Green innovation and sustainability in Saudi hospitality and tourism industry: The mediating role of vision 2030

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A B S T R A C T

This research aims to investigate the upcoming challenges of green innovation and sustainability in the hospitality and tourism sectors of Saudi Arabia and the mediating role of National Vision 2030 in fostering industry growth. A quantitative design was used, and a close-ended questionnaire was used to collect data from 499 respondents in the hospitality and tourism sectors of Saudi Arabia. The analysis was performed using SmartPLS and structural equation modeling (SEM). The findings indicate several upcoming challenges, such as renewable energy consumption, energy efficiency, and the changing preferences of consumers. However, these challenges can be dealt with adequate government policies and the mediating role of the Saudi Arabia 2030 vision to achieve sustainability in the hospitality and tourism sectors. These findings have theoretical and practical implications, which are discussed in the end. The scope of the findings is constrained to the geographic context of Saudi Arabia, inviting future investigations in a broader international context.

1. Introduction

Overcoming its traditional image of a conservative state, the Saudi Vision 2030 is designed to increase the diversification of economic avenues along with social and cultural empowerment by Saudi Crown Prince Muhammad Bin Salman (Abuhjeeleh, 2019). The vision is designed to address the overwhelming rate of globalization worldwide and make Saudi Arabia an important part of the journey toward sustainability and innovation. Economically, the country has been dependent on exporting its natural reserves in the form of oil and gas. However, Saudi Vision 2030 has enabled the country to focus on tourism. Traditionally, the country's vision was limited to religious tourism under the obligatory pilgrimage in Islam, which occurred on a specific date annually (Ahmad & Siddiqui, 2024). However, as part of the diversification program, the Saudi government indulged in the development of downtown Jeddah, NEOM, and the Al-Faisaliah Project, among many other projects in various locations of the country, to surge tourism.

The inclusion of sustainable tourism practices has readily embraced the presence of an energy management system that marginalizes the use of non-renewable resources to provide a hospitable environment in hotels. Rahim et al. (2019) determined that the European governments have imposed limitations on hotels to keep their temperature maintained at 26 degrees Celsius in pursuit of conserving energy. However, it is noticed that the tourists have dynamic needs in terms of temperature setting, which has limited their interest in a destination with an energy management system. Contrarily, in the case of Saudi Arabia, the country is perceivably newly introduced to the urban tourism sector, where the country predominantly relies on religious tourism. Thus, the practices of energy management systems can be significantly detrimental to the growth of the sector.

However, the usage of renewable resources in maintaining their carbon emission level toward a low level can sufficiently maintain their level of interest in tourism, and the potential consumers can be readily targeted from all around the world.

Being a conservative country with a controlled economic avenue in the oil and gas sector, Saudi Arabia must reach itself to meet the objectives of Saudi Vision 2030. Ali and Salameh (2021) determined that the achievement of Saudi Vision 2030 can be made possible through international partnerships, which can result in the promotion of a softer image for a diverse population and tourists around the world. The preceding study emphasized that the Muslim tourism market has sufficiently thrived for the Saudi economy due to government control over yearly pilgrimages. However, to develop urban tourism, the Saudi government must address the demand of tourists in a distinct manner that enables them to compete with other destinations in Arab countries, including the UAE and Qatar, which have readily capitalized on the tourism economy. Furthermore, the heavy investment in Qatar in achieving the desired level of tourism must also be completed by the Saudi government.

The reliance of Saudi Arabia on Saudi Vision 2030 for its globalization project has been increasing significantly with time (Ali & Salameh, 2021). However, the inclusion of tourism and hospitality for the country, in the case of urban tourism, is not interpreted efficiently, as the focus of Saudi Vision 2030 is also dependent on technological advancements in the country that could result in trading advantages in the Middle Eastern economy. Dogru et al. (2020) stated that the growth of the leisure economy could be sufficiently increased by the tourism and hospitality sectors, which may incur higher growth than any secondary sector for an economy. In the case of Saudi Arabia, its primary output tool would remain the oil and gas sector; however, the inclusion of the travel and tourism industries can readily empower the country economically. Therefore, the study focused on green innovation and sustainability in the Saudi tourism industry and hospitality to incorporate its alliance with Saudi Vision 2030.

The research aimed to investigate the upcoming challenges of green innovation and sustainability in the hospitality and tourism sectors of Saudi Arabia. Therefore, the following objectives were set for the completion of this study:

- Analyze the role of the tourism and hospitality sectors in the Saudi Vision 2030 in determining the program's success.
- Understand the short-term cost and long-term benefits of green innovation in the hospitality and tourism sectors.
- Investigate the role of sustainable tourism in depicting potential tourist preferences when visiting a country with sustainable tourism.
- Investigation on the importance of sustainable tourism in improving the longevity of the tourism life cycle in Saudi Arabia.
- To provide strategic recommendations for the efficient achievement of Saudi Vision 2030 in the tourism and hospitality sectors.

2. Literature Review and Hypotheses Development

Being focused on the oil and gas sector for its developmental and sustainability budget, the Saudi government designed the Saudi Vision 2030 to improve the diversification of its economic output while increasing its competitiveness in the international market (Ibrahim et al., 2021). Traditionally, the country has governed and obtained global recognition using conservative methodology and increased dependence on its oil and gas reserves. However, Vision 2030 is to control their dependence on the oil and gas sector to establish an important image in the era of globalization and internationalization. Waheed et al. (2020) determined that oil-based economies have readily aimed to diversify their economic strategies in pursuit of addressing the depreciating reserves by the year. Since oil and gas are in limited quantities, the long-term sustainability of an economy can never be addressed with limited resources. Therefore, the Saudi government believed they should increase the diversity of their offerings while increasing their competitiveness in the fields of tourism, technology, and retail. The vision has enforced the development of new cities that withstand the cultural acceptability required for the Western population in the conservative population of Saudi Arabia. Ibrahim et al. (2021) stated that competitive labor cannot migrate to areas with controlled acceptance of their culture. As a result, Saudi Arabia has envisioned separate cities with distinct business and investment opportunities for foreigners that could assist their prevalence in the country. Furthermore, the UAE also incorporated a similar practice, which raised the cultural acceptability index in the region while empowering their economy rather than trading their natural reserves (Spiess et al., 2012). It primarily enabled the country to portray a softer image in the world despite being under authoritarian rule. Thus, the Saudi government has to enlist a similar level of enthusiasm for welcoming foreign cultures and enhancing the diversity within the region to address globalization.

Caldeira and Kastenholz (2019) stated that the decision to migrate is readily powered by the perceptions of individuals toward a particular region. Therefore, the region needs to provide a liberal image that inhibits acceptance of foreign culture. Currently, the Saudi region is looked upon as conservative and traditional, with a lack of regard for foreign culture by the local population. However, with the increase in tourism, it is depicted that the company can sustain the level of advantage in its favor by providing tourism opportunities to individuals and showcasing its redefined image. Currently, the tourism sector only allows and motivates the Muslim population; however, with a liberalized image in the rest of the unutilized land of Saudi Arabia, the

country can comprehensively attain the attention of the possible tourists, which motivates diversity within the economy and also seeks foreign direct investment as an economic avenue for the government.

2.1 Green Innovation in the Hospitality and Tourism Industry

Green innovation in the tourism industry is focused on the conservation of energy and emissions of carbon (Yue et al., 2021). Mishra et al. (2022) determined that the tourism industry is extensively criticized for its higher carbon emissions while contemplating that the net benefit, in terms of environmental cost, may become negative. Therefore, green innovations must be exercised in the tourism and hospitality industries to maintain economic sustainability. The preceding study also identified that green innovation in energy conservation through renewable resources is costly for an introductory destination. Gurlek and Koseoglu (2021) stated that the inclusion of higher costs through green innovation should only be incorporated after the initial response from the tourists. However, with a widespread understanding of consumer behavior and tourist preferences, a destination can readily achieve its targeted market extensively while maintaining its feasibility. Therefore, developing new destinations should consider green innovations to finalize the destination's sustainability.

Despite the presence of tourism in Europe, which includes a range of groups, including adventure, urban, and luxury tourism, Qu et al. (2022) stated that their concern has largely shifted toward the conservation of the environment. Contrarily, countries with marginalized tourism have not readily incorporated the calculation of carbon emissions and environmental costs associated with tourism development and limited budgets. However, Yue et al. (2021) emphasized that the upcoming regions for tourism should readily integrate energy efficiency mechanisms along with transportation methods that control the region's carbon emissions. Furthermore, the preceding study highlighted that the initiatives could sustain air quality within the region, which can assist in gaining the attention of tourists. Therefore, it readily opens up the possibility of luxury tourism in the region through collaboration with exquisite accommodation facilities. Culturally inclined countries have extensively marketed their traditions through the hospitality sector; however, their lack of concern for the environment has readily depreciated tourist interest. Thus, the emphasis is placed on green innovation to maintain the longevity of tourists' interests.

Using renewable sources for energy consumption has become an upcoming trend in the tourism industry. The use of solar power, windmills, and hydropower has readily attracted the attention of developing economies to rejuvenate their tourism industries. However, the higher initial cost of investment has readily subsidized the interests of governments. Dogru et al. (2020) stated that the long-term investment expenditure in renewable energy is sufficiently marginal, and the return on investment is higher along with the controlled environmental cost. Furthermore, green innovations are focused on modes of transportation where tourist locations are accessible by large transport units, which marginalizes carbon emissions on a per-passenger basis. As a result, air quality and sustainability are efficiently addressed.

Based on the preceding discussion, we postulate the following hypothesis:

H₁: *Green innovation has a significant influence on hospitality and tourism growth.*

2.2 Sustainability in the Hospitability and Tourism Industry

Sustainable tourism is the type of tourism that takes short- and long-term costs into consideration with factors such as economic, social, and environmental factors for prolonged interest in the industry (Elmo et al., 2020). However, Cotterell et al. (2021) stated that the urgency of economic growth through tourism has readily marginalized the presence of tourism. Furthermore, the involvement of private businesses aiming to increase the liquidity of businesses has also marginalized the presence of sustainability. Contrarily, the recent development of sustainable tourism resorts and destinations has readily changed the landscape of the tourism industry, as tourists prefer going to sustainable destinations due to the cleaner environment that enables them to take a break from an urbanized lifestyle. However, the popularity of sustainable tourism is still not in the majority due to higher costs and marginalized luxury. Breisinger et al. (2020) determined that the increased cost of tourism is primarily due to businesses aiming for profitability. Thus, a need for government intervention was identified to capitalize on tourism interest through price control.

Governments of developing economies have distributed their tourist destinations from their economic regions to diversify their economic avenues (Asadi et al., 2020). Furthermore, it enables them to protect their cultural heritage and preserve the environment. In the case of Bali, Indonesia, it was noticed that the local culture of Bali was sufficiently marginalized in presence due to the increased global interest of tourists who demanded to mold the destination following their requirements. Since the tourism business is competitive, businesses seem to lose their interest in the social impact of tourism while prioritizing economic betterment. In the long run, Buhalis and Karatay (2022) stated that tourism is readily marginalized due to a lack of cultural offerings in the destination. Therefore, sustainable tourism practices for preserving culture are being readily prioritized in the upcoming development of destinations. The preceding study highlighted that local culture is part of the tourist experience that enables them to realize the diversity of language, practices, religion, and other attributes of daily lifestyle. Including diverse festivities is also a keen, intriguing point for cultural tourism, which is lost in unsustainable tourism development.

Khan et al. (2021) determined that the presence of sustainable tourism increases the level of responsibility of the tourist, with active government regulations in place for violations of sustainable tourism practices. The preceding study emphasized that intrinsic motivation among tourists is deterred if they are imposed with rules and regulations in a tourist destination if they are not accustomed to the rules from their home region. However, it positively increases awareness among intrinsically motivated tourists, which enables them to market the destination through word-of-mouth marketing. Telfer and Sharpley (2015)claimed that the increase in population with environmental concerns has readily fueled the tourism industry. Furthermore, it has increased tourists' sensitivity to cultural acceptance. It empowers the local community to demonstrate their culture with a higher level of acceptability. As a result, sustainable tourism enhances the tourist-host relationship, leading to a hospitable environment that also contributes to tourism interest.

Butler's tourism lifecycle distributes touristic interest levels into five distinct stages, which include the exploration stage, involvement stage, development stage, consolidation stage, and stagnation stage (McKercher & Wong, 2021). The lifecycle determines that the peak of tourism interest marginalize over time as the market size is limited, challenging the market's affordability due to rising inflation. Furthermore, the presence of competition was also acknowledged in the model, where it was determined that the competition extends their hospitality features or touristic destinations to lure tourists' attention in their favor. It can be addressed by improving facilities in other regions while comparing cost-benefit analyses from tourists' viewpoints to determine their effectiveness. Competition among European tourist destinations is readily understood through Butler's tourism lifecycle (Fig. 1), which enables the government to allocate a certain level of developmental budget in their tourist regions to address competition. Therefore, the stagnation stage is sufficiently delayed by the businesses. Furthermore, the private sector's keen interest in elongating the destination's lifecycle readily empowers the government to assist them in maintaining and enhancing potential tourists' interest.
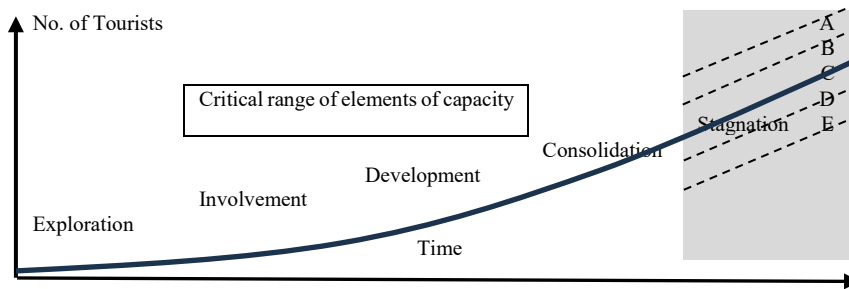

Fig. 1. Butler's Tourism Lifecycle

Buhalis and Karatay (2022) stated that generating renewable energy is a challenge for existing tourism destinations in the tourism lifecycle. It was depicted that the investment in depreciation of interest in tourism for a particular destination should be addressed by enhancing the infrastructure of facilities associated with the destination. However, in the case of changes in energy systems, investment cannot be made to enhance the viewable pleasure for tourists. Qu et al. (2022) stated that renewable energy installation and usage should concern businesses. However, in developed areas of tourism, the increasing cost of solar power generation has subsidized the interest of businesses, and the speculation associated with the non-achievement of a return on investment has readily increased. Therefore, it presented itself as a greater challenge for developing the tourism industry, as the development method was not finalized. This discussion, in turn, leads us to the following hypothesis:

H₂: *Sustainable tourism has a significant influence on hospitality and tourism growth.*

2.3 The Role of Saudi Vision 2030

The Saudi Government, as part of their plan for Saudi Vision 2030, is developing new sites for tourism that are distinct from their existing developed locations, which enables a higher level of preservation of culture and marginalizes the social impact of tourism in the local industry Hassan et al. (2022). Al Mohaya and Elassal (2021) determined that the lack of social concern for tourism in Saudi Arabia extends its capabilities to enhance tourism levels in distinct tourism destinations, resulting in a higher level of interest from internal industry stakeholders. It empowers economic endeavors for the country, while the lifecycle of a destination is powered by features that attract tourists. Furthermore, the new development of tourism depends on sustainable initiatives to elongate the tourism lifecycle. Therefore, the Saudi government has reciprocated the interest by converging its policies with the interests of private businesses in assisting tourism in the respective region. The principal strategy of the government is to provide infrastructure with offerings that interest globalized tourists. However, Kim et al. (2021) determined that the globalized tourism requirement may disrupt the preservation of their local culture by spreading into the local region. Therefore, the government's involvement is highly critical to determining the sustainability level of tourism in the region.

Currently, in the development stage of the tourism lifecycle, Saudi Arabia has focused on developing Neom, the Red Sea Project, and Qiddiya Khan et al. (2021). Each of the preceding destinations is aimed at addressing tourist requirements, which enhances their willingness to visit the destination. Furthermore, domestic connectivity is also improved within the country to empower business owners and tourists to explore other regions of Saudi Arabia. However, the prohibition of non-Muslim tourists in the areas of Makkah and Madinah can marginalize the number of tourists. Therefore, Saudi Arabia has extensively facilitated the interest of tourists in the preceding 3 destinations mentioned to promote their cultures. The over-attention of tourists during the pilgrimage season in Saudi Arabia readily requires the government to take over through protective measures on entry. However, developing new destinations for globalized tourists can readily enable the country to seek the desired level of diversity envisioned in Saudi Vision 2030. This indicates the influence of Vision 2030 on hospitality and tourism sector growth, primarily led by green innovation and sustainable tourism. Thus, we propose the following hypothesis:

H3: *Green innovation and sustainable tourism in the hospitality and tourism sectors are mediated by Saudi Vision 2030s.*

Fig. 2 presents the conceptual framework of the study based on the literature review and proposed hypotheses.
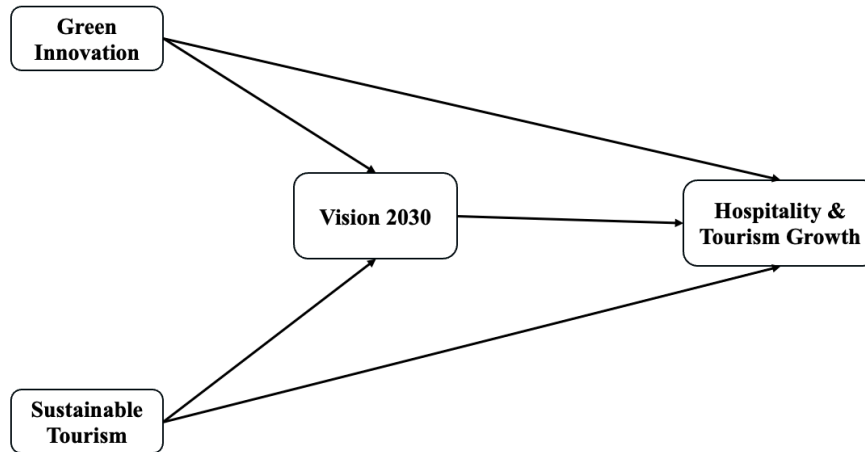

Fig. 2. Conceptual Framework

3. Method

The research aimed to investigate the future challenges associated with green innovation and sustainability in the tourism and hospitality sectors in Saudi Arabia. Therefore, the study incorporated a positivist research philosophy, enabling the research to reason out its findings, resulting in a higher ecological validity. Marsonet (2019) stated that the inclusion of positivism enables research to be focused on quantifiable results, which establish relationships between variables through magnitudes in pursuit of interpreting the strength of relationships. In the case of research on the tourism and hospitality industries, the existing literature is already powered by qualitative findings expanding on tourists' experiences. However, for challenges associated with green innovation and sustainability, the research's criticality impacts the government's investment behavior, which requires focused results. Therefore, positivism was integrated into this research.

3.1 Data Collection

Employing a quantitative research method, primary data was collected from survey questionnaires. The desired respondents included managers and staff in the hospitality and tourism sector of Saudi Arabia. The study used Google Forms, where links were shared with the respondents to be completed. The use of quantitative data from primary sources was prioritized for the research in pursuit of vitalizing positivism and deductive approaches. El Archi et al. (2023) determined that using primary resources in tourism research can extensively empower the study to facilitate new findings about the current tourism needs. Since Shi et al. (2020) determined that the tourism industry is extensively diverse and readily changes consumer preferences, it was therefore important for the study to incorporate the use of quantitative data from primary sources.

3.2 Population & Sampling

To determine the sample from the population, the research uses purposive sampling. Purposing sampling is defined as non-probability sampling, which is selective while recruiting participants Etikan et al. (2016). For this purpose, the research selected this technique to recruit employees who serve in the hospitality and tourism sectors of Saudi Arabia. For reviewing the sample, the accurate number of representatives was unknown; therefore, the research used the formula to determine an unknown sample. The formula used in the study has been prescribed by Herkenhoff and Fogli (2013), as given below:

$$n = \frac{z^2 \times p \times (1-p)}{e^2}$$

As per the calculation, the 'p' value stands for the population that is intended to be included in the research. While 'z' relates to the standard score with 95% confidence. Below, the values have been inserted to obtain the required sample size:

$$n = \frac{(1.96)^2 \times 0.5 \times (1 - 0.5)}{(0.05)^2} = 384$$

Therefore, the research required a minimum sample size of 384 participants. Initially, 950 hotel managers and staff were approached, of whom only 550 attempted the survey. However, only 499 complete responses were retained for final data analysis, and incomplete responses were excluded.

3.3 Research Instrument

The current research paper has acquired a quantitative design; therefore, the research instrument has been effectively designed based on a closed-ended questionnaire. Moreover, the developed questionnaire was made on a 5-point Likert scale, with statement responses ranging from strongly disagree to strongly agree. The questionnaire was developed in English and Arabic for effective comprehension.

3.4 Data Analysis Technique

The data collected through the primary survey has used structural equation modeling (SEM) for the overall analysis. Moreover, the tool used was dependent on partial least squares (PLS), which does not require normally distributed data (Hair et al., 2021). Hence, the test was effectively performed on SmartPLS, and the outcome included the measurement model for testing validity, reliability, path assessment, blindfolding technique, and factor loading for investigating the predictive relevance linked with the model.

With regard to ethical measures, an informed consent form was adopted to seek the subject's approval on data collection. Brittain et al. (2020) proposed that the consent form for primary research should include such information concerning the data and the participants as might be required. Thus, while completing the informed consent form, participants were also informed about the relevant information included in the consent form and the researcher's assurance that the participant credentials would be kept confidential and other identification information would be removed after the research was over. If the participants were more uncomfortable in responding to the data collection techniques, they were given an option that if they want, they can leave and this was as per ethial measures.Therefore, this study also adhered to principles of ethical consideration while doing the primary research to obtain the samples that are ecologically valid.

4. Findings

4.1 Confirmatory Factor Analysis (CFA)

CFA is dependable statistical analysis technique that is widely used usually, to validate the factor structure of the measured variable. CFA enables the researcher to parse hypotheses on the connection between endogenous observed variables and exogenous latent variables. Convergent validity and discriminant reliability are best suited by means of CFA, researchers can assess latent constructs, Cronbach's Alpha, as well as composite reliability which are vital for verifying internal consistencies and reliability of constructs. The use of this method is evident in research works like Ahmad and Iqbal (2022), Syed et al. (2020) and Eltayeb and Ahmad (2021) as documented.

Table 1
Construct Reliability And Validity

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Green Innovation	0.894	0.895	0.922	0.703
Hospitality and Tourism Sector	0.923	0.925	0.942	0.765
Saudi Vision 2023	0.909	0.92	0.933	0.735
Sustainability	0.808	0.812	0.866	0.564

Construct validity and reliability of the study is presented in the table 1 as follows: According to Ahmad et al. (2019), if Cronbach alpha score is to be considered adequate, it should be greater than 0. 70. Vaske et al. (2017) also defend the Cronbach Alpha to be used as a reliable measure which evaluates the consistency of the participants' scores to the items tested. The following table indicates the composite reliability for constructs such as green innovation, sustainability, Saudi Vision 2023, and the hospitality and tourism sectors. The Cronbach Alpha values for the above-mentioned variables are 0.894, 0.808, 0.909, and 0.923, respectively. The Cronbach Alpha statistics for all the variables above are found to be greater than 0.7. This

indicates that the constructs encompass high internal consistency. Afterward, the composite reliability was tested for all the constructs. The composite reliability for the constructs was green innovation (.922), sustainability (0.866), Saudi Vision 2023 (.933), and the hospitality and tourism sector (.942). The statistics displayed that there was high composite reliability, which means the constructs ought to be reliable. Lastly, the average variance extract (AVE) for the variables was calculated, which, to be acceptable, should be more than 50. Considering the result, the AVE values for the variables were green innovation (.703), sustainability (.564), Saudi Vision 2023 (.735), and the hospitality and tourism sector (.765). The result depicts that the value of all the constructs is higher than.50; therefore, it can be interpreted that the constructs mentioned are acceptable for the analysis, and the outcome is positive. The overall result of the confirmatory analysis showcases that the constructs in the model are highly reliable and valid.

Table 2
Discriminant Validity

	Green Innovation	Hospitality and Tourism Sector	Saudi Vision 2023	Sustainability
Green Innovation				
Hospitality and Tourism Sector	0.391			
Saudi Vision 2023	0.721	0.555		
Sustainability	0.698	0.544	0.672	

As shown in Table 2, the discriminant validity was also established to assess the validity related to the data. It is assumed that the HTMT ratio should be lower than the value of 0.85 to be valid (Iqbal & Ahmad, 2022). In the above table, the values of variables such as green innovation, sustainability, Saudi Vision 2023, and the hospitality and tourism sector were lower than 0.85. Hence, the data is valid and does not violate the assumptions of discriminant validity.

4.2 Path Assessment

Path analysis is used intensively to estimate equations in systems where multiple observed variables exist, which provides a deeper analysis than regression models. Yusif et al. (2020) elicited that path analysis includes more than one variable hence enabling the determination of the interaction of variables in a better way. After conducting a CFA to confirm discriminant validity and construct reliability of the measures, the study used bootstrapping procedures to analyse the effect of green innovation and sustainability on the hospitality and tourism industries. Specifically, this analysis particularly concentrated on the meditating factor of the Saudi Arabia's 2030 vision. In SmartPLS software, bootstrapping is effectively used as suggested by Ramayah et al. (2018) to determine the reliability of the estimated process coefficients and paths. In this way, several subsamples were created from different data sets, and the estimation of the process model and path analysis on a large scale can be conducted. It also helps in boosting the reliability of the model because influences within the model can be evaluated on statistically sound grounds.

Table 3
Direct Effects

	Original sample (O)	T statistics (|O/STDEV|)	P values
Green Innovation → Hospitality and Tourism Sector	-0.076	1.351	0.177
Green Innovation → Saudi Vision 2023	0.482	9.544	0.000
Saudi Vision 2023 → Hospitality and Tourism Sector	0.391	7.275	0.000
Sustainability → Hospitality and Tourism Sector	0.293	4.829	0.000
Sustainability → Saudi Vision 2023	0.300	5.797	0.000

Hence, considering Table 3, the variables' path coefficients and significance levels have been identified. The path coefficient is recognized as a measure that studies the association between the variables. The first variable tested was green innovation, where the path coefficient value was -0.076. Since the path coefficient value is negative, it showcases an inversely negative and weak correlation with the performance in the hospitality and tourism sectors. The p-value for the variable is 0.177, which is higher than the threshold, therefore indicating that the association between the variables is insignificant. Similarly, the path coefficient value between green innovation and the mediating variable, i.e., Saudi Vision 2030, was 0.486; this indicates a positive and strong association between the variables. The p-value is also 0.000, which means less than 0.05 and indicates significance.

The path coefficient value for the Saudi Vision, Hospitality, and Tourism sectors was 0.391, with a P-value of 0.000. Hence, it can be interpreted that the association between the mediating and the dependent variables is significant and strong. Similarly, sustainability was tested against the dependent and the mediating variables. Regarding the dependent variable, the path coefficient value for sustainability was 0.293 with a P-value of 0.000; therefore, it can be interpreted that the association between the variables is positive, significant, and strong. In terms of the mediating variable, the path coefficient value for the variable was 0.300, indicating that the association between the variables is strong, positive, and significant.

Table 4

Indirect Effects

	Path Coefficient	T statistics	P values
Green Innovation → Hospitality and Tourism Sector	0.188	5.819	0.000
Sustainability → Hospitality and Tourism Sector	0.117	4.471	0.000

Table 4 above indicates the indirect effect after recognizing the measurement error for the construct. The above table shows that the path coefficient value for green innovation is 0.188, indicating that the association between green innovation and performance in the hospitality and tourism sectors is moderate and significant. The significance can be undermined by the p-value, which assesses significance by considering the overall indirect effect. The p-value for the first construct is 0.000, indicating that green innovation has indirect implications for the performance of the tourism and hospitality sectors.

For the second variable, i.e., sustainability, the value of the path coefficient is 0.117, which indicates a moderate association with performance in the hospitality and tourism sectors. It depicts that sustainability has a moderate indirect effect on the performance of the hospitality and tourism sectors. The p-value for the variable is 0.000, which is again less than the threshold, indicating that the indirect impact of sustainability is significant statistically. The overall result above depicts that both green innovation and sustainability significantly indirectly affect the performance of the hospitality and tourism sectors.

Table 5

Specific Indirect Effects

	Path Coefficient	T statistics	P values
Green Innovation → Saudi Vision 2023 → Hospitality and Tourism Sector	0.188	5.819	0.000
Sustainability → Saudi Vision 2023 → Hospitality and Tourism Sector	0.117	4.471	0.000

The table above indicates the indirect effect by overviewing the independent, dependent, and mediating variables. Therefore, firstly, the green innovation, Saudi Vision 2030, and hospitality and tourism sectors were studied. The path coefficient value for this was 0.188, indicating weak association, while the p-value was 0.000, therefore showcasing statistical significance for the specific indirect effect. It indicates that green innovation has a weak indirect but significant effect on the hospitality and tourism sectors, as mediated by Saudi Vision 2023. Therefore, it can be claimed that the Saudi Vision 2030 significantly mediates green innovation and the hospitality sector.

Similarly, the second variable tested was sustainability, Saudi Vision 2030, and the hospitality and tourism sectors. The path coefficient value for this was 0.117, again indicating weak association, while the p-value was 0.000, therefore showcasing statistical significance for the specific indirect effect. It indicates that sustainability has a weak indirect but significant effect on the hospitality and tourism sectors, mediated by Saudi Vision 2023. Therefore, it can be claimed that, like the first variable, Saudi Vision 2030 significantly mediates sustainability and the hospitality sector.

On the other hand, for objective-based authenticity, satisfaction, and destination loyalty, the path coefficient value is 0.030, which is a weak association. While the p-value for the construct is 0.213, which is higher than the threshold value, This showcases that objective-based authenticity has a weak and non-statistically significant association with loyalty mediated by satisfaction. Therefore, it can be said that satisfaction does not mediate the association between destination loyalty and objective-based authenticity.

4.3 Predictive Relevance and Quality Model

After analyzing the confirmatory factor analysis and path assessment, the predictive quality model and the relevance of the model were analyzed. For this purpose, the R-square and the adjusted R-square values were interpreted. The table below indicates the R-Square values for the hospitality and tourism sectors and the Saudi Vision 2030 0.313 and 0.495, respectively. It indicates that the variance in the hospitality and tourism sectors explains about 31.3% of the variance in terms of Saudi Vision 2023. On the contrary, the R-Square adjusted depicts the degree of freedom, which was 30.9% for the hospitality and tourism sectors, while it was 49.3% for the Saudi Vision 2023. This shows that the R-square adjusted value for the Saudi Vision showcases the degree of freedom in the hospitality and tourism sectors.

Table 6

Quality and Relevance of the Model

	R-square	R-square adjusted
Hospitality and Tourism Sector	0.313	0.309
Saudi Vision 2023	0.495	0.493

5. Discussion

The research was aimed at determining the upcoming challenges of green innovation and sustainability in the hospitality and tourism sectors of Saudi Arabia by analyzing the mediating role of the Saudi 2030 vision. The study findings beneficently append to green innovation, Saudi Arabia Vision 2030, sustainability, and tourism advancement. The result has established

the view that the direct effect of green innovation on the tourism industry was negative albeit insignificant, except for installing a positive, albeit indirect effect on the Saudi 2030 vision. This suggests that Saudi Arabia's vision includes the capacity to address the issues that are associated with the greening of innovation. The findings are, therefore, in line with the propositions of Irfan et al. (2022) where the authors have ascertained that literature points to the need for the government to provide policies to support green innovation in the sector. This is in concordance to the literature of Zolfani et al. (2015) that focused on the environmental aspects and economic values associated with sustainability in tourism.

Confirmatory factor analysis is a statistical procedure familiar in several areas of research which helps to establish the factor structure of observed quantities and also check the links between the observed variables and the latent variables. CFA it is even more useful in testing of convergent validity, discriminant reliability that are crucial for the confirmation of the internal consistency as well as reliability of constructs. Kite and Whitley (2018) highlighted that applicability of this methodology to determine the extent of the pathways of multiple variables in their hypotheses and to confirm the structural coherence of data within the study. These are important to ensure validity in research especially in areas where the models are built with many constructs such as; psychology, marketing, and organizational behavior. Thus, CFA enables the researcher to use his/her constructs with confidence that they really measure what is intended to measure.

CFA has been useful in research that includes constructs such as Green innovation, sustainability, and strategic visions including Saudi Vision 2030. Streimikiene et al. (2021) study examined the effects of these modern practices and concepts of sustainable development in other sectors such as hospitality and tourism industries which experts signify as playing a crucial supportive role in the current international economy and society challenges. In CFA, the quantitative analysis of the model evaluate the reliability of the constructs that they measure what they are supposed to, making the interpretations of constructs' relationships adequate. Cronbach's Alpha values indicated across all the constructs underscore that they possess better internal consistency and it can be concluded that the items belonging to each construct have high inter-item reliability and are capable of reliably gauging the same construct (Ahmad et al., 2019). Further, the values of the composite reliability also support this assertion to mean that there is high internal reliability of all the constructs as measured by the different indicators. AVE values higher than the threshold of 0.50 for all the constructs represent a large extent of explained variance, by the observed variables within the various constructs. Such a level of explained variance is critical for ensuring the constructs invoked are capable of accurately capturing the underlying essence of the latent variables which they're supposed to measure.

 Another advanced technique often employed hand in hand with CFA is path analysis, which elaborates the relation of various variables within a given structural model. This technique guide an investigation of the effects and interdependence of various factors, and it helps provide a thorough understanding of all the aspects within the model. For instance, in research regarding the treatment of green innovation on industrial sectors, path analysis provides understanding not only direct but also mediating effects to be in the service of investigations like the role of strategic vision like Saudi Vision 2030 on circumstance of sustainability efforts on sectoral performance. Mishra et al. (2022) show that the environmental costs, the tourism industry is highly condemned for augmented carbon emissions which is clearly unfavourable for the sector. Therefore, the vision is important as it would enhance physical development in the country, innovations in green industries, and policies in the preservation of the environment. The important mediating role reveals the importance of the industry strategies with the objectives of vision. Epstein's (2018) study suggests that business and government actors should work in partnership for the enactment of best practices as well as to manage sustainability issues.

The application of software tools in the research process and specifically the use of SmartPLS to perform bootstrapping and path analysis shows the development of statistical procedures in research (Ramayah et al., 2018). These methods enable the researchers with the findings that are not only statistically significant but also significance for application that can support the formation of policies and critical organizational decisions. Moreover, predictive models remain as some of the most essential elements used in research. In this way, researchers can make judgments regarding the predictive relevance and quality of the models with the help of such measures like R-square values, which show the proportion of the variance in the dependent variables following from the independent variables included. The discriminant validity gauged through the HTMT ratio is emblematic of the fact that each of the constructs established in the study by Iqbal and Ahmad (2022) and that each is not a mere proxy for the other, thus a very crucial criterion of model testing and validation.

The overall results indicate that sustainability and green innovation are vital for fostering sustainability in the tourism and hospitality sectors across Saudi Arabia. The negative direct implication of green innovation on the sector is largely because of the cost and challenges linked with the execution of green initiatives such as generating renewable energy. For instance, the literature of Buhalis and Karatay (2022) indicates that renewable energy is one of the prominent challenges for existing destinations considering the lifecycle of tourism. It is reported that the investment for the interest depreciation in the tourism of a specific destination must be dealt with by improving the overall facility of the infrastructure linked to the destination. These outcomes can be consequent for policymakers and industry stakeholders striving to integrate organizations' activities into the Strategy for Sustainable Development. It also provide a framework that useful for research in similar contexts in which analysis of the relationship between policies and industry reactions is essential. Regarding the shifts in the existing changes in the energy system, the investment could not be made to the enhancement of the pleasure for tourists (Qu et al. , 2022). However, the result also specifies positive direct relationship, between green innovation and vision of Saudi Arabia hence proved that green innovation has a potential to contribute on to the SD goals of Saudi Arabia.

6. Conclusion and Recommendations

In concluding remarks, it is identified that there are multiple challenges in green innovation and sustainability practices in the hospitality and tourism industry of Saudi Arabia. In order to investigate this, the researcher conducted a survey in which participants from the KSA tourism industry were included, and the collected data was analysed with the help of SEM through SmartPLS for better clarification, interpretation, and justification of the research. It is observed from the result findings, that the tourism industry can be more productive, effective and efficient with the implementation of green management practices in terms of improved and enhanced sustainability. Some challenges are observed from the research in terms of renewable resources and energy efficiency that can be mitigated with the help of Arabia's 2030 vision and its useful practices. The mediating role of this vision helps to improve the tourism and hospitality industry of Saudia Arabia in order to make it more sustainable for catching audiences' attention in order to attract them toward the services. Tourism sectors can increase their business growth, performance management and reputation in the global competitive market. It results in the increased development of the economy with financial stability and profit maximisation that can increase the competitive advantage with the increased GDP gross domestic product of Saudia Arabia.

It is also observed, from the research that green innovation has a great positive influence on the hospitality and tourism industry which is highly appreciated for the increased growth rate in a business context. According to the Saudi Vision 2030, it is observed that the government provide greater support to the tourism industry with the implication of laws and regulations and with the compliance of codes. The government also provide greater support in terms of funding to improve the tourist places for tourists so that when internationals visit these places it attracts and charms them. It can be further improved by suggesting some useful recommendations that can make tourist places sustainable. It is possible by complying with regulations and policies for the safety, security and confidentiality of the tourists. Further, technological advancement, digitalisation, online media marketing and other practices can be adopted to attract customers in order to increase sales and greater revenue generation. It can lead the tourism sector towards success and can increase its productivity and efficacy.

Additionally, further investment is needed to develop sustainable infrastructure such as eco-friendly transportation, energy-efficient hotels, and other renewable energy sources. Moreover, workforce education and capacity building also play an important role, as it is vital to offer adequate training programs for employees in the hospitality and tourism sectors for sustainable tourism and green practices. The study also has significant managerial implications and theoretical contributions. As per the study findings, managers in the tourism and hospitality sectors need to embrace sustainability principles and green innovation to be competitive and contribute toward the objectives and vision of sustainability. The managers must perform comprehensive audits to identify improvement areas and execute energy-saving and other measures for waste reduction. Nonetheless, it is imperative to integrate the consideration of sustainability into business decisions.

7. Limitations and Future Research

The research has significantly contributed to the existing body on sustainability, green innovation, and tourism development by offering evidence concerning the mediating role of Saudi Vision 2030. The study has a few limitations, such as that it is dependent on self-reported data and that there are chances of selection bias in the data collection process. Moreover, the research scope is limited to only geographical locations, as it is in the context of Saudi Arabia. Hence, future studies must address the limitation by employing a more objective method for data collection by reviewing the sector's energy consumption to improve the overall data's accuracy. Moreover, future research studies must use the mixed method effectively by integrating qualitative and quantitative data to make more meaningful findings. Thus, by dealing with the limitations and expanding the research scope, future research studies can offer more meaningful insight into the association between green innovation, tourism development, and sustainability.

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Appendix 1 – Questionnaire

Kindly provide your responses to the following questions on a scale of 1 to 5 (1 = Strongly Disagree; 2 = Disagree; 3 = Neither Agree nor Disagree; 4 = Agree; 5 = Strongly Agree).

Green innovation
Green innovation notably contributes toward environmental conservation, specifically in the hospitality and tourism sectors.
Energy conservation and green innovation can substantially improve profitability and competitiveness of businesses.
The hospitality sector faces increasing challenges for energy conservation; therefore, the sector must invest in R&D to advance its green innovation practices.
Green innovation is considered as significant for attracting the environmentally conscious tourist.
The execution of green innovation is generally challenged by lack of investment and financial resources.
Sustainability
Limited accessibility of eco-friendly technologies along with sustainability alternatives imposes a notable challenge for the efforts of the sector toward sustainability.
Short-term consideration has taken notable precedence over the long-term goal of sustainability.
Lack of recognition toward the practices of sustainability in tourism, which represent a notable challenge for its adoption.
Saudi Vision 2030
The 2030 vision of Saudi Arabia contributes toward dealing with sustainability standards in the tourism sector.
The government plays an important role in improving green innovation in the hospitality and tourism sectors of Saudi Arabia.
The 2030 vision of Saudi Arabia is one of the driving forces that promotes businesses in the tourism and hospitality sectors.
The 2030 vision of Saudi Arabia improves its overall ability to deal with sustainability challenges.
Dependent Variable: Hospitality and Tourism Sector
The challenges linked with execution of green innovation practices notably influences the efforts of sustainability in tourism sector.
The challenges of sustainability have a notable influence on the ability of the sector to offer high-quality experiences to tourists.
The Saudi 2030 vision plays an effective role in dealing with challenges linked to sustainability in the tourism sector.