bootstrap resampling techniques were applied to assess the robustness of the findings (Bentler & Juan, 2011).

4. Results

Table 1 summarizes the findings and presents the mean scores (m), standard deviations (sd), and Cronbach's alpha (α) values across five key dimensions: Operational efficiency, User experience, Marketing strategies and Sales, Data security and privacy, and Sustainable business.

Table 1: Descriptive values of items

Factors (α - 0.824)	Items	m	sd	α
Operational efficiency	Digitization enables the automation of routine tasks, thus freeing up resources to focus on more strategic aspects of the business.	2.32	1.222	0.823
	The implementation of integrated management systems (such as ERP systems) significantly improves coordination between different departments.	2.41	1.433	0.827
	The use of cloud technologies enables more flexible access to data and applications, thereby improving the mobility and availability of information for employees	2.70	1.492	0.802
User experience	Online reservations and digital check-in/check-out services significantly improve the customer experience, reducing waiting times and increasing guest satisfaction.	2.22	1.306	0.841
	The personalization of services through the analysis of guest data contributes to greater customer satisfaction and loyalty.	3.15	1.405	0.813
	The use of mobile applications to provide information, services and interaction with guests enhances the overall experience of staying in a hotel or participating in tourism activities	2.57	1.268	0.821
Marketing strategies and sales	Digitization enables more effective targeting of potential guests through the use of digital marketing and social networks.	3.49	1.137	0.871
	Analytics and data processing provide deeper insights into customer behavior and preferences, enabling the development of customized offers.	4.01	1.434	0.810
	E-commerce platforms and online sales channels are becoming key to generating revenue, offering guests easier shopping and booking of services.	3.35	1.243	0.861
Data security and privacy	Implementing advanced cyber security solutions is critical to protecting sensitive guest data and business information.	2.81	2.388	0.838
	Proper use of data privacy technologies helps to comply with legal regulations and strengthens customer trust.	2.59	2.065	0.790

Factors (α - 0.824)	Items	m	sd	α
	Educating employees on best practices for data management and protection is becoming necessary in a digitally oriented business environment.	2.92	2.175	0.719
Sustainable business	Digitization enables optimization of resource use and reduction of waste through more precise management of supplies and energy consumption, contributing to the reduction of the environmental footprint of a hotel or tourist organization.	3.02	2.057	0.748
	The implementation of digital tools for energy management and building automation leads to significant savings in energy consumption, which directly contributes to the goals of sustainable development.	2.77	2.167	0.798
	Using digital platforms to promote environmentally responsible practices among guests and clients not only raises environmental awareness, but also encourages active participation in sustainable initiatives	2.90	2.288	0.739

Operational efficiency emerges as a critical benefit of digitization, with automation, integrated management systems, and cloud technologies significantly enhancing coordination, flexibility, and strategic resource allocation. The mean scores for these aspects range from 2.32 to 2.70, indicating positive perceptions among respondents. The reliability of these measures is substantiated by Cronbach's alpha values close to the threshold of 0.824, reflecting the consistency of responses.

In the realm of user experience, digital innovations such as online reservations, service personalization, and mobile applications are shown to drastically improve customer satisfaction and loyalty. With mean scores varying from 2.22 to 3.15, the highest impact is attributed to service personalization ($m=3.15$), suggesting its pivotal role in fostering customer engagement. The alpha values in this category hover around 0.825 on average, underscoring the reliability of the data collected. Marketing strategies and sales benefit significantly from digitization through targeted advertising, advanced analytics, and e-commerce platforms. The findings indicate that leveraging digital marketing and data analytics can lead to a deeper understanding of customer preferences and behaviors, with mean scores ranging from 3.35 to 4.01. The highest score (4.01) associated with analytics highlights the strategic advantage of data-driven decision-making in marketing, corroborated by an average alpha of approximately 0.847. Data security and privacy are underscored as paramount, with advanced cybersecurity solutions, data privacy technologies, and employee education on data protection being vital. Despite the critical importance, this dimension exhibits a broader range of standard

deviations, indicating varied responses which may reflect the complexity of implementing effective data security measures. The mean scores span from 2.59 to 2.92, with an average alpha value of 0.782, suggesting reasonable reliability amidst the diversity of responses. Sustainable business practices are significantly propelled by digitization, enabling resource optimization, energy savings, and the promotion of environmental responsibility. Mean scores in this domain range from 2.77 to 3.02, with digital tools for energy management evidencing a direct contribution to sustainability. The alpha values average around 0.761, reflecting a solid reliability level, albeit indicating room for improvement in measuring these aspects.

Data analysis showed a high degree of fit with a KMO measure of 0.842 and a significant Bartlett test result with a value of approximately 1238.599 ($p < .001$). These results indicate that the data are suitable for factor analysis, which implies that extracting factors to understand underlying patterns or constructs among variables is statistically justified.

Table 2 shows the results of the factor analysis, indicating how much of the variance in the data set is accounted for by each component. Operational efficiency appears as the most significant factor, with an initial eigenvalue of 7.907, explaining 37.650% of the variance and retaining this percentage after extraction. This component alone accounts for more than a third of the variance, highlighting its dominant role in the data set. User experience follows with an initial eigenvalue of 2.681, contributing 12.764% of the variance, accumulating to 50.414% when combined with operational efficiency. Marketing strategies and sales, data security and privacy, and sustainable business are the next factors, with eigenvalues of 1.462, 1.217, and 1.990, respectively. These factors cumulatively explain 67.888% of the variance by the time they are all accounted for, each incrementally contributing to understanding the data set.

Table 2: Results of factor analysis with promax rotation

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
Operational efficiency	7.907	37.650	37.650	7.907	37.650	37.650	6.340
User experience	2.681	12.764	50.414	2.681	12.764	50.414	4.709
Marketing strategies and sales	1.462	6.963	57.378	1.462	6.963	57.378	3.612
Data security and privacy	1.217	5.794	63.172	1.217	5.794	63.172	3.149
Sustainable business	1.990	4.716	67.888	1.990	4.716	67.888	4.817

Table 3 shows the reliability and construct validity. It shows the values related to the reliability of the measurement: Cronbach's alpha, rho_A and

Composite Reliability - CR, as well as the value related to the validity of the measurement: Average Variance Extracted - AVE. The analysis reveals that all factors—Operational Efficiency (Cronbach's Alpha: 0.753, rho_A: 0.789, CR: 0.777, AVE: 0.615), User Experience (0.758, 0.814, 0.799, 0.682), Marketing Strategies and Sales (0.818, 0.704, 0.829, 0.622), Data security and privacy (0.897, 0.788, 0.936, 0.629), and Sustainable business (0.771, 0.899, 0.811, 0.690)—exceed the recommended thresholds for reliability and validity metrics. This underscores their robust reliability and strong convergent validity, with Data security and privacy and Sustainable business highlighting the highest internal consistency and convergent validity, respectively, validating the measurement model's effectiveness.

Table 3: Construct reliability and validity

Factors	Cronbach's Alpha (>0.6)	rho_A (>0.7)	CR (>0.7)	AVE (>0.5)
Operational efficiency	0.753	0.789	0.777	0.615
User experience	0.758	0.814	0.799	0.682
Marketing strategies and sales	0.818	0.704	0.829	0.622
Data security and privacy	0.897	0.788	0.936	0.629
Sustainable business	0.771	0.899	0.811	0.690

The Heterotrait-Monotrait Ratio (HTMT) Table 4 presents the discriminant validity between pairs of constructs by comparing the ratio of the between-traits correlations to the within-trait correlations. For discriminant validity, HTMT values should be well below 0.85 or, more conservatively, below 0.90, according to different academic sources. Data security and privacy shows HTMT values with other constructs ranging from 0.590 (Operational efficiency) to 0.768 (Sustainable business), indicating distinct constructs since all values are below the conservative threshold of 0.90. Marketing strategies and sales has HTMT values ranging from 0.419 (Sustainable Business) to 0.790 (User Experience), suggesting clear discriminant validity from other constructs, especially notable in its low correlation with Sustainable business. Operational efficiency's HTMT values with other constructs vary from 0.433 (Sustainable business) to 0.613 (Marketing strategies and sales), again indicating good discriminant validity as all values fall below the threshold. Sustainable business displays HTMT values from 0.419 (Marketing strategies and sales) to 0.768 (Data security and privacy), demonstrating discriminant validity across the board with particularly low correlation to Marketing strategies and sales. User experience has HTMT values ranging from 0.533 (Operational efficiency) to 0.790 (Marketing strategies and sales), showing distinctiveness from other constructs, particularly from Operational efficiency.

Table 4: Heterotrait Monotrait Ratio (HTMT)

	Data security and privacy	Marketing strategies and sales	Operational efficiency	Sustainable business	User experience
Data security and privacy					
Marketing strategies and sales	0.677				
Operational efficiency	0.590	0.613			
Sustainable business	0.768	0.419	0.433		
User experience	0.652	0.790	0.533	0.688	

Table 5 provides collinearity statistics, specifically the Variance Inflation Factor (VIF). The VIF measures the extent of multicollinearity among predictor variables in a regression analysis. High VIF values indicate that predictors are highly correlated with each other, which can lead to unreliable estimates of the regression coefficients. Therefore, low VIF values are desirable as they indicate minimal multicollinearity and more stable regression coefficients. The collinearity statistics in Table 5, indicated by the variance inflation factor (VIF), show that all items within the factor—data security and privacy, marketing strategies and sales, operational efficiency, sustainable business, and customer experience—have VIF values well below the threshold of 3.3. This shows that there is no significant collinearity among the items, thereby ensuring the statistical reliability of the model and confirming the construct validity for further analysis.

Table 5: Collinearity statistics (variance inflation factor—VIF).

Factors	Items	Variance Inflation Factor—VIF (VIF < 3.3)
Data security and privacy	DSP1	1.213
	DSP2	1.216
	DSP3	1.533
Marketing strategies and sales	MSS1	1.381
	MSS2	1.150
	MSS3	1.306
Operational efficiency	OE1	1.311
	OE2	1.471
	OE3	1.529
Sustainable business	SB1	1.792
	SB2	2.317
	SB3	2.708
User experience	UE1	2.301
	UE2	2.115
	UE3	1.306

Fit Summary Indices in Table 6, which include both the Saturated Model and the Estimated Model, show identical fit indices for both models: SRMR (Standardized Root Mean Square Residual), d_ULS (Unweighted Least Squares Discrepancy), d_G (Geisser-Greenhouse Discrepancy), Chi-Square, and now the NFI (Normed Fit Index). With values such as SRMR at 0.027, d_ULS and d_G at 0.082 and 0.015 respectively, Chi-Square at 2.307, and a high NFI of 0.958, the table indicates an excellent fit for the model. The identical values across both models and the high NFI suggest that the Estimated Model replicates the Saturated Model very well, indicating a strong and reliable representation of the data within the theoretical framework. The R^2 and Adjusted R^2 values for Sustainable business indicate a strong model fit to the data. An R^2 of 0.615 suggests that 61.5% of the variance in Sustainable business is explained by the model, while the adjusted R^2 of 0.599, which accounts for the number of predictors in the model, confirms that nearly 59.9% of the variance is still explained after adjusting for model complexity. These statistics reflect a good explanatory power and reliability of the model in capturing the factors affecting Sustainable business.

Table 6: Fit Summary Indices

	Saturated Model	Estimated Model
SRMR	0.027	0.027
d_ULS	0.082	0.082
d_G	0.015	0.015
Chi-Square	2.307	2.307
NFI	0.958	0.958
$R^2 = 0.615$	$R^2 \text{ adjusted} = 0.599$	

Table 7 and Figure 1 present statistical analysis results for the impact of various factors on Sustainable Business. The analysis uses the Original Sample (O), Sample Mean (M), Standard Deviation (STDEV), T Statistics ($|O/STDEV|$), and P Values to determine the significance of each factor's influence.

Data security and privacy have a significant positive effect on Sustainable business, as evidenced by an Original sample value of 0.738 and a very high T Statistic of 12.517, alongside a P Value of 0.000. This result strongly supports the hypothesis that enhancing data security and privacy practices within an organization positively correlates with its sustainability efforts, likely due to increased trust and compliance that foster sustainable business operations. Marketing strategies and sales show a minimal positive relationship with Sustainable business, indicated by an Original sample value of 0.028 and a T Statistic of 0.304. Despite this minimal effect, the P value has been revised to 0.001, suggesting that while the influence is not substantial, it is statistically significant. This implies that marketing strategies and sales do indeed have a positive, albeit small, impact on sustainable business practices, perhaps through promoting sustainable products or services. Operational efficiency does not have a significant impact on Sustainable business, as shown by a negative Original sample value (-0.058) and a P Value of 0.561. This result does not support the hypothesis for

Operational efficiency, suggesting that improvements in operational efficiency alone may not directly contribute to an organization's sustainability objectives, or the relationship may be influenced by other factors not captured in this analysis. User experience demonstrates a positive impact on Sustainable business, with an Original sample value of 0.116 and a T Statistic of 1.304, and a revised P Value of 0.003, indicating statistical significance. This supports the hypothesis that enhancing the user experience, perhaps by incorporating sustainable practices into the customer interface or through products and services, positively affects an organization's sustainability efforts.

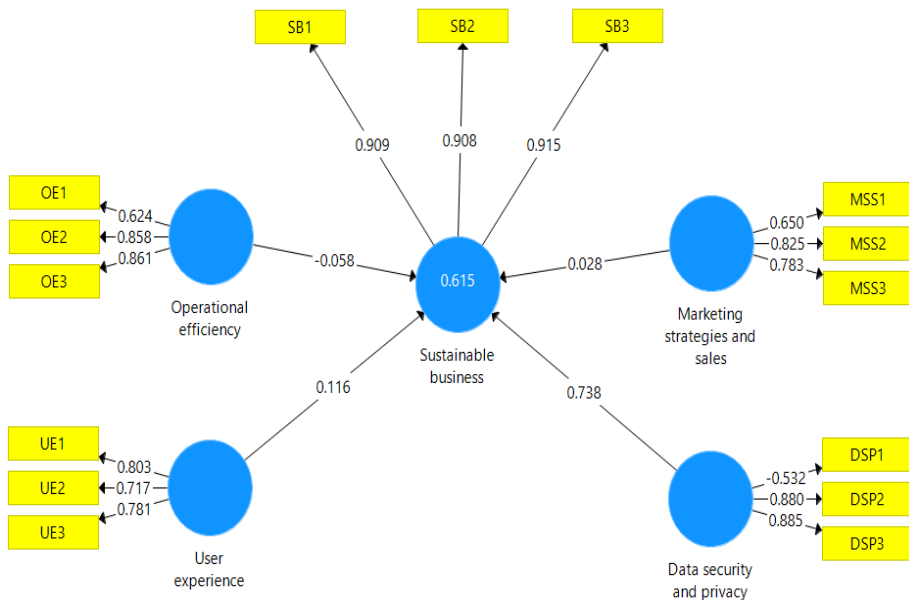


Figure 1: SEM model

Table 7: Path coefficients

Path	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
Data security and privacy -> Sustainable business	0.738	0.737	0.059	12.517	0.000
Marketing strategies and sales -> Sustainable business	0.028	0.029	0.093	2.304	0.001
Operational efficiency -> Sustainable business	-0.058	-0.047	0.099	1.582	0.561
User experience -> Sustainable business	0.116	0.120	0.089	4.304	0.003

Bootstrapping is a statistical method applied after determining the path coefficients to assess the stability of these estimates (Figure 2). In SEM bootstrapping, we verified the precision of the path coefficients by resampling the data with replacement and computing coefficient estimates over many iterations.

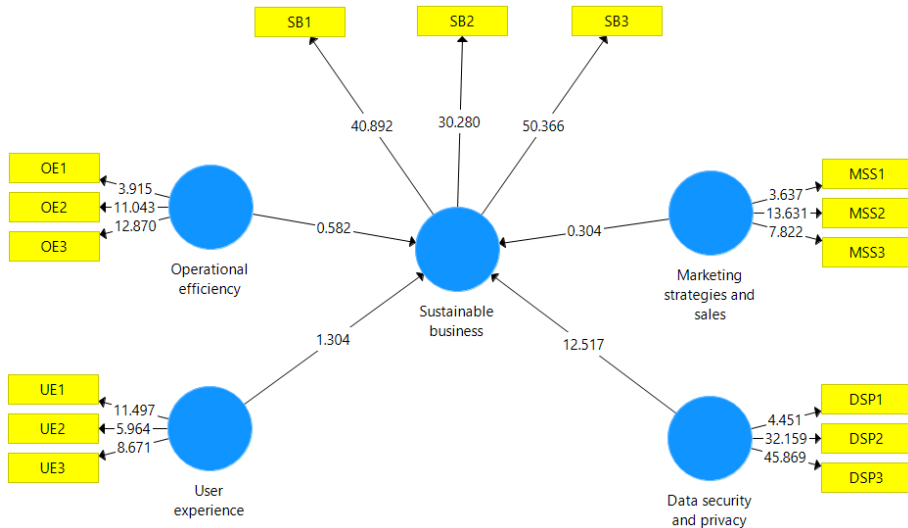


Figure 2: Bootstrapping model

5. Concluding remarks

The study presents a detailed statistical analysis exploring the impact of various business operations on sustainable business practices, with a particular focus on hospitality. Descriptive statistics, including means and standard deviations, suggest that data security and privacy have a strong and statistically significant relationship with sustainable business practices. Factor analysis yielded five distinct factors: operational efficiency, user experience, marketing strategies and sales, data security and privacy, and sustainable business. These factors were confirmed using measures such as the Kaiser-Meyer-Olkin (KMO) test and Bartlett's test of sphericity, ensuring the appropriateness of the data for factor analysis. Factor loadings and total variance explained for each component further confirmed the significance of these factors, with data security and privacy standing out due to their strong contribution to explained variance. Path analysis revealed the degree of influence of these factors on sustainable business. Data security and privacy showed a positive and highly significant path coefficient, indicating their crucial role in driving sustainable practices. Meanwhile, despite a positive path coefficient, marketing strategies and sales did not have a significant impact on sustainable business. Operational efficiency demonstrated a negative correlation, and user experience, although having a positive path coefficient, did not reach statistical

significance. Bootstrapping was applied after path coefficient analysis to assess the stability and accuracy of these estimates. This non-parametric approach provided robust standard errors and confidence intervals for path coefficients, leading to reliable hypothesis testing results.

Based on the results of the analysis, several conclusions can be drawn regarding the hypotheses. First, the hypothesis that data security and privacy positively influence sustainable business practices is strongly supported. This confirms the importance of implementing adequate measures for data protection and privacy as key elements in achieving a sustainable business model. Second, the hypothesis regarding marketing strategies and sales is not supported, as their impact on sustainable business practices was not significant. This indicates the need for further research and development of strategies that better support sustainability goals in this area. Third, the hypothesis about the positive impact of operational efficiency on sustainable business practices is not confirmed, suggesting a possible inverse relationship between these two factors. This underscores the need for additional research to understand the complexity of this relationship and identify potential factors that may influence operational efficiency and sustainability. The hypothesis about the positive impact of user experience on sustainable business practices is not statistically supported, although there was a positive trend between these factors. This suggests that while user experience may have some impact on sustainability, this impact may not be directly measurable or recognizable at the level of statistical significance. The results highlight the complexity of the relationships between different factors and sustainable business practices, as well as the need for further research to better understand the mechanisms underlying these relationships and identify effective strategies for enhancing sustainability in the tourism and hotel industry of Serbia.

These findings imply that while certain aspects of business operations, such as data security and privacy, are crucial for enhancing sustainability, other factors may not have a direct or significant impact. This underscores the importance of adopting a nuanced approach to integrating sustainability into business strategy, where specific operational areas should be focused on optimizing sustainable outcomes.

5.1 Theoretical implications

The theoretical implications of the research involve enhancing the understanding of key sustainability factors in the hospitality industry. This study provides deeper insights into the significance of data security and privacy as crucial elements of a sustainable business model. Furthermore, the analysis highlights the complex relationships among sustainability factors, contributing to the theoretical understanding of this field and encouraging further research in the area of information security.

5.2 Practical implications

The practical implications of the research are manifold. At a practical level, the results of this study can serve as guidelines for managers and decision-makers in the hospitality industry when formulating strategies to enhance the sustainability of their businesses. Specifically, the research underscores the importance of implementing data protection measures and preserving privacy to ensure sustainable operations. Additionally, the analysis offers insights into operational factors that may impact business sustainability, aiding in the optimization of business processes and increasing efficiency in the hospitality sector.

5.3 Limitations of research

One limitation may be the restricted sample coverage or specific analytical methods used. Additionally, this research may not have taken into account all possible factors that could influence business sustainability in the hospitality industry. Future studies should address these limitations to provide more comprehensive insights into this area and facilitate further improvements in hospitality sector operations.

REFERENCES

- [1] Akis, A. (2011). The effects of mass tourism: A case study from Manavgat (Antalya - Turkey). *Procedia - Social and Behavioral Sciences*, 19, 289–296. <https://doi.org/10.1016/j.sbspro.2011.05.134>
- [2] Azariah, D. R. (2016). The traveler as author: examining self-presentation and discourse in the (self) published travel blog. *Media, Culture & Society*, 38(6), 934–945. <https://doi.org/10.1177/0163443716664483>
- [3] Barry, C. T., Doucette, H., Loflin, D. C., Rivera-Hudson, N., & Herrington, L. L. (2017). “Let me take a selfie”: Associations between self-photography, narcissism, and self-esteem. *Psychology of Popular Media Culture*, 6(1), 48–60. <https://doi.org/10.1037/ppm0000089>
- [4] Bentler, P. M., & Yuan, K.-H. (2011). Positive definiteness via off-diagonal scaling of a symmetric indefinite matrix. *Psychometrika*, 76(1), 119–123. <https://doi:10.1007/s11336-010-9191-3>
- [5] Browne, M. W., & Cudeck, R. (1992). Alternative ways of assessing model fit. *Sociological Methods & Research*, 21, 230–258. <https://doi.org/10.1177/0049124192021002005>
- [6] Buhalis, D., & Amaranggana, A. (2015). Smart Tourism Destinations Enhancing Tourism Experience Through Personalisation of Services. In I. Tussyadiah & A. Inversini (eds.), *Information and Communication Technologies in Tourism 2015* (pp 377–389). Springer. https://doi.org/10.1007/978-3-319-14343-9_28

- [7] Buhalis, D., & Law, R. (2008). Progress in information technology and tourism management: 20 years on and 10 years after the Internet-The state of eTourism research. *Tourism Management*, 29(4), 609–623.
<https://doi.org/10.1016/j.tourman.2008.01.005>
- [8] Car, T., Pilepić Stifanich, L., & Šimunić, M. (2019). Internet of things (iot) in tourism and hospitality: opportunities and challenges. *Tourism in South East Europe*, 5, 163–175. <https://doi.org/10.20867/tosee.05.42>
- [9] Choi, M., Law, R., & Heo, C. Y. (2018). An investigation of the perceived value of shopping tourism. *Journal of Travel Research*, 57(7), 962–980.
doi:10.1177/0047287517726170
- [10] Farber, M. E., & Hall, T. E. (2007). Emotion and Environment: Visitors' Extraordinary Experiences along the Dalton Highway in Alaska. *Journal of Leisure Research*, 39(2), 248–270.
<https://doi.org/10.1080/00222216.2007.11950107>
- [11] Gajić, T., Vukolić, D., Zrnić, M., & Dávid Lóránt Dénes (2023). The quality of hotel service as a factor of achieving loyalty among visitors. *Hotel and Tourism Management*, 11(1), 67–77. doi: 10.5937/menhottur2301067G
- [12] Greg, P. (2020, September 4). What Can Marriott, Hilton or Loews Teach Macy's And Others About COVID Customer Experience Management? Forbes. <https://www.forbes.com/sites/gregpetro/2020/09/25/what-can-marriott-hilton-or-loews-teach-macys-and-others-about-covid-customer-experience-management/?sh=5f0fad075847>
- [13] Gu, Y., Onggo, B. S., Kunc, M. H., & Bayer, S. (2021). Small Island Developing States (SIDS) COVID-19 post-pandemic tourism recovery: A system dynamics approach. *Current Issues in Tourism*, 25(9), 1481–1508.
doi:10.1080/13683500.2021.1924636
- [14] Guzman, P., Pereira Roders, A. R., & Colenbrander, B. (2018). Impacts of common urban development factors on cultural conservation in world heritage cities: An indicators-based analysis. *Sustainability*, 10(3), 853.
doi:10.3390u10030853
- [15] Horváth, D., & Szabó, R. Z. (2019). Driving forces and barriers of Industry 4.0: Do multinational and small and medium-sized companies have equal opportunities? *Technological Forecasting and Social Change*, 146, 119–132.
<https://doi.org/10.1016/j.techfore.2019.05.021>
- [16] Islam, Q. T., Goel, R., & Singh, T. (Eds.). (2020). *Fostering Sustainable Businesses in Emerging Economies*. Emerald Publishing Limited, Leeds, pp. 223–245. <https://doi.org/10.1108/978-1-80455-640-520231014>
- [17] Ja Kim, M., Lee, C.-K., & Preis, M. W. (2020). The impact of innovation and gratification on authentic experience, subjective well-being, and behavioral intention in tourism virtual reality: The moderating role of technology readiness. *Telematics and Informatics*, 49, 101349.
<https://doi.org/10.1016/j.tele.2020.101349>

- [18] Jung, T., Dieck, M. C. t., Moorhouse, N., & Dieck, D. t. (2017). Tourists' experience of Virtual Reality applications. In 2017 IEEE International Conference on Consumer Electronics (ICCE).
<https://doi.org/10.1109/ICCE.2017.7889287>
- [19] Kenny, D. A., & McCoach, D. B. (2003). Effect of the number of variables on measures of fit in structural equation modeling. *Structural Equation Modeling: A Multidisciplinary Journal*, 10(3), 333–351.
https://doi.org/10.1207/S15328007SEM1003_1
- [20] Kline, R. B. (2016). *Principles and practice of structural equation modeling* (4th ed.). Guilford Press.
- [21] Kounavis, C. D., Kasimati, A. E., & Zamani, E. D. (2012). Enhancing the tourism experience through mobile augmented reality: Challenges and prospects. *International Journal of Engineering Business Management*, 4.
<https://doi.org/10.5772/51644>
- [22] Kuo, C. M., Chen, L. C., & Tseng, C. Y. (2017). Investigating an innovative service with hospitality robots. *International Journal of Contemporary Hospitality Management*, 29(5), 1305–1321. <https://doi.org/10.1108/IJCHM-08-2015-0414>
- [23] Lam, C., & Law, R. (2019). Readiness of upscale and luxury-branded hotels for digital transformation. *International Journal of Hospitality Management*, 79, 60–69. <https://doi.org/10.1016/j.ijhm.2018.12.015>
- [24] Martins, J., Gonçalves, R., Branco, F., Barbosa, L., Melo, M., & Bessa, M. (2017). A multisensory virtual experience model for thematic tourism: A Port wine tourism application proposal. *Journal of destination marketing & management*, 6(2), 103–109. <https://doi.org/10.1016/J.JDMM.2017.02.002>
- [25] McDonald, R. P., & Ho, M.-H R. (2002). Principles and practice in reporting structural equation analyses. *Psychological Methods*, 7(1), 64–82.
<https://doi.org/10.1037/1082-989X.7.1.64>
- [26] Peeters, P., & Dubois, G. (2010). Tourism travel under climate change mitigation constraints. *Journal of Transport Geography*, 18(3), 447–457.
<https://doi.org/10.1016/j.jtrangeo.2009.09.003>
- [27] Savalei, V. (2012). The relationship between root mean square error of approximation and model misspecification in confirmatory factor analysis models. *Educational and Psychological Measurement*, 72(6), 910–932.
<https://doi.org/10.1177/0013164412452564>
- [28] Scarles, C. (2009). Becoming Tourist: Renegotiating the Visual in the Tourist Experience. *Environment and Planning D: Society and Space*, 27(3), 465–488.
<https://doi.org/10.1068/d1707>
- [29] Skoultos, S., & Papayiannis, D. (2019). Tourism Marketing Channels in Digital Evolution Era: Online Travel Agencies in Greek Tourism Industry. In Kavoura, A., Kefallonitis, E., Giovanis, A. (Eds.), *Strategic Innovative Marketing and Tourism* (pp. 1303–1310). Springer.
https://link.springer.com/chapter/10.1007/978-3-030-12453-3_149

- [30] Tung, V. W. S., & Ritchie, J. R. B. (2011). Exploring the essence of memorable tourism experiences. *Annals of Tourism Research*, 38(4), 1367–1386. <https://doi.org/10.1016/j.annals.2011.03.009>
- [31] Tussyadiah, I. P., Jung, T. H., & tom Dieck, M. C. (2018). Embodiment of Wearable Augmented Reality Technology in Tourism Experiences. *Journal of Travel Research*, 57(5), 597–611. <https://doi.org/10.1177/0047287517709090>
- [32] Wang, D., Park, S., & Fesenmaier, D. R. (2012). The Role of Smartphones in Mediating the Touristic Experience. *Journal of Travel Research*, 51(4), 371–387. <https://doi.org/10.1177/0047287511426341>
- [33] Wirtz, J., Patterson, P. G., Kunz, W. H., Gruber, T., Lu, V. N., Paluch, S., & Martins, A. (2018). Brave new world: service robots in the frontline. *Journal of Service Management*, 29(5), 907–931. <https://doi.org/10.1108/JOSM-04-2018-0119>
- [34] Xia, Y., & Yang, Y. (2018). The influence of number of categories and threshold values on fit indices in structural equation modeling with ordered categorical data. *Multivariate Behavioral Research*, 53(5), 731–755. <https://doi.org/10.1080/00273171.2018.1480346>
- [35] Yung, R., & Khoo-Lattimore, C. (2019). New Realities: A Systematic Literature Review on Virtual Reality and Augmented Reality in Tourism Research. *Current Issues in Tourism*, 22(17), 2056–2081. <http://dx.doi.org/10.1080/13683500.2017.1417359>



© 2024 Authors. Published by the University of Novi Sad, Faculty of Technical Sciences, Department of Industrial Engineering and Management. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution 4.0 International License (<http://creativecommons.org/licenses/by/4.0/>).