African Journal of Tourism and Hospitality Management, Volume 4, Issue 1, 2025
Article DOI: https://doi.org/10.37284/ajthm.4.1.3024

African Journal of Tourism and Hospitality Management
ajthm.eanso.org
Volume 4, Issue 1, 2025
Print ISSN: 2790-9603 | Online ISSN: 2790-9611
Title DOI: https://doi.org/10.37284/2790-9611

EAST AFRICAN NATURE & SCIENCE ORGANIZATION

Original Article

Water Conservation Practices for Hotel's Performance in Uganda's Conservation Areas

Christopher Paapa[1], Dr. George Otieno Obonyo[2] & Dr. Oscar Ouma Kambona[2]*

[1] Kabale University, P. O. Box 317 Kabale, Uganda.
[2] Maseno University, P. O. Box 333-40105, Maseno, Kenya.
[*] Author for Correspondence Email: cpaapa@kab.ac.ug

Article DOI: https://doi.org/10.37284/ajthm.4.1.3024

Date Published:

21 May 2025

Keywords:

Water Conservation Practices, Hotel Performance, Sustainable Tourism, Natural Resource-Based View Theory, PLS-SEM.

ABSTRACT

The study sought to determine the effect of water conservation practices (WCP) on hotel performance (HP) in conservation areas in Uganda. Anchored on the Natural Resource-Based View (NRBV) theory, the study used a correlational research design with quantitative methods about WCP and HP. Krejcie and Morgan's 1970 sample size determination table was applied in selecting 265 participants from a population of 851 employees, including managers, chefs, housekeepers, receptionists, and waiters in 19-star-rated hotels from the study area. These participants were selected using multistage sampling consisting of stratified, proportional, and simple random sampling. Data was collected via self-administered questionnaires distributed with the help of trained research assistants. Construct validity was evaluated through factor analysis. Data was subjected to descriptive and factor analysis in SPSS 25 and partial least squares structural equation modelling (PLS-SEM) in SmartPLS4 for modelling and hypothesis testing. The results indicate that WCP accounts for 52% (R^2 =0.515) of the variation in hotel performance. Specifically, the results show that water conservation practices (P<0.001) had significant effects on hotel performance in conservation areas in Uganda. The blindfolding results confirm adequate predictive relevance, with the lowest Q^2 value at 0.511. Model fit is supported by Standardised Root Mean Residual - SRMR <0.08 and Normed Fit Index-NFI > 0.90. The findings of this study conclude with a confirmation that water conservation practices significantly enhance hotel performance in Uganda's conservation areas. The results of this study are useful to policymakers and industry practitioners by providing relevant insights in guiding decision-making to improve hotel performance. It also adds to the existing body of knowledge on the discussions relating to WCP and performance.

APA CITATION

Paapa, C., Obonyo, G. O. & Kambona, O. O. (2025). Water Conservation Practices for Hotel's Performance in Uganda's Conservation Areas. *African Journal of Tourism and Hospitality Management*, *4*(1), 172-188. https://doi.org/10.37284/ajthm.4.1.3024.

CHICAGO CITATION

Paapa, Christopher, George Otieno Obonyo and Oscar Ouma Kambona. 2025. "Water Conservation Practices for Hotel's Performance in Uganda's Conservation Areas". *African Journal of Tourism and Hospitality Management* 4 (1), 172-188. https://doi.org/10.37284/ajthm.4.1.3024.

Article DOI: https://doi.org/10.37284/ajthm.4.1.3024

HARVARD CITATION

Paapa, C., Obonyo, G. O. & Kambona, O. O. (2025) "Water Conservation Practices for Hotel's Performance in Uganda's Conservation Areas" *African Journal of Tourism and Hospitality Management*, 4(1), pp. 172-188. doi: 10.37284/ajthm.4.1.3024

IEEE CITATION

C. Paapa, G. O. Obonyo & O. O. Kambona "Water Conservation Practices for Hotel's Performance in Uganda's Conservation Areas", *AJTHM*, vol. 4, no. 1, pp. 172-188, May. 2025.

MLA CITATION

Paapa, Christopher, George Otieno Obonyo & Oscar Ouma Kambona. "Water Conservation Practices for Hotel's Performance in Uganda's Conservation Areas". *African Journal of Tourism and Hospitality Management*, Vol. 4, no. 1, May. 2025, pp. 172-188, doi:10.37284/ajthm.4.1.3024

INTRODUCTION

Conservation areas in Uganda host globally significant biodiversity and crucial ecosystems; unsustainable forms of tourism have put increasing pressure on the environment. Due to intensive water extraction practices in the hospitality sector, resource exhaustion and ecosystem degradation ensue. Hotels inside these sensitive areas take in huge quantities of water for various services such as laundry, landscaping, pools, and guest services (Barakagira & Paapa, 2023; Abdelrady & Hussien, 2020). This state of water exploitation, coupled with poor resource management, has led to a situation where freshwater resources are wreaking under pressure while ecological systems are disrupted (Mendoza et al., 2023). Such loss of biodiversity at an estimated rate of 10–11% per decade discourages the efforts of conservation programs while simultaneously putting into jeopardy the very natural attraction on which the tourism industry is dependent (Grace, 2022).

On the other hand, while green environmental practices (GEP), including water conservation-practice-could potentially provide mitigation, in the Uganda hotel industry, such practices are still rarely adopted, especially within rural conservation areas (Mbasera et al., 2016). Lack of set policies, awareness, and high costs of implementation have presented barriers to the mass adoption of such GEPs. It only makes matters worse that a number of hotels are still engaging in such damaging activities as unsustainable harvesting of wood fuels, overexploitation of natural resources, and the pollution of water bodies (National Enviromental Authority, 2016). These acts accelerate the environmental deterioration and threaten the long-term sustainability of ecosystems and hospitality businesses.

As nature continues to degrade, hotels are increasingly at risk in terms of water scarcity, rising operational costs, reduced guest satisfaction, and damage to reputation (Yuniati, 2021; Langgat et al., 2023). These are scenarios more evident in conservation areas where ecological health is a direct factor in tourism viability. Even though the sector is a big contributor to Uganda's GDP, in the long run, this sector's unbounded environmental footprint will work against itself.

Statement of the Problem

The performance of hotels in Uganda's conservation areas is fast being constrained by unsustainable operational practices, especially poor water use patterns. Such actions accelerate ecosystem degradation with biodiversity loss occurring at the rate of 10–11% in a decade (National Enviromental Authority, 2016), thereby undermining the natural resources, which attract tourists. Subsequently, hotels bear increased operational costs, face a reduction in guest satisfaction, and lose competitive advantage, thus threatening environmental and economic sustainability.

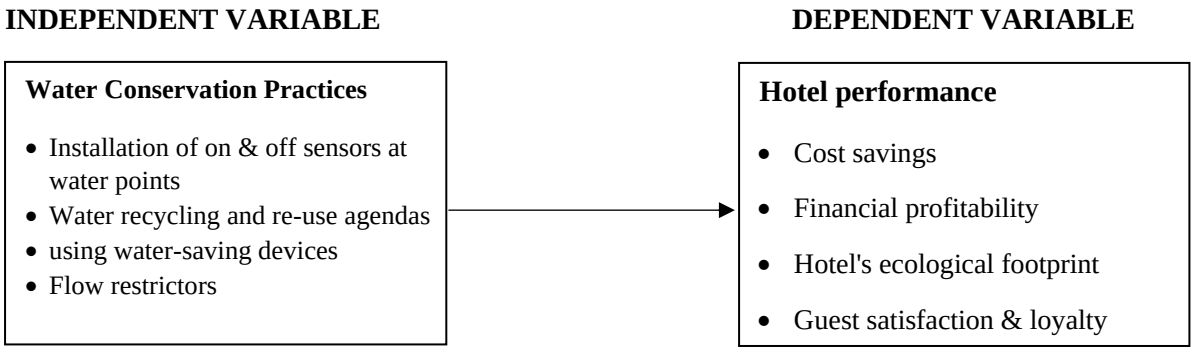
While the existing researchers are propagating green environment practices like water conservation, information regarding how these activities affect the performance of hotels in conservation areas is lacking. Moreover, most of this research has been conducted in urban setups, yet little is known about hotels in non-urban setups, which would provide a better context for understanding the effect.

Article DOI: https://doi.org/10.37284/ajthm.4.1.3024

Objective of the Study

The study's objective is to investigate the effect of water conservation practices on hotel performance in Uganda's conservation areas.

Figure 1: Conceptual Framework



THEORETICAL BACKGROUND AND HYPOTHESES DEVELOPMENT

The Natural Resource-Based View (NRBV)

The Natural Resource-Based View (NRBV) Theory provides a strong framework for understanding the impact of water conservation practices on hotel performance in conservation areas in Uganda. The theory posits that firms can achieve a sustainable competitive advantage by integrating environmental stewardship, resource efficiency, and innovation in their operational strategies (Ali et al., 2021; Tu & Wu, 2021).

In line with Hart's (1995) NRBV framework, hotels operating in conservation areas can enhance both their environmental and financial performance by investing in water conservation strategies, technologies, and sustainable management practices. These include efficient water recycling systems, wastewater management, eco-friendly procurement, and staff training on water conservation (Abdou et al., 2020; Abd El-Latief & Saleh, 2020). By doing so, hotels not only reduce their ecological footprint but also improve operational efficiency, reduce costs, and enhance their market positioning (Barakagira & Paapa, 2024; Omune et al., 2021)

Moreover, the NRBV theory emphasises that leveraging unique resource endowments, such as natural water sources and conservation-driven initiatives, can differentiate hotels in Uganda's conservation areas. Implementing water conservation measures aligns with sustainability-focused business models, which strengthens regulatory compliance, improves brand reputation, and attract eco-conscious tourists (Yang et al., 2023; Zhang et al., 2021).

While the NRBV can be recognised as a useful framework for strategically integrating environmental issues, specific constraints are shared in developing contexts. To begin with, the NRBV assumes that firms have available resources and capabilities, as well as institutional structures that would enable investment into sustainable development; often, this is not the case in resource-constrained environments. Weak regulatory frameworks, restricted access to green technology, and higher socio-economic priorities may generate hindrances to adopting the NRBV principles, thus constituting a challenge to its applicability or effectiveness for firms working under such constrained conditions.

Despite these challenges, the NRBV remains crucial in encouraging long-term sustainable practices and resilience, offering a framework through which even resource-constrained organisations can strategically position themselves for environmental and economic benefits.

Overall, the application of NRBV theory in this study highlights how water conservation practices

Article DOI: https://doi.org/10.37284/ajthm.4.1.3024

serve as a strategic resource, enabling hotels to achieve both environmental responsibility and competitive advantage in Uganda's conservation areas.

Empirical Review

Water is a crucial resource in the lodging industry, underpinning essential hotel operations. While the necessity of water consumption is undeniable, its conservation presents both an operational challenge and an ecological obligation (Abdelrady & Hussien, 2020). Scholars argue that water conservation enhances environmental sustainability and reduces operational costs (Abd El-Latief & Saleh, 2020; Abdou et al., 2020b). However, the actual impact of water conservation practices on hotel performance, particularly in conservation areas, remains a subject of debate due to the varying economic, environmental, and guest-related implications.

The literature emphasises that water consumption in hotels is a significant contributor to environmental concerns, particularly in relation to greywater management, waste production, and energy use (Antonova et al., 2021). Given the increasing ecological and operational costs of water supply, efficient water management has been identified as a priority (Antonova et al., 2021). Nonetheless, most existing studies focus on water conservation in developed countries, where infrastructure and regulatory frameworks support such initiatives. The transferability of these findings to conservation areas in Uganda is questionable, given the differing economic conditions, resource availability, and regulatory oversight.

Water-saving strategies such as tap aerators, low-flow showerheads, dual-flush toilets, and green laundry technologies have been shown to reduce water wastage (Langgat et al., 2023; Tirado et al., 2019). Additionally, greywater reuse systems can further minimise water consumption (Syahputra et al., 2023; Abdallah & Antary, 2021). Some studies report that hotels implementing such measures achieve up to a 23% reduction in total water usage (Abdelrady & Hussien, 2020; Untaru et al., 2016).

Although these figures point to a beneficial environmental impact, they do not take into consideration possible implementation obstacles in conservation areas, such as exorbitant installation costs, a lack of technical know-how, and low visitor compliance. The literature currently in publication has not sufficiently examined the economic viability of these measures for Ugandan hotels, where funding may be limited. The behaviour of visitors is one of the main obstacles to water conservation. According to studies, visitors—especially those staying in upscale lodgings—have a tendency to drink too much water because they are pleasure-seekers (Untaru et al., 2016). Initiatives to reuse linens, incentive schemes, and awareness campaigns are some of the strategies that have been suggested to affect visitor water consumption. These interventions' efficacy varies, though, as visitors may view conservation initiatives as a hassle, especially in upscale hotels where comfort standards are high. Furthermore, the effectiveness of behavioural nudges and cultural variations in water consumption patterns in Ugandan hotels has not yet been thoroughly investigated in the literature. Numerous advantages, such as decreased ecological footprints, improved operational effectiveness, and financial savings, are frequently linked to water conservation (Barakagira & Paapa, 2023; Mbasera et al., 2016). It is oversimplified to assume that these advantages result in better hotel performance in conservation areas. The direct relationship between conservation efforts and financial gains is complicated by elements like regulatory compliance, visitor satisfaction, and initial investment costs (Tirado et al., 2019). The idea that water conservation measures directly improve hotel financial performance in Uganda is not well supported by empirical data, necessitating a context-specific study. Water conservation is unquestionably a key component of sustainable hotel management, but little is known about how it affects hotel performance in conservation areas.

Article DOI: https://doi.org/10.37284/ajthm.4.1.3024

This study determined whether there were any direct correlations between the variables under investigation. The following four hypotheses were developed.

$H0_1$: Water conservation practices do not significantly affect hotel performance in conservation areas in Uganda

Only by addressing these gaps can a more holistic understanding of the relationship between water conservation and hotel performance be achieved

MATERIALS AND METHODS

The study applied the research philosophy of positivism to establish cause-and-effect relationships between variables. A deductive research approach was used to allow for a systematic and structured investigation that minimises biases and maintains consistency. The study followed a quantitative methodological choice, which involved the collection and analysis of numerical data through statistical methods. A correlational research design was applied with a survey research strategy using a self-administered questionnaire. This allowed the researcher to collect data systematically and objectively, without influencing the participants' responses. The questionnaire's validity and reliability were examined for an accurate assessment through a pilot study. Multistage sampling (i.e., stratified, proportional, and simple random sampling) was used.

Sampling Procedure

The target sample was selected from the study target population using multi-stage sampling, which includes stratified, proportional, and simple random sampling.

First, the population was stratified into a stratum based on hotel star-rating in conservation areas in Uganda, listed by the Uganda Tourism Board. From the stratum of 19 star-rated lodges and hotels, a population of 851 was generated (Table 1). The study used Krejcie and Morgan's (1970) table to calculate the sample size for this population. In this case, a population of 851 generated 265 as the minimum sample size. Participants were then apportioned proportionately for each population stratum using the Särndal et al. (2003) formula in Equation 1 below will be used (see Table 2). For example, for the strata sample size for Hotel A,

$$n_i = \frac{N_i \times n}{N}$$

Equation (1)

Where;

n_i is the sample size of a specific star-rated hotel

N_i is the total number of employees of a specific star-rated hotel.

n is the sample size computed for the star-rated hotels.

N is the total number of employees across all star-rated hotels

For example, for Hotel A in Table 1

$$n_i = \frac{45 \times 265}{851} = 14$$

To choose the target responders, purposive and simple random sampling was employed for general managers and other participants, respectively (see Table 2).

Table 1: Aggregate Sample Per Hotel /Proportionate Sample per Hotel

S/N	Star Rated Lodge/Hotel	Population	Aggregate/Proportionate Sample
1	(A)	45	14
2	(B)	35	11
3	(C)	39	12
4	(D)	50	16
5	(E)	48	15
6	(F)	55	17
7	(G)	51	16
8	(H)	56	17

Article DOI: https://doi.org/10.37284/ajthm.4.1.3024

9	(I)	32	10
10	(J)	47	15
11	(K)	35	11
12	(L)	48	15
13	(M)	50	16
14	(N)	36	11
15	(O)	41	13
16	(P)	55	17
17	(Q)	58	18
18	(R)	36	11
19	(S)	34	10
Total		**851**	**265**

Table 2: Population and Sample Size for Star-rated Hotels in Conservation Areas in Uganda

S/N	Hotel	Total Population	Total Sample	General Manager	Employees
1	A	45	14	1	13
2	B	35	11	1	10
3	C	39	12	1	11
4	D	50	16	1	15
5	E	48	15	1	14
6	F	55	17	1	16
7	G	51	16	1	15
8	H	56	17	1	16
9	I	32	10	1	09
10	J	47	15	1	14
11	K	35	11	1	10
12	L	48	15	1	14
13	M	50	16	1	15
14	N	36	11	1	10
15	O	41	13	1	12
16	P	55	17	1	16
17	Q	58	18	1	17
18	R	36	11	1	10
19	S	34	10	1	09
		851	265	19	246

The researcher chose survey respondents in each hotel or lodge via random sampling, having determined the stratum size. A sample taken from the population using a simple random sampling procedure is one in which samples of the same size are selected equally (Amin, 2005; West, 2016). This study applied simple random selection because the sample size from a population category in each hotel is more than two.

In addition, this study uses purposive sampling, which is judgmental and enables the researcher to handpick particular groups or individuals based on their relevance to the study (Palinkas et al., 2015). Respondents from the top management level were selected using purposive sampling to obtain as much pertinent data as possible for the study. This study purposefully selected a general manager from each hotel.

One key limitation of the methodology employed in this study is its reliance on self-reported data,

Article DOI: https://doi.org/10.37284/ajthm.4.1.3024

which may be subject to biases such as social desirability or recall inaccuracies. While efforts were made to ensure anonymity and encourage honest responses, the subjective nature of self-reporting can affect the reliability and validity of the findings.

However, the results are more generalizable and representative of the population. The study engaged a multi-analytical approach using SPSS and PLS SEM. Factor analysis in SPSS and Partial Least Square - Structural Equation Modelling in Smart PLS was applied.

RESULTS

Hotels and lodges in conservation areas that were sampled were given questionnaires. The researcher sent out 265 questionnaires to receive the desired number of responses; 255 (96 percent) of them were returned. As a result, the 96 percent response rate in this study was considered appropriate. 64.6% of the sample were males, and 35.7% were females. Following the initial review, SPSS version 22 software was used to perform a preliminary analysis on all 265 eligible cases.

Descriptive Statistics

Descriptive Statistics for Water Conservation Practices

The results in Table 3 indicate that the most commonly adopted water conservation measures among hotels and lodges in Uganda's conservation areas involve upgrading water-related appliances with more efficient models. This suggests a strong focus on technological solutions to reduce water consumption, likely due to their long-term cost-saving benefits and ease of implementation. The high mean score (M = 4.196, SD = 0.822) reflects widespread adoption, possibly driven by increasing awareness of sustainability practices and operational efficiency. The installation of automatic on/off sensors on water outlets is also a prevalent strategy (M = 4.184, SD = 0.812), highlighting an emphasis on reducing unnecessary water wastage through automation. This approach is likely influenced by the need to maintain sustainability without relying heavily on human intervention, which can be inconsistent.

Interestingly, the institutionalisation of linen and towel reuse programs had the lowest mean score (M = 4.039, SD = 0.820), suggesting relatively lower adoption compared to other strategies. This may be due to guest preferences, concerns about hygiene, or a lack of structured policies enforcing such programs.

Despite the strong adoption of technological water conservation measures, the findings reveal a gap in behavioural and policy-driven strategies. Hotels and lodges do not extensively educate employees and visitors about water conservation (M = 4.169, SD = 0.853), which could hinder the long-term effectiveness of conservation efforts. Without awareness and behavioural reinforcement, technological solutions alone may not achieve optimal water savings.

Additionally, the limited implementation of water recycling and reuse programs (M = 4.169, SD = 0.816) points to potential barriers such as high initial investment costs, infrastructure limitations, or regulatory constraints. This suggests an opportunity for policy interventions or financial incentives to encourage broader adoption of these measures.

Overall, while hotels and lodges in Uganda's conservation areas prioritise efficiency-driven water conservation strategies, a more holistic approach incorporating education, behavioural change, and recycling initiatives could enhance sustainability outcomes.

Article DOI: https://doi.org/10.37284/ajthm.4.1.3024

Table 3: Showing Descriptive Statistics for Water Conservation Practices

Water Conservation Practices		Min	Max	Mean	SD
WCP1	The hotel has water recycling and reuse programs in place.	2.000	5.000	4.169	0.816
WCP2	The hotel has instituted linen and towel reuse programs in guest rooms.	2.000	5.000	4.039	0.820
WCP4	The hotel educates staff and guests on water conservation by displaying water-saving stickers at appropriate locations.	1.000	5.000	4.169	0.853
WCP5	The hotel has installed automatic on/off sensors on various water outlets such as faucets, showerheads, toilets, etc.	2.000	5.000	4.184	0.812
WCP8	The hotel has upgraded or retrofitted laundry equipment, bathtubs, fixtures, and other water appliances with water- and energy-efficient models to reduce water consumption.	2.000	5.000	4.196	0.822

Descriptive Statistics for Hotel Performance

Table 4 presents the descriptive statistics on the performance of hotels and lodges in Uganda's conservation areas, highlighting key performance metrics related to environmental practices and customer satisfaction. The most frequently cited performance indicator was the willingness of guests to recommend the hotel to others (M = 3.918, SD = 0.848). This suggests that guests highly value the environmental conservation efforts of hotels and lodges, which in turn enhances their satisfaction and likelihood of promoting the establishment through word-of-mouth recommendations. This finding aligns with existing research that underscores the role of sustainability practices in fostering positive guest experiences and brand loyalty.

Another notable performance metric was customer retention, with frequent guest returns being highly rated (M = 3.898, SD = 0.839). This result indicates that hotels and lodges successfully create meaningful guest experiences that encourage repeat visits. Sustainable practices may contribute to this trend by attracting eco-conscious travellers who appreciate establishments that prioritise environmental conservation.

Interestingly, the least agreed-upon performance indicator among hotel and lodge staff was the reduction in energy, water, and waste disposal costs (M = 3.859, SD = 0.828). While this metric still received a relatively high mean score, its position as the lowest-rated indicator suggests that cost savings from environmental initiatives may not be as immediately apparent or impactful as customer-related benefits. This could be due to the initial investment required for implementing green practices, the time lag before cost reductions become significant, or the challenges in accurately quantifying these savings.

Overall, these findings reinforce the notion that environmentally sustainable practices in the hospitality sector contribute significantly to customer satisfaction and business performance. Hotels and lodges that actively promote their green initiatives are more likely to receive positive recommendations and repeat business, ultimately enhancing their competitive advantage. However, further research could explore the financial implications of sustainability efforts in greater detail to better understand how cost savings evolve over time.

Article DOI: https://doi.org/10.37284/ajthm.4.1.3024

Table 4: Showing Descriptive Statistics for Performance of Hotels

Study Constructs and Measurement Items		Min	Max	Mean	SD
Performance of Hotels					
HP2	Our guests are always happy to recommend our facility to other potential guests.	1.000	5.000	3.918	0.848
HP6	The hotel experiences a high number of repeat customers regularly.	1.000	5.000	3.898	0.839
HP7	The costs of energy, water, and waste disposal have been reduced significantly.	1.000	5.000	3.859	0.828

Note: Valid N listwise = 255

1 – Strongly Disagree; 2 -Disagree; 3 – Neither Agree nor Disagree; 4 – Agree; and 5 – Strongly Agree

Assessment of the Measurement Model

Reliabilities and Average Variance Extracted

The three fundamental types of measurement—average variance extracted (AVE), composite reliability (CR), and Cronbach's alpha (a)—are shown in Table 5. Cronbach's alpha and CR threshold value are 0.70 (Hair et al., 2019). Cronbach's alpha and CR values in our study are higher than the cut-off point (Table 3). In line with Hair et al. (2014), the convergent validity should be supported by the AVE being greater than the 0.50 threshold limit. We have shown the AVE value in Table 3, which satisfies the requirement. As a result, Table 5 reports that all necessary prerequisites for conducting confirmatory factor analysis (CFA) have been met.

Confirmatory Factor Analysis (CFA)

According to Alrawad et al. (2023), CFA is a multivariate approach based on structural equation modelling that can be used to analyse a hypothesised model. During the validation process, standard factor loadings are used to analyse and validate both exogenous and endogenous variables (Awang et al., 2015). Eight items from the two factors are included in the fixed sample of observed and unobserved data used by the CFA. Table 5 displays the results of the proposed measurement model, which includes factor loading, Cronbach's alpha (a), CR, and AVE. All of these values fall within the acceptable range. The CFA method is used when the factor loading of each item is greater than 0.50. For construct and convergent validity, the factor loading of every item in our study falls between 0.874 and 0.945; this is sufficient.

Table 5: Item Loadings and Significance of the Reflective Measurement Models

Constructs/Measurement Items	Loading	Cronbach's alpha (α)	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Hotel Performance					
HP2	0.927	0.932	0.933	0.957	0.881
HP6	0.945				
HP7	0.943				
Water Conservation Practices					
WCP1	0.874	0.936	0.937	0.951	0.797
WCP2	0.884				
WCP4	0.898				
WCP5	0.907				
WCP8	0.899				

Article DOI: https://doi.org/10.37284/ajthm.4.1.3024

Discriminant Validity

Discriminant Validity is a measure in research that ensures that constructs or variables that are supposed to be distinct from each other are indeed empirically different. It confirms that a latent variable is not too closely related to other variables in a model, ensuring that each construct measures a unique concept. To evaluate discriminant validity, Henseler et al. (2015) proposed the Heterotrait-Monotrait Ratio (HTMT), which measures the ratio of within-construct to between-construct correlations. Constructs are thought to be sufficiently distinct when HTMT values fall below 0.85 (Franke & Sarstedt, 2019; Henseler et al., 2015). The value 0.766 in Table 6 is below 0.85, hence the measurement model is valid.

Table 6: Discriminant validity (Heterotrait-monotrait ratio (HTMT)

Constructs	Hotel performance
Hotel performance	
Water conservation practices	.766

Goodness of Model Fit

To prevent model misspecification, the study measured the Goodness of Model Fit. The model fit indices measured consist of the geodesic distance (d_G), the squared Euclidean distance (d_LS), the Chi-Square, the Standardised Root Mean Residual (SRMR), and the Normed Fit Index (NFI). According to Dijkstra and Henseler (2015), a good model fit results when the confidence interval's upper bound is greater than the original d_ULS and d_G values, i.e., $p > .05$. A good model fit is indicated by NFI values > .90, which are an incremental fit metric, and the SRMR value. < .08. A well-fitting model should meet the recommended thresholds for multiple indices, rather than relying on just one. Table 7 shows that the indices indicate a good model fit.

Table 7: Model fit

	Saturated model	Estimated model
SRMR	**0.037**	**0.037**
d_ULS	0.106	0.106
d_G	0.272	0.272
Chi-square	368.314	368.314
NFI	**0.909**	**0.909**

The Structural Model (Hypothesised direct relationship)

Collinearity, Path Coefficients, R^2 and Effect Size (f^2)

This study examined the direct relationship between the two variables, WCP and HP. Standardised Beta coefficients, which quantitatively range from 0.000 to 1.000, were used to interpret the path coefficients of the Partial Least Square (PLS) structural model (Hair et al., 2019). Hair et al. (2017) highlighted that values below 0 and 10 are typically regarded as non-significant. While non-significant or opposing paths do not support the earlier hypotheses, significant paths in the hypothesised direction offer empirical support for the proposed causal relationship (Hair et al., 2011). For direct associations, Smart PLS4 determined the significance of the route coefficients and associated t-values using a consistent PLS-SEM bootstrapping process. According to Wong (2013), a two-tailed t-test at a significance level of 5% considers a path coefficient significant if the T-statistic is higher than 1.96. The study discovered that the path coefficients of the inner model were statistically significant, indicating that the suggested connections between the model's variables are supported by empirical

Article DOI: https://doi.org/10.37284/ajthm.4.1.3024

evidence and help to explain the difference in the endogenous variables.

A null hypothesis, **$H0_1$:** Water conservation practices (WCP) do not significantly affect hotel performance (HP) in conservation areas in Uganda. This hypothesis was rejected based on P=0.000 and T=19.188 (Table 8). The path coefficient (β=0.717) shows that a one-unit increase in Water conservation practices (WCP) will lead to a 72% increase in hotel performance (HP).

First, the structural model should be assessed for collinearity, explanatory power (R2), and effect size (f2). Next, it is necessary to analyse the path coefficient values and statistical significance (Hair et al., 2019). The structural model was first examined for possible collinearity or common bias method issues by looking into the Variance Inflation Factor (VIF) of the predictor's constructs. Every VIF value was much lower than the 5.00 cutoff (Hair et al., 2019), as shown in Table 9, which was a definite indication that collinearity was not an issue. The Effect Size (f2) shows if the removal of an exogenous (independent) variable could significantly change the R2 of the endogenous variables. The impact of water conservation (WCP) on hotel performance was significant (f2). According to Hair et al. (2019), levels 0.02, 0.15, and 0.35 correspond to small, medium, and large f2 effect sizes, respectively. (Table 6).

Next, the coefficient of determination (R2) for the endogenous (dependent) variables was examined. The structural model's explanatory power with regard to an endogenous construct is indicated by the R2 of the construct, which shows how much of the variance in the construct can be explained by each of the exogenous (independent) variables in the model. According to Hair et al., 0.25, 0.50, and 0.75 are thought to have weak, moderate, and substantial explanatory power, respectively (Roldán & Sánchez-Franco, 2012; Sarstedt et al., 2021). The endogenous latent variable for hotel performance had a coefficient of determination (R2) of .515, meaning that 51.5% of the endogenous factor (hotel performance) is explained by exogenous variables (water conservation practices).

Other factors outside the purview of this study contributed to the remaining 48 percent of the change in hotel performance. As a result, it can be concluded that the current study has adequately explained the variance and that the data are suitable for further hypothesis testing. Additionally, this shows that our model's predictive power is Q2 = 0.511.

The indicators are depicted by the questions as coded below;

WCP1 The hotel has water recycling and reuse programs in place.

WCP2 The hotel has instituted linen and towel reuse programs in guest rooms.

WCP4 The hotel educates staff and guests on water conservation by displaying water-saving stickers at appropriate locations.

WCP5 The hotel has installed automatic on/off sensors on various water outlets such as faucets, showerheads, toilets, etc.

Shower heads.

WCP8 The hotel has upgraded or retrofitted laundry equipment, bathtubs, fixtures, and other water appliances with water- and energy-efficient models to reduce water consumption.

HP2 Our guests are always happy to recommend our facility to other potential guests.

HP6 The hotel experiences a high number of repeat customers regularly.

HP7 The costs of energy, water, and waste disposal have been reduced significantly.

ed by its fundamental values.

Article DOI: https://doi.org/10.37284/ajthm.4.1.3024

Table 8: Measurement Model Estimates; Collinearity, Path Coefficients, R^2 and Effect Size (f^2)

Direct effects / Total effects	Beta	Sample mean	Standard deviation	T stat	P values	f-square	VIF	BCI	Remarks
Water Conservation Practices -> Hotel Performance	0.717	0.717	0.037	19.188	0.000	1.061	1.915	0.634 - 0.780	Not supported

Variance predictions	R Square	R Square adjusted	Q^2predict
Hotel Performance	.515	.513	0.511

Source: *Created by the author*

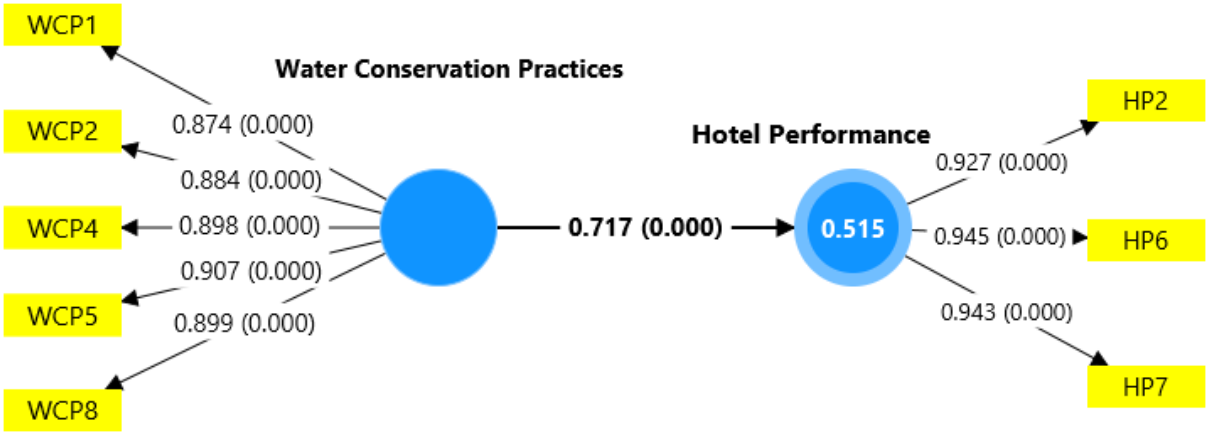
Note: β – beta coefficient, VIF – Variance inflation factor;

Table 9: Collinearity Statistics

Measurement items	VIF
Water performance	
HP2	3.316
HP6	4.443
HP7	4.222
Water conservation practices	
WCP1	2.800
WCP2	3.054
WCP4	3.380
WCP5	3.807
WCP8	3.682

Source: *Created by author*

Figure 2: Measurement and Structural Models Showing Path Coefficients of the Direct Effects



DISCUSSION

The findings show that water conservation practices positively and significantly predict hotel performance (β = .717** ρ < .01), hence, hypothesis ***H1*** is not supported. (See Table 8 and Figure 2). Additionally, the 95% confidence interval for the water conservation practices on hotel performance does not contain zero (95% Bias-Corrected Confidence Interval of 0.634 and 0.780). Thus, we are 95% confident of the existence of a significant positive correlation between water conservation practices and hotel performance in conservation areas in Uganda.

Hypothesis H01, stating that water conservation practices do not significantly affect hotel performance in conservation areas in Uganda, was tested to explore the relationship between sustainable water use and hotel performance metrics such as financial profitability, Hotel's ecological footprint, Brand reputation, Guest satisfaction & loyalty, and operational efficiency in terms of cost savings.

Article DOI: https://doi.org/10.37284/ajthm.4.1.3024

The results from the analysis revealed that water conservation practices exert a significant effect on hotel performance, leading to the rejection of the null hypothesis. This indicates that initiatives such as water recycling, rainwater harvesting, installation of water-efficient appliances (Installation of on & off sensors at water points), Water recycling and reuse agendas, and employee and guest engagement in water-saving behaviours contribute positively to hotel outcomes. Hotels that effectively implement water conservation practices often benefit from reduced operational costs, enhanced reputation, and Guest satisfaction & loyalty. This aligns with the findings of previous studies, which highlight resource efficiency as a driver of cost savings and competitive advantage (Park et al., 2021), enhanced reputation, and guest satisfaction & loyalty (Han et al., 2018; Han et al, 2018)

Water conservation practices reduce water bills and mitigate risks associated with water scarcity at night (Antonova et al., 2023; Barberán et al., 2013), which is particularly relevant in Uganda's conservation areas, where natural water resources are often under pressure. Studies show that integrating conservation measures such as low-flow showerheads and dual-flush toilets can lead to substantial cost savings (Antonova et al., 2023; Barberán et al., 2013). Their results are in line with those of the current study.

The results validate those of Langgat et al. (2023) and Barakagira & Paapa (2023), who discovered that water and waste management procedures were a strong indicator of hotel performance in Malaysian and Ugandan establishments. By reducing operational expenses associated with water, hotels can allocate resources to other performance-enhancing activities, such as staff training or marketing to improve brand reputation.

Contributions

Theoretically, this study extends the Resource-Based View (RBV) Theory by demonstrating that water conservation practices serve as valuable, rare, and inimitable resources, enhancing a hotel's competitive advantage and performance. In doing so, it strengthens the case that the hospitality industry can benefit from sustainability initiatives. Additionally, the study bridges the gap between business success and environmental sustainability (water conservation) by integrating sustainability and performance metrics. By demonstrating the direct relationship between environmental management and organisational performance, especially in conservation areas, this empirical evidence supports the Natural Resource-Based View (NRBV). The study reinforces the notion that companies must address environmental issues in order to remain legitimate and competitive by offering insights into the relationship between green practices and hotel performance. This further develops the NRBV framework. The study also addresses a gap in sustainability research, which has mostly concentrated on developed economies, by placing water conservation in emerging markets. A more inclusive theoretical discussion is facilitated by this extension to Uganda's tourism and hospitality industry, which advances global awareness of sustainability management in developing nations. By empirically illustrating how water conservation functions as a strategic resource, connecting green practices with business performance, and expanding sustainability research to emerging markets, this study, in summary, strengthens both RBV and NRBV theories.

Practically, this research provides hotel managers with practical suggestions for putting effective water conservation measures into practice (e.g. greywater recycling, rainwater collection, and water-saving appliances. Sustainability becomes a key competitive advantage as a result of these tactics, which improve financial, operational, and environmental performance. These results can be used by policymakers and conservation organisations to create rules and incentives that support the expansion of the tourism sector while also advancing water sustainability. One can apply a three-pronged strategy to encourage sustainable water use in the hospitality industry: First, set tiered tariffs and rebates so that hotels that can cut down on water use per guest-night pay a lower tariff and are given financial incentives for the implementation of water-efficient

Article DOI: https://doi.org/10.37284/ajthm.4.1.3024

technologies. Second, implement a national certification to recognise water-smart hotels-who would then be promoted by tourism boards, eco-travel platforms and booking sites-so as to draw environmentally conscious tourists. Third, improve access to green financing so as to provide low-interest loans or grants for water-saving infrastructure investments and, in collaboration with development banks, to establish industry-specific conservation funding mechanisms.

Hotel managers can use water conservation techniques to increase operational effectiveness, lower expenses, and improve brand reputation when making strategic decisions. Along with stressing the value of guest engagement, the study shows how eco-conscious consumer preferences affect hotel performance. This pushes hotels to incorporate sustainability into their marketing plans in order to draw in eco-conscious tourists and improve their standing in the market. Overall, these contributions offer practical advice on sustainable water management to hoteliers, legislators, and environmentalists, showing how prudent water use can spur economic growth, legislative changes, and the expansion of ecotourism in Uganda's hospitality industry.

These initiatives offer a far-reaching platform through which to pursue holistic and sustainable water management in hospitality.

CONCLUSIONS

The findings of this study confirm that water conservation practices significantly enhance hotel performance in Uganda's conservation areas, leading to the rejection of the null hypothesis. Sustainable water initiatives, including water recycling, rainwater harvesting, water-efficient appliances, and guest engagement, contribute to reduced operational costs, improved brand reputation, and increased guest satisfaction and loyalty. These practices also mitigate risks associated with water scarcity, which is particularly critical in conservation areas. The results align with prior research, reinforcing the idea that resource efficiency drives financial and competitive advantages. Additionally, cost savings from water conservation allow hotels to reinvest in other strategic areas, such as staff development and marketing, further strengthening overall performance.

Recommendations

To ensure sustainable water usage, hotels should invest in water-saving technologies such as low-flow faucets, showerheads, water-efficient toilets, greywater recycling systems, and rainwater collection systems should be standardised to minimise water consumption. Train employees on best practices for minimising water waste, such as reporting leaks, optimising laundry operations, and educating guests on water-saving habits. Encourage guests to participate in water conservation initiatives by offering incentives, like discounts or loyalty points, for reusing towels and linens, and promoting "greener" water-conscious behaviours.

Study Limitations

Several limitations can be adduced in the study, which, however, affect the broader applicability and depth of its findings. Foremost on the list of limitations, the study area was restricted to conservation areas in Uganda, thereby limiting generalisation to other regions that are different environmentally and in administrative and socio-economic setups. Then comes the cross-sectional study design, which limits the research since data are collected at one point in time and cannot establish causes or assess long-term effects. An additional limitation may stem from bias in self-reported data from hotel staff, with either social desirability or inaccurate recall. The study's scope, on the other hand, focused narrowly on internal water conservation practices, overlooking the effects of such external factors as policy frameworks, community dynamics, or tourist behaviour. Lastly, hotel performance was studied under a few performance parameters, while others, like employee engagement, brand value, and investor interest, may be significant indicators in this regard.

Future Research Directions

The future water-conservation research in the hotel industry can benefit by considering a few

Article DOI: https://doi.org/10.37284/ajthm.4.1.3024

key directions. First, there is a need for longitudinal research tracking the long-term effects of conservation practices on hotel performance while considering changes that are seasonal and sustainability-oriented. Regional or cross-country level comparative studies could reveal how diverse environmental and policy contexts influence the efficacy of water-saving activities. Inclusion of viewpoints of other important stakeholders like tourists, local communities, and policymakers would allow a holistic understanding of the issues and possibilities regarding water management. Furthermore, the investigation into water conservation could facilitate the integration of other sustainability practices like energy and waste management, which would present synergistic effects on hotel operations and on the ecosystem on a broader level. Lastly, aiming to look for scalable and cost-effective conservation solutions, research needs to look into innovative technologies such as AI-enabled monitoring tools and rainwater harvesting systems.

REFERENCES

Abd El-Latief, M., & Saleh, M. (2020). Sustainability and Water Consumption Rationalization in the Hotel Sector: Applied to Five-Star Hotels in Hurghada. *International Journal of Heritage, Tourism and Hospitality*, *14*(1), 1–21. https://doi.org/10.21608/ijhth.2020.120256

Abdallah, A. L., & Antary, T. M. A. L. (2021). Key discriminant factors affecting hotels owners and managers tendencies towards implementation of water conservation measures, and rainwater harvesting systems installation at hotels in Jordan. *Fresenius Environmental Bulletin*, *30*(1), 779–789.

Abdelrady, M., & Hussien, F. (2020). The Relationship between Water Management, Operational Performance and Competitive Advantage in Egyptian Hotels. *International Academic Journal Faculty of Tourism and Hotel Management*, *6*(1), 1–31.

Abdou, A. H., Hassan, T. H., & Dief, M. M. El. (2020a). A description of green hotel practices and their role in achieving sustainable development. *Sustainability (Switzerland)*, *12*(22), 1–21. https://doi.org/10.3390/su12229624

Abdou, A. H., Hassan, T. H., & Dief, M. M. El. (2020b). A description of green hotel practices and their role in achieving sustainable development. *Sustainability (Switzerland)*, *12*(22), 1–21. https://doi.org/10.3390/su12229624

Ali, E. B., Anufriev, V. P., & Amfo, B. (2021). Green economy implementation in Ghana as a road map for a sustainable development drive: A review. *Scientific African*, *12*, e00756.

Alrawad, M., Lutfi, A., Alyatama, S., Al Khattab, A., Alsoboa, S. S., Almaiah, M. A., Ramadan, M. H., Arafa, H. M., Ahmed, N. A., & Alsyouf, A. (2023). Assessing customers perception of online shopping risks: A structural equation modeling–based multigroup analysis. *Journal of Retailing and Consumer Services*, *71*, 103188.

Amin, M. E. (2005). *Social Science Research: Conception, Methodology and Analysis*. Makerere University.

Antonova, N., Mendoza-Jiménez, J., & Ruiz-Rosa, I. (2023). Determinants of Water Consumption in Hotels: New Insights Obtained through a Case Study. *Water*, *15*(17), 3049.

Antonova, N., Ruiz-Rosa, I., & Mendoza-Jiménez, J. (2021). Water resources in the hotel industry: a systematic literature review. *International Journal of Contemporary Hospitality Management*, *33*(2), 628–649.

Awang, Z., Afthanorhan, A., Mohamad, M., & Asri, M. A. M. (2015). An evaluation of measurement model for medical tourism research: the confirmatory factor analysis approach. *International Journal of Tourism Policy*, *6*(1), 29–45.

Article DOI: https://doi.org/10.37284/ajthm.4.1.3024

Barakagira, A., & Paapa, C. (2023). *Green practices implementation for environmental sustainability by five-star hotels in Kampala, Uganda*.

Barakagira, A., & Paapa, C. (2024). Green practices implementation for environmental sustainability by five-star hotels in Kampala, Uganda. *Environment, Development and Sustainability*, *26*(4), 9421–9437.

Barberán, R., Egea, P., Gracia-de-Rentería, P., & Salvador, M. (2013). Evaluation of water saving measures in hotels: A Spanish case study. *International Journal of Hospitality Management*, *34*, 181–191.

Dijkstra, T. K., & Henseler, J. (2015). Consistent Partial Least Squares. *MIS Quarterly*, *39*(1), 1–44. http://misq.org/consistent-partial-least-squares-path-modeling.html

Franke, G., & Sarstedt, M. (2019). Heuristics versus statistics in discriminant validity testing: a comparison of four procedures. *Internet Research*, *29*(3), 430–447. https://doi.org/10.1108/IntR-12-2017-0515

Grace, L. (2022). *Nature, causes and development implications of ecological injustice in Uganda*.

Hair, J. F., Matthews, L. M., Matthews, R. L., & Sarstedt, M. (2017). Updated guidelines on which method to use. *International Journal of Multivariate Data Analysis*, *1*(2), 107.

Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing Theory and Practice*, *19*(2), 139–152. https://doi.org/10.2753/MTP1069-6679190202

Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European Business Review*, *31*(1), 2–24. https://doi.org/10.1108/EBR-11-2018-0203

Hair, J. F., Sarstedt, M., Hopkins, L., & Kuppelwieser, V. G. (2014). Partial least squares structural equation modeling (PLS-SEM): An emerging tool in business research. *European Business Review*, *26*(2), 106–121. https://doi.org/10.1108/EBR-10-2013-0128

Han, H., Lee, J.-S., Trang, H. L. T., & Kim, W. (2018). Water conservation and waste reduction management for increasing guest loyalty and green hotel practices. *International Journal of Hospitality Management*, *75*, 58–66.

Han, H., Lee, M. J., & Kim, W. (2018). Promoting towel reuse behaviour in guests: A water conservation management and environmental policy in the hotel industry. *Business Strategy and the Environment*, *27*(8), 1302–1312. https://doi.org/10.1002/bse.2179

Hart, S. L. (1995). A natural-resource-based view of the firm. *Academy of Management Review*, *20*(4), 986–1014.

Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, *43*(1), 115–135. https://doi.org/10.1007/s11747-014-0403-8

Langgat, J., Ramdani, B., Pavic, S., & Tok, E. (2023). Environmentally sustainable practices and hotel performance: Evidence from Malaysia. *Sustainability*, *15*(6), 5289.

Mbasera, M., Plessis, E. Du, Saayman, M., Commercii, M. K.-A., & 2016, undefined. (2016). Environmentally-friendly practices in hotels. *Journals.Co.Za*, *16*(1), 362. https://doi.org/10.4102/ac.v16i1.362

National Enviromental Authority. (2016). *NATIONAL BIODIVERSITY STRATEGY AND ACTION PLAN II (2015-2025) Theme : Supporting Transition to a Middle Income Status and Delivery of Sustainable Development Goals* (Issue October 2016).

Omune, B., Kambona, O., Wadongo, B., & Wekesa, A. (2021). Environmental management practices implemented by the hotel sector in Kenya. *World Leisure Journal*,

Article DOI: https://doi.org/10.37284/ajthm.4.1.3024

63(1), 98– 108. https://doi.org/10.1080/16078055.2021.1888001

Palinkas, L. A., Horwitz, S. M., Green, C. A., Wisdom, J. P., Duan, N., & Hoagwood, K. (2015). Purposeful sampling for qualitative data collection and analysis in mixed method implementation research. *Administration and Policy in Mental Health and Mental Health Services Research*, *42*, 533–544.

Park, J., Park, Y., Yoo, J. L., & Yu, J. (2021). Can hotel companies' water conservation management and waste reduction measures influence hotel customers' willingness to pay more and intention to revisit? *International Journal of Environmental Research and Public Health*, *18*(17). https://doi.org/10.3390/ijerph18179054

Roldán, J. L., & Sánchez-Franco, M. J. (2012). Variance-based structural equation modeling: Guidelines for using partial least squares in information systems research. In *Research methodologies, innovations and philosophies in software systems engineering and information systems* (pp. 193–221). IGI Global.

Sarstedt, M., Ringle, C. M., & Hair, J. F. (2021). Partial least squares structural equation modeling. In *Handbook of Market Research* (pp. 587–632). Springer.

Syahputra, B., Kiono, B. F. T., & Sudarno. (2023). Water Conservation Model in Hotel and Apartment Building in Semarang City, Indonesia. *International Journal of GEOMATE*, *25*(110), 9–20. https://doi.org/10.21660/2023.110.3691

Tirado, D., Nilsson, W., Deyà-Tortella, B., & García, C. (2019). Implementation of water-saving measures in hotels in Mallorca. *Sustainability (Switzerland)*, *11*(23), 1–13. https://doi.org/10.3390/su11236880

Tu, Y., & Wu, W. (2021). How does green innovation improve enterprises' competitive advantage? The role of organizational learning. *Sustainable Production and Consumption*, *26*, 504–516.

Untaru, E.-N., Ispas, A., Candrea, A. N., Luca, M., & Epuran, G. (2016). Predictors of individuals' intention to conserve water in a lodging context: The application of an extended theory of reasoned action. *International Journal of Hospitality Management*, *59*, 50–59.

West, P. W. (2016). Simple random sampling of individual items in the absence of a sampling frame that lists the individuals. *New Zealand Journal of Forestry Science*, *46*, 1–7.

Wong, K. K.-K. (2013). Partial least squares structural equation modeling (PLS-SEM) techniques using SmartPLS. *Marketing Bulletin*, *24*(1), 1–32.

Yang, Y., Jiang, L., & Wang, Y. (2023). Why do hotels go green? Understanding TripAdvisor GreenLeaders participation. *International Journal of Contemporary Hospitality Management*, *35*(5), 1670–1690.

Yuniati, N. (2021). Green hotel concept and practices in Indonesia. *E-Journal of Tourism*, *8*(2), 184–196.

Zhang, Y., Hou, Z., Yang, F., Yang, M. M., & Wang, Z. (2021). Discovering the evolution of resource-based theory: Science mapping based on bibliometric analysis. *Journal of Business Research*, *137*, 500–516.

