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# Integrating Geotourism and Community Perspectives for Geoconservation: Evidence from Gökbel Valley

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## Abstract

This study explores tourism role in safeguarding threatened geological heritage through local residents perceptions and governance trust, grounded in Social Exchange Theory and Stakeholder Theory. The focus area, the Gökbel Valley in Yatağan, Muğla, one of Turkey's oldest geological formations, faces escalating risks from intensive mining activities. These environmental pressures heighten the urgency of adopting alternative, conservation-oriented development approaches. Within the study, a 24-item geotourism measurement scale was developed, structured around three core dimensions: geotourism awareness, perceived geotourism impacts, and geotourism satisfaction. The construct validity of the scale was rigorously tested using exploratory and confirmatory factor analyses. Advanced statistical analyses confirmed the scale's validity and reliability, supported by integrated quantitative and qualitative evidence.

The findings indicate that geotourism awareness positively and significantly influences local residents' perceived personal benefits and their sense of influence over tourism-related decisions, but does not support trust in local governance. In contrast, geotourism satisfaction emerges as a strong determinant, enhancing tourism-related knowledge, perceived personal benefits, and governance trust. Qualitative findings further confirm strong community support for geotourism despite low levels of geotourism awareness. These results generate field-applicable recommendations for local authorities and tourism policymakers, contributing to the design of sustainable tourism policies, community engagement programs, and governance models that strengthen local participation and conservation-oriented approaches. The study positions geotourism as a transformative tool for destination promotion, community development, and conservation, with clear theoretical and managerial implications for sustainable tourism policy.

**Keywords:** Geotourism, Geological heritage, Mixed-methods.

**JEL Codes:** Q26, Z32, Q56

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## 1. Introduction

In the 1990s, the concept of geotourism emerged within communities of earth scientists as a means of enhancing public awareness, appreciation, and conservation of geological sites and landscapes (Gordon, 2018). Over the past three decades, this concept has evolved from a niche conservation initiative into a globally recognized framework that links geoheritage, geoconservation, and sustainable tourism (Newsome & Dowling, 2010). Contemporary geotourism not only seeks to protect geological features but also to interpret them for educational and recreational purposes, contributing to local development while maintaining the integrity of the natural environment (Stace & Larwood, 2006).

Within this framework, the district of Yatağan (Muğla Province, southwestern Turkey) stands out as an underexplored area of significant geoheritage potential. Covering 1,772 km², Yatağan is strategically located on the Aydın–Muğla–Milas highway, approximately 28 km from Muğla and 79 km from Aydın. The district is bounded by the Gökbel and Yatağan Mountains to the north, the Göktepe Mountains to the east, the Marçal and parallel Bencik Mountains to the south, and the Aldağ and Kurukümes Mountains to the west. Its geomorphological setting reflects a complex interplay between tectonic, metamorphic, and erosional processes that have shaped southwestern Anatolia over geological time (Yatağan Belediyesi, 2024).

Geologically, Yatağan forms part of the Menderes Massif, one of the oldest metamorphic core complexes in Turkey and the eastern Mediterranean. With an estimated age of nearly one billion years, the Menderes Massif represents an extraordinary geoheritage entity that provides insight into the evolution of the continental crust and the tectono-metamorphic history of the region. In geological terminology, it is classified as a core complex, characterized by high-grade metamorphic rocks and extensive tectonic deformation (Provincial Council Yatağan Geopark Project Proposal, 2008). This formation meets multiple geoheritage evaluation criteria as defined by Brilha (2016):

Scientific Value; The Menderes Massif exposes critical evidence of the tectonic evolution of Anatolia and serves as a natural laboratory for structural and metamorphic studies. Rarity; comparable formations are extremely limited globally, enhancing its uniqueness within the Eastern Mediterranean context. Integrity; despite mining and anthropogenic pressures, large sections of the massif remain well preserved, maintaining stratigraphic and geomorphological coherence. Educational and Interpretive Potential; the massif provides outstanding opportunities for geological education, fieldwork, and interpretation of metamorphic processes. Aesthetic and Cultural Value; the geological formations blend with traditional rural landscapes, offering both scientific and visual appeal for sustainable geotourism initiatives. Ecnomically, the Yatağan region hosts substantial quartz and feldspar deposits, which have driven industrial development for decades (Gül & Uslular, 2017). However, mining activities conducted on rock formations of high geomorphological and aesthetic value present critical threats to their long-term preservation. Balancing economic extraction with conservation imperatives thus constitutes a central challenge for local authorities and stakeholders.

It is evident in the international literature that geotourism is embraced as a multidimensional approach integrating geoconservation, sustainable development, and community empowerment (Farsani et al., 2011; Ólafsdóttir & Dowling, 2014; Farsani et al., 2013). Dowling and Newsome (2022) conceptualize geotourism as a holistic framework that links the interpretation of geological heritage with responsible tourism practices and local community participation. Similarly, UNESCO Global Geopark reports reinforce the view that geoparks represent a convergence of conservation, education, and sustainable economy. Complementing these perspectives, research on community-based geotourism governance (Gupta et al., 2024; Ruban, 2015; Ruban, 2021; Henriques & Brilha, 2023; Louis et al., 2025) underscores the importance of participatory decision-making and shared governance in achieving long-term sustainability. Collectively, these international viewpoints situate the Gökbel Valley case not merely as a conservation strategy but as a driving force of inclusive and community-centered sustainable development within the global discourse on geotourism.

The Gökbel Valley (Yatağan Geopark) Project, initially conceptualized around 2008, sought to protect, interpret, and promote the area's geological features within a geopark framework. The proposal reached the application stage but was eventually suspended due to administrative and financial constraints. Reviving this initiative today holds considerable potential for positioning Yatağan as a regional model of geoheritage-based sustainable tourism. Conducting interdisciplinary research in this vulnerable yet geologically rich area is vital for shaping an innovative, conservation-oriented paradigm within the tourism–nature–conservation nexus, and for integrating Yatağan's geological legacy into broader national and international geopark networks. This integrative framework advances the literature by bridging geoheritage conservation with community-based tourism governance. It reframes residents not merely as passive recipients of tourism impacts but as co-managers of geoheritage resources. By combining SET's focus on perceived exchanges with Stakeholder Theory's participatory lens, the study proposes a dual mechanism through which awareness and trust jointly determine sustainable support for geotourism. This approach directly contributes to filling the theoretical and empirical gaps identified in prior studies and strengthens the conceptual foundation for future geotourism research.

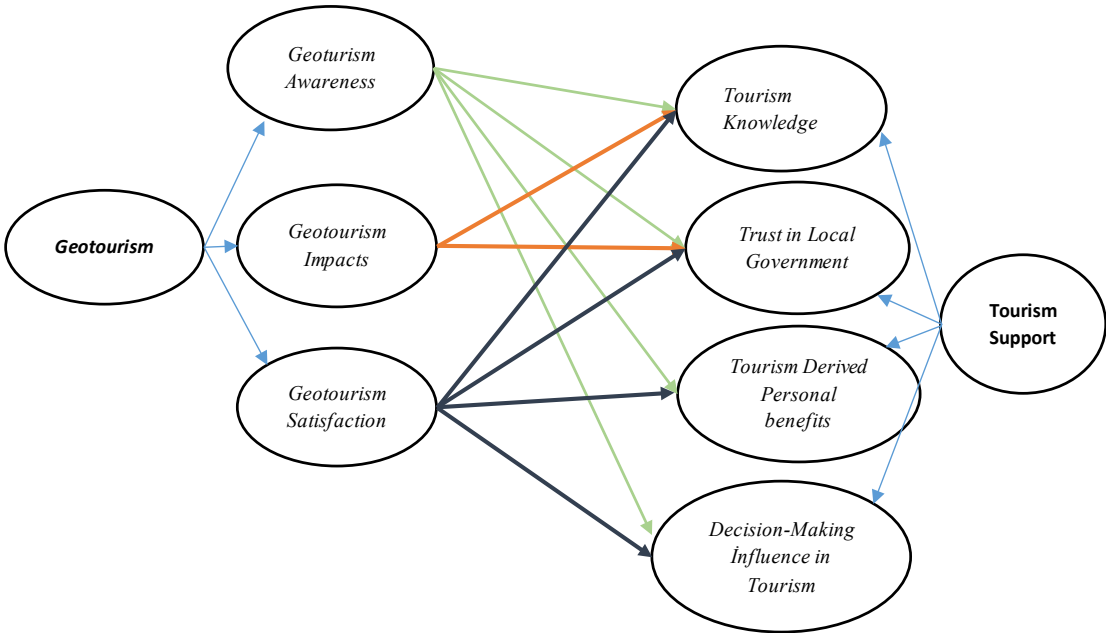


Figure 1. Research Model

In the research model, the causal relationships between geotourism sub-dimensions (awareness, impacts and satisfaction) and tourism support sub-dimensions (tourism knowledge, tourism-derived personal, decision-making influence in tourism, and trust in local government) were examined (Figure 1).

This design not only validated the newly developed scale but also contributed methodologically to tourism research by demonstrating the utility of a convergent parallel mixed-methods approach in geotourism contexts. By combining Social Exchange Theory and Stakeholder Theory, the study highlights both individual-level perceptions and collective governance dynamics, offering a comprehensive framework for understanding and promoting sustainable geotourism.

## 2. Theoretical Framework: Integrating Social Exchange and Stakeholder Perspectives

### 2.1 Social Exchange Theory (SET)

Social Exchange Theory explains human relationships through the exchange of tangible or intangible resources such as benefits, trust, and reciprocity. In tourism studies, it has been widely adopted to analyze the relationship between residents and visitors, focusing on how perceived rewards and costs influence residents' support for tourism (Albayrak & Kırova, 2020; Jurowski et al., 1997). When residents perceive tourism as beneficial—economically, socially, or environmentally—they tend to support tourism development. However, if perceived costs outweigh benefits, opposition and conflict may arise (Gonzales et al., 2018).

The theory assumes that support for tourism development reflects a willingness to engage in change and that local hospitality, as a fundamental component of the tourism product, is linked to the fair distribution of costs and benefits within the community. Previous studies have emphasized that neglecting residents' and local businesses' opinions in tourism planning undermines participation and sustainability (Doxey, 1975; Long & Richardson, 1989; Akova, 2006; Türkmen & Saatçi, 2020; Çalışkan & Özer, 2014, 2022; Güney, 2019; Çalışkan, Özer & Tütüncü, 2018; Ayazlar & Ayazlar, 2016; Çiçek, 2017).

### 2.2 Stakeholder Theory in the Context of Geotourism

While SET provides a strong individual-level explanation, Stakeholder Theory (Freeman, 1984) offers a broader governance-based perspective that situates tourism within a network of interdependent actors. Geotourism, by its nature, involves multiple stakeholders—local residents, municipal authorities, conservation bodies, educational institutions, and extractive industries—whose goals and responsibilities may conflict or converge. Sustainable outcomes depend on how well these stakeholder relationships are balanced (Byrd, 2007; Waligo et al., 2013).

Integrating Stakeholder Theory allows geotourism research to transcend individual exchanges and address participatory governance. It emphasizes dialogue, representation, and collaborative decision-making rather than transactional reciprocity. When residents perceive transparent communication and equitable involvement in decision processes, they are more likely to trust local authorities and support geotourism initiatives (Bramwell & Lane, 2011).

Thus, the fusion of SET and Stakeholder Theory creates a comprehensive explanatory framework: while SET captures why individuals support or resist tourism based on perceived outcomes, Stakeholder Theory explains how collective trust, inclusion, and governance mechanisms influence sustainable support for geotourism.

## 3. Hypothesis Development

Drawing on these theoretical foundations, this study investigates the relationships among geotourism awareness, perceived impacts, satisfaction, decision-making influence, trust in local government, and residents' support for tourism.

H1–H4: Geotourism awareness influences (a) tourism knowledge, (b) decision-making influence in tourism, (c) tourism derived personal and (d) trust in local government.

H5–H8: Perceived geotourism impacts influence (a) tourism knowledge, (b) decision-making influence in tourism, (c) tourism derived personal and (d) trust in local government.

H9–H12: Geotourism satisfaction influences (a) tourism knowledge, (b) decision-making influence in tourism, (c) tourism derived personal and (d) trust in local government.

H13: Decision-making influence mediates the relationship between geotourism awareness and residents' support for tourism.

H14: Trust in local government moderates the relationship between perceived impacts and residents' behavioral support for tourism.

## 4. Methodology

This study adopted a convergent parallel mixed-methods design, allowing qualitative and quantitative data to be collected simultaneously and interpreted together to provide a holistic understanding of the research problem (Creswell, 2013; Johnson & Onwuegbuzie, 2004). Both strands were given equal priority and integrated during the interpretation phase through meta-inferences, enabling a comprehensive comparison of findings. Convergences and divergences between quantitative results and qualitative themes were identified, thereby enhancing the robustness of the results.

The quantitative phase involved the development of a new Geotourism Perception and Support Scale, designed to measure stakeholders' awareness, attitudes, and behavioral intentions regarding geotourism. The initial item pool of 194 statements was generated based on a comprehensive literature review (Bayram, 2014; Ferraro et al., 2020; Khodayar, 2018; Moswete et al., 2020; Yazıcı, 2017; Shahhoseini et al., 2016; Tunçay, 2011). The interviews were conducted in Turkish, and the translation of the questions and participants' quotes was carefully verified by two experts holding degrees in Translation and Interpretation (certified sworn translators), ensuring accuracy and academic rigor in the translation process.

Following expert validation by six specialists in tourism management and sustainable development, the scale was refined to 65 items. Tourism support was measured in line with the framework of Çiçek and Sarı (2018). Data analysis was conducted using SmartPLS 4.0 for Structural Equation Modelling (SEM), examining the relationship between geotourism perceptions and tourism support.

The qualitative phase aimed to capture the interpretive dimension of local perceptions, values, and meanings attributed to geotourism. Semi-structured interviews were conducted with local residents and tourism stakeholders. The interview protocol was adapted from previous studies (Tunçay, 2011; Yazıcı, 2017; Gürsay & Güneş, 2014) and revised in line with the findings of the quantitative pretest. Data were analyzed through thematic analysis, following Creswell's (2013) six-step coding framework. Researcher reflections and field notes were used to strengthen validity through triangulation.

The philosophical stance of the study was pragmatic, combining ontological pluralism (accepting multiple realities) and axiological transparency, where the researcher acknowledges personal values as integral to interpretation. This alignment enabled the researcher to interpret patterns beyond statistical significance and to identify emerging qualitative meanings.

Integration of qualitative and quantitative findings provided a holistic view of geotourism perceptions and support. The qualitative phase enriched the interpretation of quantitative results, revealing underlying motivations, cultural meanings, and governance expectations that could not be captured by survey instruments alone. Conversely, the quantitative phase offered generalizability and statistical validation of emergent patterns.

Qualitative research uses interpretive frameworks to explain how individuals or groups assign meaning to social phenomena (Creswell, 2013). In this study, ontological, epistemological, axiological, and methodological assumptions were combined to collect data from local residents and tourism stakeholders, identify patterns, and generate themes. The researcher's field observations and subjective reflections were integrated with participant data, supported by descriptive analysis and open-ended questions. The qualitative research questions (RQ) are presented below:

RQ1: What are the awareness levels of tourism stakeholders regarding geotourism/geoparks?

RQ2: How do tourism stakeholders perceive geotourism and sustainability?

RQ3: What are tourism stakeholders' attitudes toward supporting geotourism?

RQ4: How do tourism stakeholders perceive local government in terms of geotourism and conservation?

# 5. Findings

## 5.1. Study 1. Quantitative Research Findings

Table 1. Distribution of Participants According to Demographic Characteristics

| Variables | | n | % |
|---|---|---|---|
| **Gender** | Female | 258 | 64 |
| | Male | 144 | 36 |
| **Marital Status** | Married | 216 | 54 |
| | Single | 186 | 46 |
| **Age ($\bar{X}$ ±SS, 32.76±12.23)** | Under 33 years old | 206 | 51 |
| | Over 33 years old | 196 | 49 |
| **Education** | Primary education | 71 | 18 |
| | High School | 154 | 38 |
| | University | 140 | 35 |
| | Master's degree | 24 | 6 |
| | Others | 13 | 3 |
| **Duration of Residence in Yatağan** | 1-5 years | 70 | 17 |
| | 6-10 years | 39 | 10 |
| | 11-15 years | 37 | 9 |
| | 16 years and above | 256 | 64 |
| **Previous Visit to the Geopark Area** | Yes | 120 | 30 |
| | No | 282 | 70 |
| **Perceived Attention Given to the Geopark in the Local Area** | Yes | 45 | 11 |
| | No | 357 | 89 |
| | | 402 | 100.0 |

According to Table 1, the overall Cronbach's Alpha for the scale was 0.917, with an explained variance of 51.817%. The Kaiser-Meyer-Olkin (KMO) test was conducted to assess sample adequacy for factor analysis, yielding a value of 0.889, indicating the sample was sufficient (acceptable KMO: 0.5–1.0; values below 0.5 indicate inadequacy) (Altunışık et al., 2010). Bartlett's Test of Sphericity was significant ($\chi^2(276) = 4994.080$, $p < 0.05$), confirming factorability. Skewness and kurtosis values for the geotourism scale were -0.680 and 1.319, and for the tourism support scale 0.21 and 0.394, respectively, indicating normal distribution (acceptable range: -1.5 to +1.5; Shao, 2002; Demirci & Kement, 2017). Factor loadings below 0.30 were considered insufficient (Aksu, Eser & Güzeller, 2017).

Table 2. Exploratory Factor Analysis of the Geotourism Scale Used in the Study

| | Factors | | |
|---|---|---|---|
| **Items** | **F1:Geoturism Awareness** | **F2:Geotourism Satisfaction** | **F3:Geotourism Impacts** |
| **J14** | 0.755 | | |
| **J16** | 0.719 | | |
| **J15** | 0.717 | | |
| **J13** | 0.693 | | |
| **J18** | 0.678 | | |
| **J17** | 0.626 | | |
| **J21** | 0.562 | | |

| | | | |
|---|---|---|---|
| **J23** | 0.548 | | |
| **J22** | 0.534 | | |
| **J38** | 0.404 | | |
| **J37** | | 0.832 | |
| **J6** | | 0.798 | |
| **J7** | | 0.796 | |
| **J2** | | 0.709 | |
| **J1** | | 0.662 | |
| **J5** | | 0.659 | |
| **J3** | | 0.569 | |
| **J11** | | 0.543 | |
| **J10** | | 0.543 | |
| **J8** | | 0.488 | |
| **J9** | | 0.449 | |
| **J34** | | | 0.879 |
| **J35** | | | 0.874 |
| **J31** | | | 0.479 |
| **Cronbach's Alpha** | 0.901 | 0.869 | 0.689 |
| **Explained Variance (%)** | 22.332 | 19.575 | 9.911 |
| **KMO =0.889; χ2(276) =4994.080; Bartlett's Test of Sphericity (p) = 0.000** | | | |

According to Table 2, items with factor loadings below 0.30 (J4, J12, J19, J20, J24, J25, J26, J27, J28, J29, J30, J32, J33, J36, J39) were removed from the scale, and the final version was established (Altunışık et al., 2010). The factors explained 51.817% of the total variance, which is considered sufficient for multi-factor designs (Büyüköztürk, 2007).

Table 3. Exploratory Factor Analysis of the Tourism Support Scale Used in the Study

| | Tourism Knowledge | Tourism-Derived Personal | Decision-Making Influence in Tourism | Trust in Local Government |
|---|---|---|---|---|
| **TS41** | .852 | | | |
| **TS43** | .840 | | | |
| **TS42** | .830 | | | |
| **TS44** | .767 | | | |
| **TS40** | .757 | | | |
| **TS45** | .746 | | | |
| **TS48** | | .952 | | |
| **TS47** | | .844 | | |
| **TS49** | | .820 | | |
| **TS46** | | .470 | | |
| **TS54** | | | .737 | |
| **TS53** | | | .727 | |
| **TS52** | | | | .444 |
| **TS50** | | | | .937 |
| **TS51** | | | | .670 |

| | | | | |
|---|---|---|---|---|
| **Cronbach's Alpha** | .913 | .888 | .780 | .846 |
| **Explained Variance (%)** | 18.988 | 24.515 | 20.284 | 6.277 |
| **KMO =0.889; χ2(262) =4278,701; Bartlett's Test of Sphericity (p) = 0.000** | | | | |

According to Table 3-4, the Cronbach's Alpha value for the total scale is 0.882, and the total explained variance is 70.064%. To assess whether the sample size was suitable for factor analysis, the Kaiser-Meyer-Olkin (KMO) test was conducted, yielding a KMO value of 0.889. This indicates that the sample is "adequate" for factor analysis. KMO values between 0.5 and 1.0 are considered acceptable, while values below 0.5 suggest that factor analysis is not suitable for the dataset (Altunışık et al., 2010: 266). Additionally, the Bartlett's Test of Sphericity results showed that the chi-square value was acceptable ($\chi^2(262) = 4278.701$, $p < 0.05$). In SmartPLS, confirmatory factor analysis (CFA) starts with testing the measurement model.

Table 4. Factor Loadings of the Geotourism Scale After Confirmatory Factor Analysis

| | Geotourism Awareness | Geotourism Satisfaction | Geotourism Impacts |
|---|---|---|---|
| **J1** | 0.674 | | |
| **J2** | 0.700 | | |
| **J3** | 0.664 | | |
| **J5** | 0.726 | | |
| **J6** | 0.757 | | |
| **J7** | 0.688 | | |
| **J8** | 0.652 | | |
| **J9** | 0.532 | | |
| **J10** | 0.674 | | |
| **J11** | 0.706 | | |
| **J13** | | 0.748 | |
| **J14** | | 0.804 | |
| **J15** | | 0.753 | |
| **J16** | | 0.799 | |
| **J17** | | 0.700 | |
| **J18** | | 0.706 | |
| **J21** | | 0.695 | |
| **J22** | | 0.680 | |
| **J23** | | 0.656 | |
| **J37** | | 0.640 | |
| **J38** | | 0.625 | |
| **J31** | | | 0.695 |
| **J34** | | | 0.835 |
| **J35** | | | 0.837 |

Factor loadings, also called outer loadings, are generally interpreted as factor loadings, and should range between 0.70 and 0.90 in PLS-SEM analyses (Chin, 2010).

Table 5. Factor Loadings of the Tourism Support Scale After Confirmatory Factor Analysis

| | Tourism Knowledge | Decision-Making Influence in Tourism | Tourism-Derived Personal | Trust in Local Government |
|---|---|---|---|---|
| **TS40** | 0.802 | | | |
| **TS41** | 0.879 | | | |
| **TS42** | 0.876 | | | |
| **TS43** | 0.869 | | | |
| **TS44** | 0.826 | | | |
| **TS45** | 0.820 | | | |
| **TS53** | | 0.942 | | |
| **TS54** | | 0.861 | | |
| **TS50** | | | 0.922 | |
| **TS51** | | | 0.919 | |
| **TS52** | | | 0.777 | |
| **TS46** | | | | 0.818 |
| **TS47** | | | | 0.888 |
| **TS48** | | | | 0.876 |
| **TS49** | | | | 0.838 |

According to Table 5, for newly developed scales, a rho_A value above 0.60 is considered acceptable (Hair et al., 2014). In this analysis, the factor loadings of both the newly developed Geotourism Scale and the Tourism Support Scale exceed 0.60. Indicators with loadings between 0.60 and 0.70 can be retained in the model if their theoretical importance and the reliability and validity values of the associated constructs are considered (Doğan, 2019).

Table 6. Composite Reliability (CR), Cronbach's Alpha, Rho_A, Construct Reliability, and Average Variance Extracted (AVE) for the Study Variables

| Variables | Croanbach Alpha | Rho_a | Rho_c | VIF | Average Variance Extracted (AVE) |
|---|---|---|---|---|---|
| **Geotourism Awareness** | 0.702 | 0.690 | 0.833 | 1.47 | 0.627 |
| **Geotourism Satisfactions** | 0.902 | 0.905 | 0.918 | 1.62 | 0.507 |
| **Geotourism Impacts** | 0.870 | 0.873 | 0.895 | 1.58 | 0.462 |

Table 6 presents the Composite Reliability (CR) and Average Variance Extracted (AVE) values for the factors. CR values should exceed 0.70 (Hair et al., 2011: 145), and AVE values should be 0.40 or higher (Hair et al., 2019: 9). Reporting CR alongside AVE, with CR greater than AVE, indicates that convergent validity has been achieved (Gürbüz, 2021; Ekinci, 2024).

Table 7 presents the Composite Reliability (CR) and

Table 7. Composite Reliability (CR), Cronbach's Alpha, Rho_A, Construct Reliability, and Average Variance Extracted (AVE) for the Study Variables

| Variables | Croanbach Alpha | Rho_a | Rho_c | VIF | Average Variance Extracted (AVE) |
|---|---|---|---|---|---|
| **Tourism Knowledge** | 0.920 | 0.922 | 0.938 | 1.72 | 0.716 |
| **Decision-Making Influence in Tourism** | 0.781 | 0.879 | 0.898 | 1.58 | 0.815 |
| **Tourism-Derived Personal** | 0.850 | 0.913 | 0.907 | 1.63 | 0.766 |
| **Trust in Local Government** | 0.885 | 0.951 | 0.916 | 1.69 | 0.732 |

Average Variance Extracted (AVE) values for the factors. CR values are expected to exceed 0.70 (Hair et al., 2011: 145), and AVE values should be 0.40 or higher (Hair et al., 2019: 9). Additionally, CR values greater than AVE indicate that convergent validity has been achieved (Gürbüz, 2021; Ekinci, 2024). According to the results in Table 8, all CR values are above 0.70 and all AVE values exceed 0.40, indicating that the scales are both reliable and valid. Moreover, Cronbach's Alpha and rho_A values above 0.60 demonstrate sufficient internal consistency of the constructs. Linearity is first checked using Variance Inflation Factor (VIF = 1/Tolerance), with values below 0.20 or above 5 indicating potential issues. All VIF values are below the recommended threshold of 5.0, indicating that multicollinearity is not a concern in the structural model (Hair et al., 2021).

Table 5. Factor Loadings of the Tourism Support Scale After Confirmatory Factor Analysis

| | Geoturism Awareness | Geotourism Impacts | Geotourism Satisfaction | Tourism Knowledge | Decision-Making Influence in Tourism | Tourism-Derived Personal | Trust in Local Government |
|---|---|---|---|---|---|---|---|
| **Geoturism Awareness** | | | | | | | |
| **Geotourism Impacts** | 0.339 | | | | | | |
| **Geotourism Satisfaction** | 0.453 | 0.738 | | | | | |
| **Tourism Knowledge** | 0.289 | 0.602 | 0.703 | | | | |
| **Decision-Making Influence in Tourism** | 0.304 | 0.218 | 0.212 | 0.204 | | | |
| **Tourism-Derived Personal** | 0.318 | 0.284 | 0.322 | 0.293 | 0.755 | | |
| **Trust in Local Government** | 0.184 | 0.320 | 0.352 | 0.411 | 0.548 | 0.324 | |

Table 8 presentes that another value used to assess discriminant validity is the Heterotrait-Monotrait Ratio (HTMT). HTMT represents the ratio of the average correlations between indicators across constructs to the geometric mean of correlations within the same construct (Doğan, 2019: 46–47). HTMT values should be 0.90 or below (Hair et al., 2019: 9). Table 9 presents the HTMT ratios, showing that all values are below 0.90.

Table 9 presents the Fornell-Larcker criterion values for the variables. Bold values on the diagonal represent the square root of each construct's AVE and should exceed the correlations in the same column. As shown, all correlation coefficients are below the square roots of AVE, indicating that the Fornell-Larcker criterion is satisfied (Hair et al., 2019: 9).

Table 9. Discriminant Validity Results for the Study Variables (Fornell-Larcker Criterion)

| | Geoturism Awareness | Geotourism Impacts | Geotourism Satisfaction | Tourism Knowledge | Decision-Making Influence in Tourism | Tourism-Derived Personal | Trust in Local Government |
|---|---|---|---|---|---|---|---|
| **Geoturism Awareness** | **0.792** | | | | | | |
| **Geotourism Impacts** | 0.261 | **0.680** | | | | | |
| **Geotourism Satisfaction** | 0.355 | 0.658 | **0.712** | | | | |
| **Tourism Knowledge** | 0.231 | 0.552 | 0.644 | **0.846** | | | |
| **Decision-Making Influence in Tourism** | 0.246 | 0.186 | 0.186 | 0.177 | **0.903** | | |
| **Tourism-Derived Personal** | 0.255 | 0.254 | 0.298 | 0.274 | 0.581 | **0.875** | |
| **Trust in Local Government** | 0.170 | 0.313 | 0.351 | 0.412 | 0.451 | 0.289 | **0.856** |

The mean score for the Geotourism Scale is 4.1420. Participants rated Geotourism Impacts higher than Geotourism Awareness, indicating overall satisfaction with geotourism development and effects (Table 10).

Table 10. Means for the Geotourism Scale

| | n | Mean | Standard Deviation |
|---|---|---|---|
| **Geotourism Scale** | 402 | 4.1420 | .53587 |
| **Geotourism Awareness** | 402 | 3.7330 | .86175 |
| **Geotourism Satisfaction** | 402 | 4.1628 | .64950 |
| **Getourism Impacts** | 402 | 4.2418 | .57962 |

Table 11. Means for the Tourism Support Scale

| | n | Mean | Standard Deviation |
|---|---|---|---|
| **Tourism Support Scale** | 402 | 3.8580 | .68567 |
| **Tourism Knowledge** | 402 | 4.2886 | .76476 |
| **Tourism-Derived Personal** | 402 | 3.4768 | 1.05993 |
| **Decision-Making Influence in Tourism** | 402 | 3.1766 | 1.17323 |
| **Trust in Local Government** | 402 | 3.8389 | 1.15682 |

The mean score for the Tourism Support Scale is 3.8580, indicating participants' support for tourism. The Tourism Knowledge subdimension has the highest mean, suggesting strong local knowledge. Other means follow in the order of trust in local government, tourism derived personal, and influence over tourism decision (Table 11).

Table 12. $R^2$ Values for the Study Variables

| | R^2 | Düzeltilmiş $R^2$ |
|---|---|---|
| **Tourism Knowledge** | 0.444 | 0.440 |
| **Decision-Making Influence in Tourism** | 0.078 | 0.071 |
| **Tourism-Derived Personal** | 0.119 | 0.113 |
| **Trust in Local Government** | 0.137 | 0.131 |

The $R^2$ value indicates the proportion of variance in an endogenous variable explained by exogenous variables. Values of 0.25, 0.50, and 0.75 are considered weak, moderate, and strong, respectively (Sastedt et al., 2017), although in some cases 0.10 may be acceptable (Doğan, 2019). The $R^2$ values for the study variables are presented in Table 12. As shown, 44% of Tourism Knowledge, 7.1% Decision-Making Influence in Tourism, 11.3% of Tourism-Derived Personal, and 13.1% of Trust in Local Government are explained.

Table 13. $f^2$ Effect Sizes for the Study Variables

| Relationships Among Variables | $f^2$ |
|---|---|
| **Geotourism Awareness ->Tourism Knowledge** | 0.000 |
| **Geotourism Awareness -> Decision-Making Influence in Tourism** | 0.039 |
| **Geotourism Awareness -> Tourism-Derived Personal** | 0.028 |
| **Geotourism Awareness -> Trust in Local Government** | 0.002 |
| **Geotourism Satisfaction -> Tourism Knowledge** | 0.235 |
| **Geotourism Satisfaction -> Decision-Making Influence in Tourism** | 0.001 |
| **Geotourism Satisfaction -> Tourism-Derived Personal** | 0.019 |
| **Geotourism Satisfaction -> Trust in Local Government** | 0.036 |
| **Geotourism Impacts -> Tourism Knowledge** | 0.053 |
| **Geotourism Impacts -> Decision-Making Influence in Tourism** | 0.007 |

| | |
|---|---|
| **Geotourism Impacts -> Tourism-Derived Personal** | 0.006 |
| **Geotourism Impacts -> Trust in Local Government** | 0.013 |

The $f^2$ effect size is calculated for each exogenous variable, indicating its contribution to the explained variance of the endogenous variable (Doğan, 2019). $f^2$ values for the study variables are presented in Table 13. Values of 0.02–0.15 indicate small effects, 0.16–0.35 medium effects, and above 0.35 large effects (Cohen, 1988). If no linearity problem exists, path coefficients are examined along with t and p values. Bootstrapping was applied for hypothesis testing, and path coefficients (O), means (M), standard deviations, t, and p values are presented in the table.

Table 14. Path Coefficients for the Research Variables

| Variables | Path Coefficient (O) | Mean Values (M) | Standard Deviation | t Values | p Values |
|---|---|---|---|---|---|
| **Geotourism Awareness -> Tourism Knowledge** | -0.005 | -0.005 | 0.045 | 0.112 | 0.910 |
| **Geotourism Awareness -> Decision-Making Influence in Tourism** | 0.203 | 0.207 | 0.058 | 3.507 | 0.000* |
| **Geotourism Awareness -> Tourism-Derived Personal** | 0.168 | 0.171 | 0.059 | 2.869 | 0.004* |
| **Geotourism Awareness -> Trust in Local Government** | 0.047 | 0.049 | 0.052 | 0.908 | 0.364 |
| **Geotourism Impacts -> Tourism Knowledge** | 0.227 | 0.231 | 0.060 | 3.762 | 0.000* |
| **Geotourism Impacts -> Decision-Making Influence in Tourism** | 0.103 | 0.103 | 0.067 | 1.526 | 0.127 |
| **Geotourism Impacts -> Tourism-Derived Personal** | 0.093 | 0.092 | 0.076 | 1.231 | 0.218 |
| **Geotourism Impacts -> Trust in Local Government** | 0.143 | 0.140 | 0.083 | 1.713 | 0.087 |
| **Geotourism Satisfaction -> Tourism Knowledge** | 0.497 | 0.497 | 0.056 | 8.845 | 0.000* |
| **Geotourism Satisfaction -> Decision-Making Influence in Tourism** | 0.046 | 0.049 | 0.071 | 0.650 | 0.516 |
| **Geotourism Satisfaction -> Tourism-Derived Personal** | 0.176 | 0.181 | 0.078 | 2.268 | 0.023* |
| **Geotourism Satisfaction -> Trust in Local Government** | 0.241 | 0.247 | 0.079 | 3.033 | 0.002* |

*$p<0.05$

Geotourism awareness was found to be positively associated with tourism decisions ($\beta = 0.203$, $p < 0.05$) and tourism derived personal ($\beta = 0.168$, $p < 0.05$). Geotourism impacts were positively linked to tourism knowledge ($\beta = 0.227$, $p < 0.05$). Additionally, geotourism satisfaction was positively associated with tourism knowledge ($\beta = 0.497$, $p < 0.05$), tourism derived personal ($\beta = 0.176$, $p < 0.05$), and trust in local governance ($\beta = 0.241$, $p < 0.05$) (Table 14).

Supported hypotheses indicate that geotourism awareness is positively associated with tourism decision-making power and tourism derived personal, explaining 16% of the variance in decision-making influence. No significant relationship was found between geotourism awareness and tourism knowledge or trust in local governance. A positive relationship exists between geotourism awareness and both tourism decision-making and tourism derived personal: as awareness increases, so do decision-making power and tourism derived personal. Geotourism impacts are positively linked to tourism knowledge, explaining 22% of its variance, while no significant associations were found with tourism decision-making, tourism derived personal, or trust in local governance. Geotourism satisfaction is strongly associated with tourism knowledge (49% variance explained), tourism derived personal (17%), and trust in local governance (24%). Positive associations were

observed between satisfaction and all three outcomes, confirming the related hypotheses. Overall, higher geotourism satisfaction corresponds to greater tourism knowledge, enhanced tourism derived personal, and increased trust in local governance.

## 5.2. Study 2. Qualitative Analysis Findings

In the qualitative study, the participant list and the findings were examined in detail. Themes and sub-themes were developed and visualized for the qualitative analysis. Participants included representatives from JEMİRKO (Geological Heritage Conservation Association), Yatağan Municipality, Muğla Chamber of Commerce, Menteşe Municipality, Muğla Metropolitan Municipality, NGOs, local residents living near the study area, and academics from Muğla Sıtkı Koçman University.

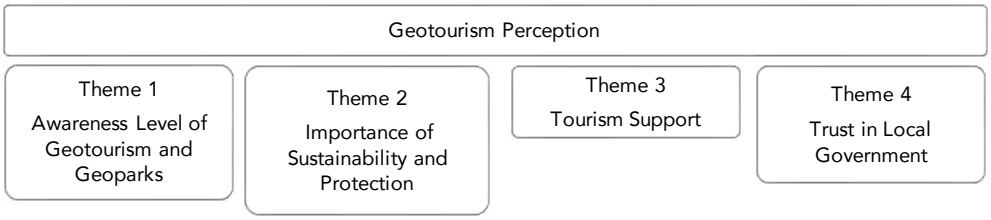


Figure 2. Conceptual Model of the Qualitative Study

Figure 2 shows the themes that emerged after the content analysis. Most participants in the qualitative study demonstrated conceptual knowledge of geoparks and geotourism, defining these concepts from nature, tourism, and conservation perspectives.

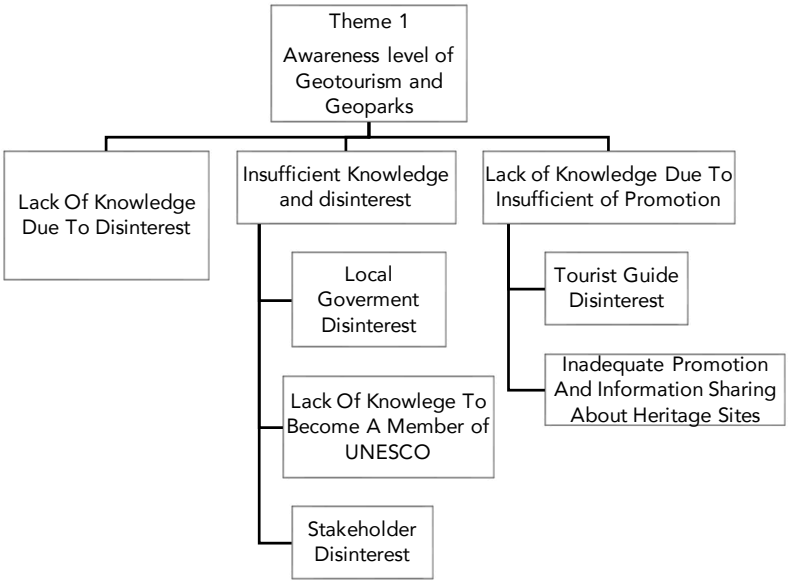


Figure 3. Sub-Themes on the Reasons for the Low Level of Awareness Regarding Geotourism and Geoparks

Responses regarding geotourism activities indicated that the majority were willing to participate, including those who had not yet visited the area but expressed interest. It was noted that local NGOs recognize the need for conservation, and field visits were conducted. Participants who visited the area, whether for leisure or by chance, expressed interest in returning, while others were more actively engaged in the site (Figure 3).

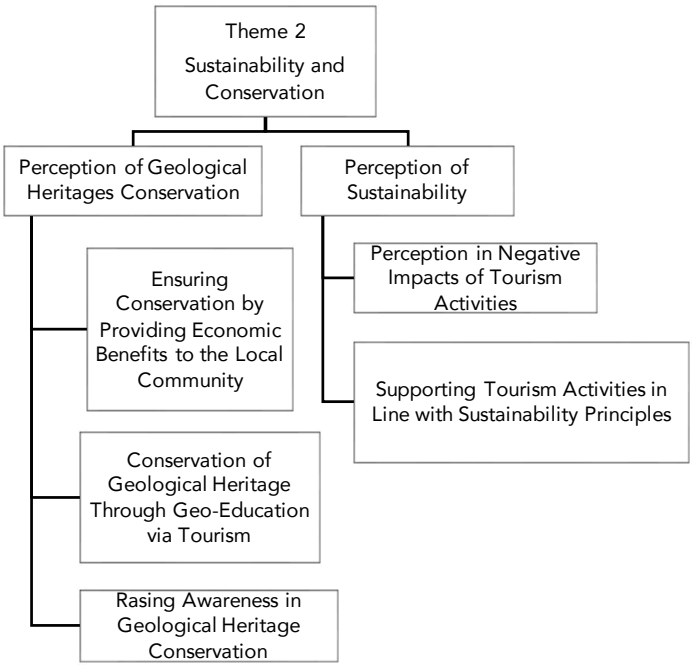


Figure 4. Theme of Sustainability and Conservation

In Theme 2, interview questions aimed to identify views on sustainability and conservation were divided into sub-themes covering the protection of geological and natural heritage, the relationship between geotourism and sustainability, the scientific and visual value of Gökbel Valley, and awareness of threats to its existence. No negative feedback was reported regarding the idea of opening the area to tourism to ensure its conservation and sustainability. Participants recognized a link between geotourism activities and sustainability, agreeing that controlled visitation and protection by local authorities are essential. Most emphasized the significant role of tourism in the area's sustainability, reflecting strong awareness of the relationship between tourism and sustainability. Participants were also knowledgeable about the unique value of Gökbel Valley, highlighting its visual, historical, and cultural significance. Overall, participants consistently pointed to insufficient promotion and the disinterest of local authorities and stakeholders as key factors hindering geotourism development and awareness in the region (Figure 4).

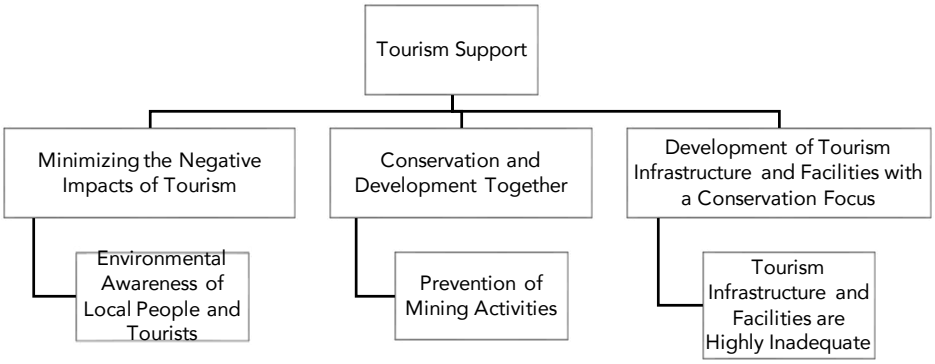


Figure 5. Theme of Tourism Support

Participants expressed positive views on opening the geopark to tourism, viewing it as an opportunity if supported by proper management for conservation and sustainability. Efforts should aim to strengthen the link between sustainability, geo-education, and awareness, using tourism as a tool to unite people under a sustainable tourism framework.

While participants recognized geotourism's role in conserving geological heritage, they expressed conditional concerns regarding sustainability and protection. Raising awareness among local communities, tourists, and businesses is essential; once achieved, tourism can be seen as an opportunity to support conservation. Stakeholders agreed that completing the geopark project would benefit the region, with concerns primarily relating to site management (Figure 5).

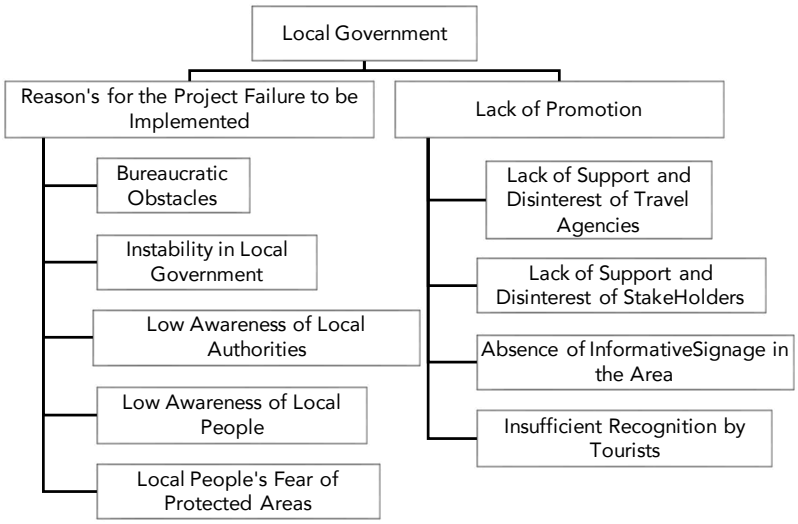


Figure 6. Local Government

The project's failure to be implemented is primarily attributed to the disinterest and lack of knowledge of local authorities and stakeholders. Bureaucratic obstacles and long-standing issues with private land ownership were also highlighted. About 84.6% of participants reported that local authorities do not give sufficient attention to the geopark, and 69.2% noted its low recognition. To improve awareness and support, measures suggested include informing local hotels, raising community awareness, producing promotional materials, organizing tours, removing bureaucratic barriers, and increasing academic studies and projects (Figure 6).

## 6. Discussion

The analysis revealed that geotourism awareness significantly and positively affects tourism decision-making, tourism derived personal, and tourism knowledge. These findings align with Social Exchange Theory (SET), as residents perceive personal and community benefits from geotourism, which reinforces their willingness to support tourism development (Albayrak & Kırova, 2020; Gonzales et al., 2018). The qualitative data further highlighted that participants visited the area for educational trips, photography, and conservation purposes, describing the experience as "completely enchanting" and expressing a unanimous desire to return. This demonstrates the interplay between perceived benefits and behavioral intention, a core principle of SET.

The geotourism impacts dimension was positively associated with tourism knowledge and tourism derived personal. These results suggest that when residents experience tangible and intangible impacts from tourism, such as environmental awareness or economic opportunities, they are more likely to support sustainable practices. Qualitative findings corroborated this, showing that locals acknowledged the value of the geopark's natural heritage while identifying threats from mining and insufficient conservation. The combined quantitative and qualitative evidence underscores that local perceptions of geotourism impacts are closely linked to support, consistent with prior studies (Choi & Murray, 2010; Stylidis et al., 2014; Boğan & Sarışık, 2016).

Residents' satisfaction with geotourism was positively associated with trust in local governance and willingness to participate in tourism-related decisions. This finding integrates both SET and Stakeholder Theory, suggesting that perceived fairness in benefit distribution and inclusive governance structures are crucial for sustainable geotourism. Participants reported limited knowledge of local initiatives by authorities but expressed strong support for tourism development, indicating that community engagement and transparent management are essential to enhance both satisfaction and trust (Çiçek & Sarı, 2018; Tür, 1999).The convergent mixed-methods design revealed complementary insights. Quantitative results quantified the relationships between geotourism dimensions and tourism support, while qualitative interviews contextualized these effects, illustrating residents' motivations, concerns, and experiential perceptions. This integration not only validates the geotourism scale but also provides a holistic understanding of local support mechanisms, emphasizing the necessity of participatory approaches and multi-stakeholder governance in geotourism development.

## 7. Theorical Implications

This study contributes to tourism and geotourism research by developing a validated geotourism scale, integrating both quantitative and qualitative findings to provide a comprehensive understanding of residents' perceptions and support. It extends Social Exchange Theory by demonstrating how residents' awareness and satisfaction with geotourism influence engagement, trust in local governance, and personal benefits from tourism. Additionally,

by incorporating Stakeholder Theory, the study highlights the importance of multi-actor collaboration in managing and conserving geoheritage, bridging gaps between tourism development, environmental conservation, and community empowerment.

8. Practical Implications

The study demonstrates that residents recognize the importance of geotourism for sustainable development, yet geotourism knowledge remains limited, and project support from authorities is insufficient. Both quantitative and qualitative results indicate strong local support for tourism, highlighting the need for enhanced engagement by local governments and stakeholders.

- Guidance and Infrastructure: Establish walking trails, signage, and viewing platforms within the geopark to enhance visitor experience while protecting geological heritage.
- Education and Awareness: Conduct school visits, workshops, and local community campaigns to raise awareness of geotourism and conservation.
- Communication and Promotion: Increase visibility and engagement through local websites, brochures, and tourism partnerships.
- Management and Participation: Form a multi-stakeholder Geopark Management Board including municipalities, universities, NGOs, tourism enterprises, and provincial authorities to coordinate management and promotion.
- Tourist Guiding and Participatory Rules: Train tourist guides and develop visitor behavior guidelines through a participatory process to support sustainable tourism.
- Sustained Promotion and Communication: Update digital and print promotion tools and strengthen local partnerships during the medium term.
- Strategic Planning and Investment: Prepare for UNESCO Geopark designation, establish sustainable funding mechanisms, and plan infrastructure.
- Conservation and Monitoring: Implement continuous monitoring and evaluation protocols to ensure long-term geological and environmental protection.
- Interdisciplinary Projects: Develop projects that foster collaboration between academia and industry to strengthen both tourism and conservation outcomes.

This integrated roadmap provides concrete steps for geopark management, offering quick wins in the short term while enhancing long-term sustainability and community engagement.The findings confirm that integrating Social Exchange and Stakeholder Theory provides a robust framework for understanding and fostering local support in geotourism.

## 9. Limitations and Future Research

This study has several limitations that should be acknowledged. First, it was conducted in a single geopark region, which may limit the generalizability of the findings to other geotourism destinations. Second, although a mixed-methods design was employed, data were collected simultaneously, which may affect causal interpretations. Third, the study focused primarily on local residents and stakeholders, and did not include tourists' perspectives, which could provide additional insights into geotourism development and management.

A limitation of the study is that SRMR (Standardized Root Mean Square Residual) and $Q^2$ (predictive relevance) could not be reported due to model specifications. However, based on the available statistical evidence—including CFA factor loadings, Composite Reliability, Cronbach's Alpha, rho_A, AVE, $R^2$, $f^2$, HTMT, and Fornell-Larcker criteria—limited but robust inferences about the model's adequacy can still be made. These results indicate that the model reliably represents the relationships among variables and that the measurement instruments are valid and consistent (Hair et al., 2011; Doğan, 2019).

Future research could apply the developed geotourism scale to other regions, investigate the influence of demographic and socio-economic factors on residents' perceptions and attitudes, and examine the interrelationships among tourism support, sustainability practices, and governance strategies. Longitudinal studies could also provide deeper insights into changes in awareness, satisfaction, and engagement over time, further informing evidence-based policy-making and stakeholder collaboration in geotourism management. Future research could focus on the longitudinal tracking of awareness and trust, experimental geo-education interventions, and comparative studies across multiple geoparks.

## Ethical Statement

This study received ethical approval from the Ethics Committee of Muğla Sıtkı Koçman University. The approval was granted on October 26, 2021, under the decision number 09. All procedures performed in the study involving human participants were conducted in accordance with the ethical standards of the institutional research committee and the principles of the Declaration of Helsinki.

**Author Contributions Statement:** The conception and design of this study were carried out by the corresponding author. All authors actively contributed to the processes of data collection, analysis, and interpretation. The initial draft of the manuscript was prepared by the corresponding author, and all authors contributed to the critical revision and further development of the content. The final version to be published has been read and approved by all

authors. All authors agree to be accountable for all aspects of the work.

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