

# Scaling circularity from campus to globe: The roles of resident attitudes and community participation in Kinabalu UNESCO Global Geopark

Christy Bidder<sup>\*1,2</sup> and Awangku Hassanal Bahar Pengiran Bagul<sup>1</sup>

<sup>1</sup>Universiti Malaysia Sabah, Jalan UMS 88400 Kota Kinabalu Sabah, Malaysia

<sup>2</sup>Universiti Teknologi MARA, Locked Bag 71 88997 Kota Kinabalu Sabah, Malaysia

## ABSTRACT

Circular economy discussions have increasingly moved beyond materials efficiency and environmental management. However, more attention should be paid to the social factors that support circular and sustainable development in community-based tourism. This conceptual paper examines Kinabalu UNESCO Global Geopark in Sabah, Malaysia, as a rural geopark context for advancing social circularity in sustainable tourism. Drawing on Social Exchange Theory, Stakeholder Theory, and Social Representations Theory, this paper develops a conceptual framework to explain residents' support for sustainable tourism. The framework proposes that residents' sustainable tourism attitudes influence their support for tourism. These attitudes include perceived economic benefits, environmental sustainability, perceived social costs, cultural sustainability, and visitor satisfaction. The framework also proposes that these attitudes influence residents' support for tourism both directly and indirectly through place image. Furthermore, community participation is included as a moderating variable that may strengthen the relationship between residents' attitudes and support for tourism. The paper contributes to circular economy and sustainable tourism literature by introducing social circularity as a conceptual lens. This lens focuses on residents' attitudes, place-based perceptions, participation, and support as social feedback mechanisms that help sustain tourism development. The paper also positions geoparks as community-based living laboratories where higher education institutions can support campus-to-globe knowledge transfer, participatory governance, and local value retention. Finally, the proposed framework provides a basis for future empirical testing using quantitative methods such as Partial Least Squares Structural Equation Modeling (PLS-SEM).

## INTRODUCTION

Sustainability challenges extend beyond environmental degradation to include important social and economic concerns. Addressing these interconnected issues requires a more integrated approach to sustainable development (Velenturf and Purnell 2021; Korhonen et al. 2018; Geissdoerfer et al. 2017).

In response, the circular economy has gained increasing attention as an alternative to the traditional linear model of resource extraction, production, consumption, and disposal (Mendoza et al. 2019; Korhonen et al. 2018; Geissdoerfer et al. 2017; MacArthur 2013). The circular economy is commonly defined as "a regenerative system in which resource input and waste, emission, and energy leakage are minimized by slowing, closing, and narrowing material and energy loops" (Geissdoerfer et al. 2017). Strategies such as maintenance, reuse, remanufacturing, refurbishing, and recycling can be adopted to achieve this (Geissdoerfer et al. 2017).

Circular economy principles are widely associated with the pursuit of sustainable development (Kirchherr et al. 2017; Murray et al. 2017). However, the adoption of circular practices alone does not guarantee sustainability. These practices must be integrated within the broader environmental, social, and economic priorities (Velenturf and Purnell 2021; Geissdoerfer et al. 2017).

Within this broader sustainability discussion, higher education institutions have become important in supporting the transition toward the circular economy (de la Torre et al. 2021). Their role is not limited to teaching and research. They also contribute to sustainability through campus operations, infrastructure development, curriculum design, sustainability-focused research

\*Corresponding author

Email Address: [christy.b2008@gmail.com](mailto:christy.b2008@gmail.com)

Date received: 03 July 2026

Dates revised: 02 August 2026

Date accepted: 29 July 2026

DOI: <https://doi.org/10.54645/202619SupWKY-53>

## KEYWORDS

Circular Economy, Social Circularity, Sustainable Rural Tourism, Residents' Support for Tourism, Community Participation, Place Image, Higher Education Institutions, Geoparks

partnerships, and community engagement (Renfors 2024; Giannoccaro et al. 2021; Mendoza et al. 2019).

Furthermore, higher education institutions are important because they create knowledge and influence society. Through knowledge creation and societal influence, they can support sustainability transitions at local, regional, and global levels (Ferrer-Balas et al. 2008). From this perspective, the “campus-to-globe” approach highlights that sustainability efforts within higher education institutions should not remain only on campus. Instead, these efforts should also benefit wider society through knowledge transfer, innovation, and collaboration with communities (Mendoza et al. 2019).

Community-based rural tourism destinations are useful settings for applying circular economy principles beyond campus boundaries. These destinations allow sustainability ideas to be applied in real-life contexts where economic development, environmental protection, and sociocultural wellbeing are closely linked.

However, achieving sustainability in rural tourism is not simple. Rural destinations often need to balance economic, environmental, and sociocultural challenges related to tourism development (Godovykh et al. 2024; Celik and Rasoolimanesh 2023; Mason 2003). In these contexts, sustainability cannot depend only on technical or environmental solutions. It also requires stakeholder support, local governance, community participation, and residents’ continued support for tourism (Dapp 2019; Geissdoerfer et al. 2017).

Geoparks provide a particularly suitable context for examining these issues. As protected landscapes, geoparks support sustainable development by combining conservation, education, tourism, and community involvement (UNESCO 2025). Kinabalu UNESCO Global Geopark in Sabah, Malaysia, is a relevant case because it brings together biodiversity conservation, cultural heritage, geotourism, and indigenous community livelihoods within one protected landscape (Sabah Parks 2025a). Therefore, Kinabalu UNESCO Global Geopark can be viewed as a community-based living laboratory where sustainability frameworks can be understood in relation to both ecosystem protection and community wellbeing.

Although circular economy and sustainable tourism have received increasing attention, most studies have focused on the material, technical, and environmental aspects of circularity. Less attention has been given to the social factors that support circular and sustainable development in rural tourism contexts.

In particular, there is limited understanding of how residents’ sustainable tourism attitudes, place-based perceptions, and participation shape their support for tourism. This gap is important because local communities are key stakeholders. Their support can influence whether tourism development is sustained, resisted, or contested over time (Marzo-Navarro et al. 2020; Cheng et al. 2019; Shani and Pizam 2011).

To address this gap, this paper proposes a conceptual framework that can be tested to explain residents’ support for sustainable rural tourism in Kinabalu UNESCO Global Geopark. The framework brings together residents’ sustainable tourism attitudes, place image, community participation, and support for tourism. Specifically, the framework proposes that residents’ sustainable tourism attitudes influence their support for tourism both directly and indirectly through residents’ place image. It also proposes that community participation moderates these relationships by

strengthening residents’ involvement in tourism planning, decision-making and benefit-sharing.

By linking residents’ attitudes, perceptions, and participation, the study advances the concept of social circularity and shows how social feedback mechanisms can contribute to sustainable and circular tourism systems.

Overall, this study contributes to circular economy, campus-to-globe sustainability, and sustainable tourism literature by extending the circular economy thinking beyond material flows to include residents’ social and perceptual mechanisms. It also positions geoparks as community-based living laboratories where higher education institutions can support campus-to-globe knowledge transfer, participatory governance, and local value retention. In doing so, the study provides a conceptual basis for future empirical research on socially inclusive circular tourism development in rural and protected-area destinations.

## MATERIALS AND METHODS

### Research Design

This study uses a conceptual research design with a theory-driven approach. Its purpose is to develop a conceptual framework that explains residents’ support for tourism in rural communities within Kinabalu UNESCO Global Geopark. To achieve this, the study reviews academic works about sustainable tourism, circular economy, residents’ support for tourism, different dimensions of sustainable tourism attitudes, place image, and community participation. This literature is used to support the proposed model and hypotheses.

This paper does not report primary data analysis. Instead, it develops conceptual relationships among the constructs based on established theories and previous empirical findings. The proposed framework lays the foundation for future empirical testing using a quantitative, cross-sectional survey design and multivariate data analysis methods such as Partial Least Squares Structural Equation Modeling (PLS-SEM). This method is suitable for examining complex relationships involving multiple predictors, mediation, and moderation (Hair et al. 2022).

### Context and Scope of the Study

Kinabalu UNESCO Global Geopark (KUGG), Sabah, Malaysia provides the context for this study. KUGG officially became a UNESCO Global Geopark in 2023. It covers approximately 4,750 square kilometers and includes three districts, namely Ranau, Kota Belud, and Kota Marudu (Sabah Parks 2025a; UNESCO 2023). At the center of KUGG is Mount Kinabalu, an important geological landmark and a culturally significant landscape for indigenous communities, especially the Dusun people (Sabah Parks 2025a; UNESCO 2023; Bidder et al. 2014). KUGG also includes Kinabalu Park, a UNESCO World Heritage Site known for its rich biodiversity (Sabah Parks 2025b). The geopark is home to approximately 291,300 residents across many rural villages and indigenous communities. Their livelihoods are commonly linked to agriculture, animal husbandry, and increasingly tourism (Sabah Parks 2025a).

Within this wider geopark context, eight villages are officially listed by Sabah Parks as indigenous villages, which represent the ancestral homelands and living cultural landscapes of local communities. Among these, the study focuses on Kampung Kiau Nuluh, Kampung Togudon, and Kampung Marak Parak, which are predominantly inhabited by the Dusun people. Furthermore, these selected villages differ in their levels of tourism exposure, community involvement, and development intensity. These

differences are interpreted through Butler’s (1980) Tourism Area Life Cycle framework. This village-based scope allows the study to examine residents’ support for tourism in communities with different stages and levels of tourism development within the same

geopark setting. Figure 1 shows the location of KUGG on a map of Sabah and the eight indigenous villages, of which three are selected for this study.

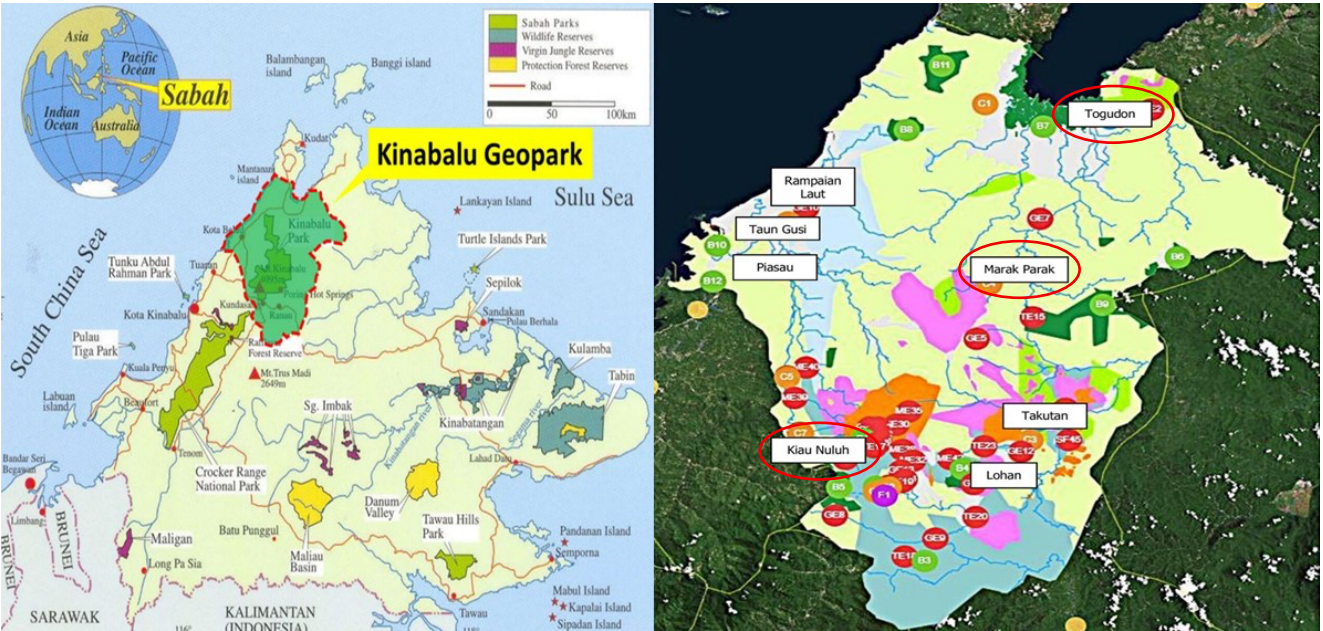


Figure 1: Location of KUGG and the eight indigenous villages (Source: Sabah Parks 2025a)

The target population of this study is limited to permanent residents aged 18 years and above who live in the selected villages. Both tourism-involved and non-tourism-involved residents are included. This allows the study to capture the views of residents who may benefit directly from tourism, as well as those who may experience tourism indirectly or feel excluded from its benefits. Temporary residents, seasonal migrants, and individuals below 18 years old are excluded.

To guide the future empirical validation phase, an a priori power analysis was conducted in GPower to calculate the minimum required sample size. As shown in Figure 2, the required minimum sample size is 178 respondents, based on a medium effect size of 0.15, 95% statistical power, 5% significance level, and 11 predictors. Although the minimum required sample size is 178 respondents, the study targets 300 participants, with approximately 100 participants to be recruited from each of the three selected villages. This target accounts for an estimated 40% non-response or incomplete response rate.

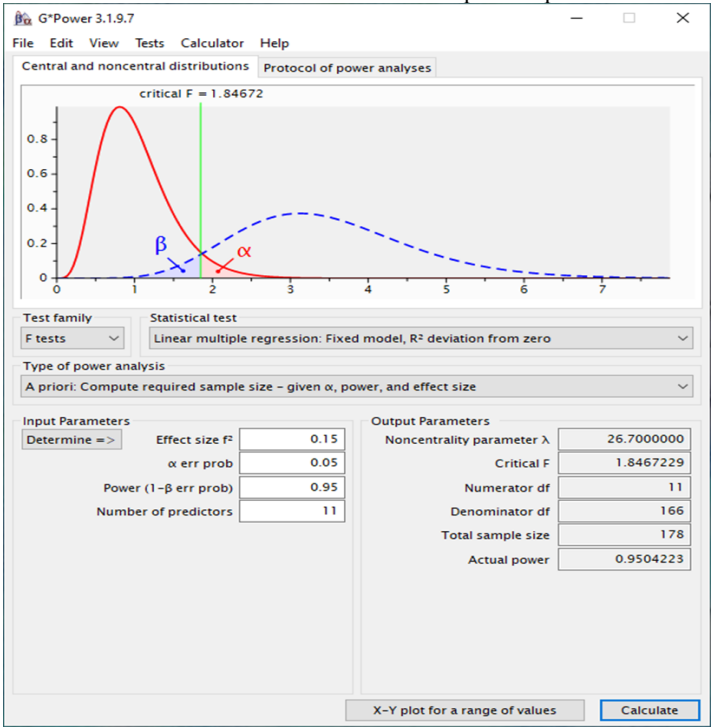


Figure 2: Sample size determination using G\*Power (Source: Authors)

### Conceptual Model Development

Building on the research design, this study develops a conceptual framework to explain residents' support for tourism in Kinabalu UNESCO Global Geopark. The model is developed by reviewing established theories and previous studies on residents' attitudes toward sustainable tourism, place image, community participation, and support for tourism. Because this study aims to propose a conceptual framework for future empirical testing, a theory-driven literature review approach is appropriate and is therefore adopted.

Three complementary theories underpin the conceptual model, namely Social Exchange Theory, Stakeholder Theory, and Social Representations Theory. Social Exchange Theory suggests that residents evaluate tourism by considering its perceived benefits and costs (Ap 1992). They are more likely to support tourism when the perceived advantages outweigh the associated disadvantages (Hu et al. 2024; Nunkoo and Ramkissoon 2011; Wang and Pfister 2008). Stakeholder Theory supports this view by positioning residents as key stakeholders in tourism development, rather than passive recipients of tourism impacts (Shani and Pizam 2011). From this perspective, sustainable tourism requires residents to be included in tourism planning, decision-making, and benefit-sharing processes (Stylidis 2020; Hsu et al. 2019; Jaafar et al. 2017). Social Representations Theory further supports the role of place image. It explains how shared meanings and perceptions of a place are shaped through community experience and interaction (Kim and Park 2023; Stylidis and Quintero 2022).

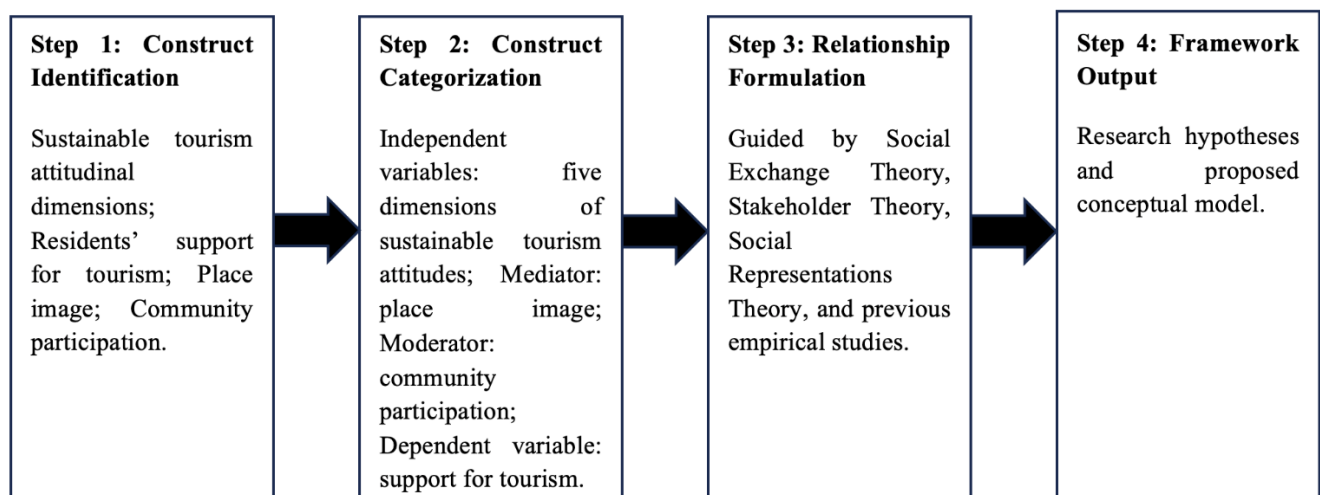
Based on these theories, residents' support for sustainable tourism is positioned as the dependent variable. It refers to residents' willingness to support and sustain tourism development in their community (Celik and Rasoolimanesh 2023; Nunkoo and So 2016). The independent variables are five dimensions of residents' sustainable tourism attitudes: perceived economic benefits, environmental sustainability, perceived social costs, cultural sustainability, and visitor satisfaction. These dimensions reflect how residents evaluate tourism impacts in economic,

environmental, social, cultural, and visitor-related domains (Hsu et al. 2019; Ribeiro et al. 2018; Choi and Sirakaya 2005).

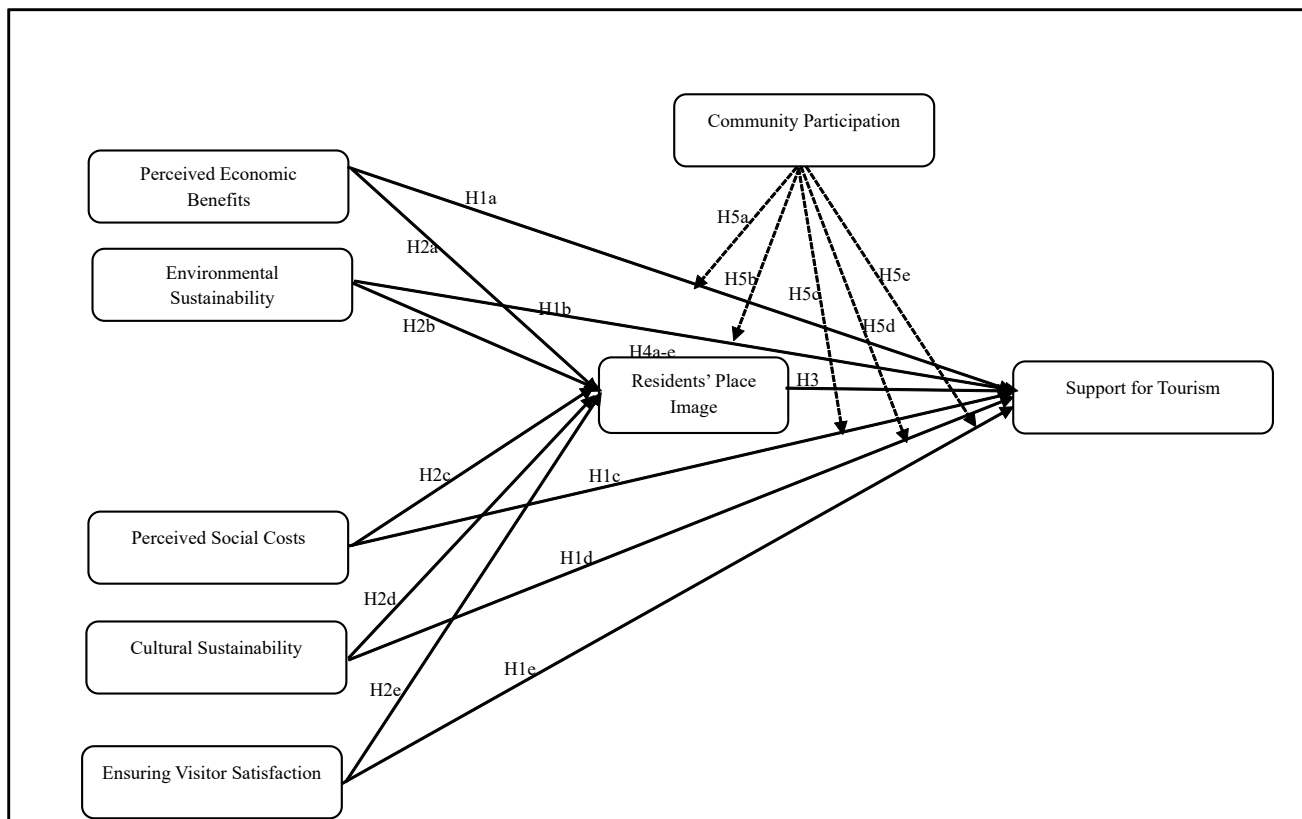
Residents' place image is included as the mediating variable. It refers to residents' cognitive and affective evaluations of their community as both a tourism destination and a place to live (Stylidis et al. 2017; Baloglu and Brinberg 1997; Crompton 1979). Cognitive image refers to beliefs and evaluations of tangible attributes of a place (Stylidis et al. 2017; Schroeder 1996). Affective image refers to a person's emotions and feelings toward a place (Stylidis 2020; Baloglu and Brinberg 1997). Finally, community participation is included as the moderating variable. It reflects residents' involvement in tourism planning, decision-making, and benefit-sharing processes (Gannon et al. 2021; Hsu et al. 2019; Rasoolimanesh et al. 2017b; Tosun 2006).

The conceptual model is developed through four steps. First, academic and professional works on sustainable tourism development, residents' support for tourism, place image, and community participation are reviewed to identify the relevant constructs. Second, the constructs are assigned their roles in the model, with residents' sustainable tourism attitude dimensions positioned as independent variables, place image as the mediator, community participation as the moderator, and residents' support for tourism as the dependent outcome. Third, the relationships among the constructs are developed based on the three theories and previous empirical findings. Finally, these relationships are translated into proposed hypotheses and presented in the conceptual model.

Overall, the framework lays the foundation for future empirical validation using quantitative survey data and structural equation modeling. Figure 3 shows the four-step conceptual model development process, while Figure 4 illustrates the conceptual model of the study.



**Figure 3:** Four-step conceptual model development process (Source: Authors)



**Figure 4:** Proposed conceptual model of the study (Source: Authors)

### Proposed Hypotheses

Building on the proposed conceptual framework, this paper proposes five sets of hypotheses. The direction of these hypotheses is grounded in the study's theoretical foundations and supported by empirical findings from previous studies.

The first set of hypotheses (H1a–e) proposes that residents' support for sustainable rural tourism is directly influenced by the five dimensions of residents' sustainable tourism attitudes. Perceived economic benefits, environmental sustainability, cultural sustainability, and visitor satisfaction are expected to positively influence support for tourism, whereas perceived social costs are expected to negatively influence support.

The second set of hypotheses (H2a–e) proposes that residents' place image is directly influenced by the five dimensions of residents' sustainable tourism attitudes. Positive attitudinal dimensions are expected to enhance residents' place image, while perceived social costs are expected to reduce it.

The third hypothesis (H3) proposes that residents' place image positively influences support for tourism. Residents who hold a more favorable image of their community both as a tourism destination and a place to live are expected to express greater support for tourism development.

The fourth set of hypotheses (H4a–e) proposes that residents' place image mediates the relationships between the five attitudinal dimensions and support for tourism. In the proposed framework, residents' sustainable tourism attitudes are expected to shape their image of the community, which subsequently influences the degree to which they are willing to support tourism development.

Finally, the fifth set of hypotheses (H5a–e) proposes that community participation moderates the relationships between residents' sustainable tourism attitudes and support for tourism.

Higher levels of community participation are expected to strengthen the positive relationships between perceived economic benefits, environmental sustainability, cultural sustainability, visitor satisfaction, and support for tourism. In contrast, community participation is expected to weaken the negative relationship between perceived social costs and support for tourism by providing residents with greater voice, involvement, and influence in tourism planning and decision-making.

## DISCUSSION OF THE PROPOSED FRAMEWORK

### Conceptual Insights from the Proposed Framework

This section presents theory-driven insights from the proposed model rather than empirical findings. Applied to Kinabalu UNESCO Global Geopark, the model integrates Social Exchange Theory, Stakeholder Theory, and Social Representations Theory to explain residents' support for sustainable rural tourism through their tourism-related evaluations, perceptions of place, and participation in tourism development.

Within the model, place image provides a possible pathway through which residents' sustainable tourism attitudes may shape their support. Community participation is treated as a contextual factor that may alter the strength of these relationships.

A key insight from the framework is that sustainable tourism in geopark destinations cannot depend only on technical circular economy practices. In tourism, circular economy approaches are often applied through material and efficiency-based strategies. These include zoning and land use planning (e.g., Yiu and Cheung 2021; Mason 2012), infrastructure planning (e.g., Mandic et al. 2018; Boers and Cottrell 2007), environmental impact assessments (e.g., Pegler et al. 2025; Pope et al. 2019), conservation plans (e.g., Le et al. 2019; Nasser 2003), and waste management systems (Obersteiner et al. 2021; Zorpas et al. 2015). These strategies are

important. However, the proposed framework suggests that they should be supported by social mechanisms that build trust, foster community engagement, and ensure meaningful local involvement.

In this regard, the study introduces social circularity as a conceptual extension of circular economy thinking in sustainable rural tourism. Social circularity focuses on the social feedback mechanisms through which residents' attitudes, place image, participation, and support help sustain tourism systems over time. This responds to a limitation in circular economy literature, where social equity and community agency are often given less attention despite their importance in achieving holistic sustainability (Korhonen et al. 2018; Kirchherr et al. 2017).

#### **Community Participation as a Circularity Enabler**

Within the proposed framework, community participation is viewed as a circularity enabler. Participation can support more inclusive tourism development by ensuring tourism planning and decision-making take local voices into account. It can also help ensure that the distribution of tourism benefits occurs in ways that reflect community needs and sustainability goals (Huo et al. 2023; Nugroho and Numata 2022; Gannon et al. 2021; Hsu et al. 2019). In geopark contexts such as KUGG, conservation objectives must be balanced with local livelihoods and cultural preservation. Therefore, community participation may help strengthen trust and long-term support for tourism (UNESCO 2025).

The proposed framework also highlights the issue of tourism leakage. Tourism leakage occurs when economic benefits are captured by external actors rather than retained within local communities (e.g., Chaitanya and Swain 2024; Mahar et al. 2024; Mtapuri et al. 2022; Lacher and Nepal 2010). Tourism leakage reflects a linear economic pattern in which value flows out of the destination. From a social circularity perspective, community participation may help transform linear leakages into locally embedded value chains. This can be done by strengthening local ownership, increasing community involvement, and supporting the retention of tourism benefits within the destination (Jeelani et al. 2023; Huo et al. 2023; Hsu et al. 2019; Rasoolimanesh et al. 2017b; Tosun 2006).

Moreover, the proposed model highlights the roles that residents' sustainable tourism attitudes and perceptions play in shaping residents' support for tourism. Consistent with Social Exchange Theory, residents are expected to weigh tourism based on several sustainability dimensions, including economic, environmental, social, cultural, and visitor-related factors. These evaluations may influence support for tourism directly. They may also influence support indirectly through the image that residents have of their community as a tourism destination, which acts as a perceptual bridge between residents' tourism-related attitudes and their support for tourism (Uslu et al. 2023; Styliadis and Quintero 2022; Ganji et al. 2021; Tournois and Djerić 2019).

#### **Theoretical Contributions**

The proposed framework offers several theoretical contributions. First, it extends circular economy research by introducing social circularity as a concept that focuses on residents' attitudes, perceptions, participation, and support. These social mechanisms are important for achieving sustainable outcomes (Korhonen et al. 2018; Kirchherr et al. 2017).

Second, this study contributes to sustainable tourism literature by bringing together residents' sustainable tourism attitudes, place image, community participation, and support for tourism into one framework. Previous studies have examined these constructs separately. However, the present framework brings them together

to provide a more comprehensive explanation of residents' support for tourism.

Third, by including residents' place image as a mediating variable, the proposed framework provides a conceptual basis for understanding the way residents evaluate tourism and how this evaluation may lead to supportive behavior toward tourism development. Fourth, the inclusion of community participation as a moderating variable provides a basis for examining whether the relationship between tourism-related attitudes and support may be strengthened by residents' involvement in tourism planning and decision-making.

Finally, the proposed framework contributes to discussions on tourism value retention. It conceptualizes community participation as a mechanism that may help transform linear economic flows into more locally embedded circular systems.

#### **Practical Implications**

The proposed framework also offers practical implications for policymakers, tourism planners, and higher education institutions. Because the present study is conceptual, these implications should be interpreted as theory-informed recommendations rather than evidence from primary data. Policymakers and tourism planners may use the framework to design participatory governance systems, strengthen local value retention, support community-based tourism enterprises, and develop monitoring tools such as resident perception surveys and visitor impact assessments. In addition, higher education institutions may support geopark communities through capacity building, stakeholder workshops, research support, and knowledge transfer initiatives aligned with sustainable tourism and circular economy principles.

#### **CONCLUSION**

This study extends circular economy and sustainable tourism discussions by emphasizing the social processes that contribute to long-term sustainability in rural tourism destinations. In the context of Kinabalu UNESCO Global Geopark, it brings together residents' sustainable tourism attitudes, place image, community participation, and support for tourism within an integrated conceptual framework.

The proposed framework suggests that residents' support for tourism can be shaped by multiple factors. First, the perceived economic or environmental outcomes of tourism can influence whether residents accept and support tourism. Second, the way residents evaluate the social, cultural, and visitor-related dimensions of tourism can shape their support for tourism. Furthermore, how residents perceive their community as both a tourism destination and a place to live, and how meaningfully they are included in tourism planning, decision-making, and benefit-sharing, can also influence their support for tourism. In this way, the study addresses the limited understanding of how residents' attitudes, perceptions, and participation influence sustainability initiatives in rural tourism contexts.

This study makes a significant contribution by introducing social circularity as a conceptual extension of circular economy thinking. Social circularity highlights that sustainability depends not only on efficient resource use, waste reduction, and environmental protection, but also on community participation, local value retention, place-based perceptions, trust, and sustained resident support. By positioning community participation as a circularity enabler, the proposed framework explains how tourism

development can move beyond linear value extraction toward more inclusive and locally embedded sustainability outcomes.

This study also contributes to the campus-to-globe sustainability discussion by positioning geoparks as community-based living laboratories. In these settings, higher education institutions can support knowledge transfer, capacity building, participatory governance, and evidence-based tourism planning. In this respect, Kinabalu UNESCO Global Geopark provides a relevant context for connecting institutional sustainability initiatives with rural community development, conservation, and support for sustainable tourism development.

As a conceptual study, this paper does not provide empirical evidence from primary data. Instead, it offers a conceptual framework that can guide future empirical validation. Future studies may test the proposed relationships using quantitative survey data and structural equation modeling, beginning with Kinabalu UNESCO Global Geopark and extending to other rural or protected-area tourism contexts. Comparative studies across different geoparks and rural destinations may also help assess the generalizability of the proposed social circularity framework.

## ACKNOWLEDGMENTS

The authors gratefully acknowledge Adamson University, in partnership with Universiti Malaysia Sabah and the National Institute of Technology–Fukushima College, for organizing the 10th Regional Conference on Campus Sustainability in Manila, Philippines, and for providing the opportunity to present this paper. The authors also sincerely thank *SciEnggJ* for the opportunity to publish this work.

## CONFLICT OF INTEREST

The authors declare no conflict of interest in this study.

## CONTRIBUTIONS OF INDIVIDUAL AUTHORS

Christy Bidder contributed to the conceptualization of the study, conducted the investigation, developed the methodology, and prepared the original draft of the manuscript. Awangku Hassanah Bahar Pengiran Bagul contributed to the conceptualization and methodological development of the study, provided supervision throughout the research process, and secured funding support. Both authors reviewed and approved the final version of the manuscript.

## REFERENCES

- Agyeiwaah E, Zhao Y. Residents' perceived social sustainability of food tourism events. *Tour Manag Perspect* 2024; 53:101276. <https://doi.org/10.1016/j.tmp.2024.101276>
- Ap J. Residents' perceptions on tourism impacts. *Ann Tour Res* 1992; 19(4):665-690. [https://doi.org/10.1016/0160-7383\(92\)90060-3](https://doi.org/10.1016/0160-7383(92)90060-3)
- Baloglu S, Brinberg D. Affective images of tourism destinations. *J Travel Res* 1997; 35(4):11-15. <https://doi.org/10.1177/004728759703500402>
- Bidder C, Kibat SA, Saien S. Mount Kinabalu: the sacred emblem of the first UNESCO World Heritage Site on Borneo. *Tour Leis Glob Chang* 2014; 1:1-9.
- Boers B, Cottrell S. Sustainable tourism infrastructure planning: a GIS-supported approach. *Tour Geogr* 2007; 9(1):1-21. <https://doi.org/10.1080/14616680601092824>
- Butler, RW. The concept of a tourist area cycle of evolution: implications for management of resources. *Can Geogr* 1980; 24(1):5-12. <https://doi.org/10.1111/j.1541-0064.1980.tb00970.x>
- Byrd ET, Bosley HE, Dronberger MG. Comparisons of stakeholder perceptions of tourism impacts in rural eastern North Carolina. *Tour Manag* 2009; 30(5):693-703. <https://doi.org/10.1016/j.tourman.2008.10.021>
- Celik S, Rasoolimanesh SM. Residents' attitudes towards tourism, cost-benefit attitudes, and support for tourism: a pre-development perspective. *Tour Plan Dev* 2023; 20(4):522-540. <https://doi.org/10.1080/21568316.2021.1873836>
- Chaitanya AK, Swain SK. Economic leakages in tourism: a comprehensive review of theoretical and empirical perspectives. *Tour Econ* 2024; 30(5):1306-1323. <https://doi.org/10.1177/13548166231204648>
- Cheng TM, Wu HC, Wang JTM, Wu MR. Community participation as a mediating factor on residents' attitudes towards sustainable tourism development and their personal environmentally responsible behavior. *Curr Issues Tour* 2019; 22(14):1764-1782. <https://doi.org/10.1080/13683500.2017.1405383>
- Choi HSC, Sirakaya E. Measuring residents' attitude toward sustainable tourism: development of sustainable tourism attitude scale. *J Travel Res* 2005; 43(4):380-394. <https://doi.org/10.1177/0047287505274651>
- Crompton JL. An assessment of the image of Mexico as a vacation destination and the influence of geographical location upon that image. *J Travel Res* 1979; 17(4):18-23. <https://doi.org/10.1177/004728757901700404>
- Dapp MM. Toward a sustainable circular economy powered by community-based incentive systems. In: Treiblmaier H, Beck R, eds. *Business transformation through blockchain*. Cham: Palgrave Macmillan, 2019: [https://doi.org/10.1007/978-3-319-99058-3\\_6](https://doi.org/10.1007/978-3-319-99058-3_6)
- de la Torre R, Onggo BS, Corlu CG, Nogal M, Juan AA. The role of simulation and serious games in teaching concepts on circular economy and sustainable energy. *Energies* 2021; 14(4):1138. <https://doi.org/10.3390/en14041138>
- Emerson RM. Social exchange theory. *Annu Rev Sociol* 1976; 2:335-362. <https://doi.org/10.1146/annurev.so.02.080176.002003>
- Ferrer-Balas D, Lozano R, Huisingh D, Buckland H, Ysern P, Zilahy G. Going beyond the rhetoric: system-wide changes in universities for sustainable societies. *J Clean Prod* 2010; 18(7):607-610. <https://doi.org/10.1016/j.jclepro.2009.12.009>
- Freeman R. *Strategic management: a stakeholder approach*. Boston: Pitman, 1984.

- Freeman RE, Phillips RA. Stakeholder theory: a libertarian defense. *Bus Ethics Q* 2002; 12(3):331-349. <https://doi.org/10.2307/3858020>
- Ganji SFG, Johnson LW, Sadeghian S. The effect of place image and place attachment on residents' perceived value and support for tourism development. *Curr Issues Tour* 2021; 24(9):1304-1318. <https://doi.org/10.1080/13683500.2020.1784106>
- Gannon M, Rasoolimanesh SM, Taheri B. Assessing the mediating role of residents' perceptions toward tourism development. *J Travel Res* 2021; 60(1):149-171. <https://doi.org/10.1177/0047287519890926>
- Geissdoerfer M, Savaget P, Bocken NM, Hultink EJ. The circular economy—a new sustainability paradigm?. *J Clean Prod* 2017; 143:757-768. <https://doi.org/10.1016/j.jclepro.2016.12.048>
- Giannoccaro I, Ceccarelli G, Fraccascia L. Features of the higher education for the circular economy: the case of Italy. *Sustainability* 2021; 13(20):11338. <https://doi.org/10.3390/su132011338>
- Godovykh M, Hacikara A, Baker C, Fyall A, Pizam A. Measuring the perceived impacts of tourism: a scale development study. *Curr Issues Tour* 2024; 27(15):2516-2532. <https://doi.org/10.1080/13683500.2023.2243003>
- Hair JF, Hult GTM, Ringle CM, Sarstedt M. A primer on partial least squares structural equation modeling (PLS-SEM). 3rd ed. Thousand Oaks: SAGE Publications, 2022.
- Henriques MH, Brilha J. UNESCO Global Geoparks: a strategy towards global understanding and sustainability. *Episodes* 2017; 40(4):349-355. <https://doi.org/10.18814/epiiugs/2017/v40i4/017036>
- Hsu CY, Chen MY, Yang SC. Residents' attitudes toward support for island sustainable tourism. *Sustainability* 2019; 11(18):5051. <https://doi.org/10.3390/su11185051>
- Hu R, Li G, Liu A, Chen JL. Emerging research trends on residents' quality of life in the context of tourism development. *J Hosp Tour Res* 2024; 48(1):131-152. <https://doi.org/10.1177/10963480221081382>
- Huo T, Yuan F, Huo M, Shao Y, Li S, Li Z. Residents' participation in rural tourism and interpersonal trust in tourists: the mediating role of residents' perceptions of tourism impacts. *J Hosp Tour Manag* 2023; 54:457-471. <https://doi.org/10.1016/j.jhtm.2023.02.011>
- Jaafar M, Rasoolimanesh SM, Ismail S. Perceived sociocultural impacts of tourism and community participation: a case study of Langkawi Island. *Tour Hosp Res* 2017; 17(2):123-134. <https://doi.org/10.1177/1467358415610373>
- Jeelani P, Shah SA, Dar SN, Rashid H. Sustainability constructs of mountain tourism development: the evaluation of stakeholders' perception using SUS-TAS. *Environ Dev Sustain* 2023; 25(8):8299-8317. <https://doi.org/10.1007/s10668-022-02401-8>
- Kim K, Uysal M, Sirgy MJ. How does tourism in a community impact the quality of life of community residents? *Tour Manag* 2013; 36:527-540. <https://doi.org/10.1016/j.tourman.2012.09.005>
- Kim S, Park E. An integrated model of social impacts and resident's perceptions: from a film tourism destination. *J Hosp Tour Res* 2023; 14(2):395-421. <https://doi.org/10.1177/10963480211011641>
- Kirchherr J, Reike D, Hekkert M. Conceptualizing the circular economy: an analysis of 114 definitions. *Resour Conserv Recycl* 2017; 127:221-232. <https://doi.org/10.1016/j.resconrec.2017.09.005>
- Korhonen J, Honkasalo A, Seppälä J. Circular economy: the concept and its limitations. *Ecol Econ* 2018; 143:37-46. <https://doi.org/10.1016/j.ecolecon.2017.06.041>
- Lacher RG, Nepal SK. From leakages to linkages: local-level strategies for capturing tourism revenue in Northern Thailand. *Tour Geogr* 2010; 12(1):77-99. <https://doi.org/10.1080/14616680903493654>
- Le D, Scott N, Becken S, Connolly RM. Tourists' aesthetic assessment of environmental changes, linking conservation planning to sustainable tourism development. *J Sustain Tour* 2019; 27(10):1477-1494. <https://doi.org/10.1080/09669582.2019.1632869>
- Lever MW, Elliot S, Joppe M. Pride and promotion: exploring relationships between national identification, destination advocacy, tourism ethnocentrism and destination image. *J Vacat Mark* 2023; 29(4):537-554. <https://doi.org/10.1177/13567667221109270>
- MacArthur E. Towards the circular economy. *J Ind Ecol* 2013; 2(1):23-44.
- Mahar N, Dobriyal P, Badola R, Hussain SA. Tourism on the roof of the world: socio-ecological impacts of tourism on the Indian Trans-Himalaya. *Land Use Policy* 2024; 138:107031. <https://doi.org/10.1016/j.landusepol.2023.107031>
- Markard J, Raven R, Truffer B. Sustainability transitions: an emerging field of research and its prospects. *Res Policy* 2012; 41(6):955-967. <https://doi.org/10.1016/j.respol.2012.02.013>
- Marzo-Navarro M, Pedraja-Iglesias M, Vinzon L. Sustainability indicators of rural tourism from the perspective of the residents. *Tour Geogr* 2015; 17(4):586-602. <https://doi.org/10.1080/14616688.2015.1062909>
- Mason P. Tourism impacts, planning and management. Oxford: Butterworth-Heinemann, 2003.
- Mason P. Zoning, land-use planning and tourism. In: Holden A, Fennell D, eds. *The Routledge handbook of tourism and the environment*. London: Routledge, 2012:266-275.
- Mandic A, Mrnjavac Z, Kordic L. Tourism infrastructure, recreational facilities and tourism development. *Tour Hosp Manag* 2018; 24(1):41-62. <https://doi.org/10.20867/thm.24.1.12>
- Mendoza JMF, Gallego-Schmid A, Azapagic A. Building a business case for implementation of a circular economy in higher education institutions. *J Clean Prod* 2019; 220:553-567. <https://doi.org/10.1016/j.jclepro.2019.02.045>
- Mtapuri O, Camilleri MA, Dłużewska A. Advancing community-based tourism approaches for the sustainable development of

- destinations. *Sustain Dev* 2022; 30(3):423-432. <https://doi.org/10.1002/sd.2257>
- Murray A, Skene K, Haynes K. The circular economy: an interdisciplinary exploration of the concept and application in a global context. *J Bus Ethics* 2017; 140(3):369-380. <https://doi.org/10.1007/s10551-015-2693-2>
- Nasser N. Planning for urban heritage places: reconciling conservation, tourism, and sustainable development. *J Plan Lit* 2003; 17(4):467-479. <https://doi.org/10.1177/0885412203017004001>
- Nugroho P, Numata S. Resident support of community-based tourism development: evidence from Gunung Ciremai National Park, Indonesia. *J Sustain Tour* 2022; 30(11):2510-2525. <https://doi.org/10.1080/09669582.2020.1755675>
- Nunkoo R, Ramkissoon H. Developing a community support model for tourism. *Ann Tour Res* 2011; 38(3):964-988. <https://doi.org/10.1016/j.annals.2011.01.017>
- Nunkoo R, So KKF. Residents' support for tourism: testing alternative structural models. *J Travel Res* 2016; 55(7):847-861. <https://doi.org/10.1177/0047287515592972>
- Obersteiner G, Gollnow S, Eriksson M. Carbon footprint reduction potential of waste management strategies in tourism. *Environ Dev* 2021; 39:100617. <https://doi.org/10.1016/j.envdev.2021.100617>
- Oshimi D, Harada M. Host residents' role in sporting events: the city image perspective. *Sport Manag Rev* 2019; 22(2):263-275. <https://doi.org/10.1016/j.smr.2018.04.002>
- Pegler GF, de Lemos CC, Ranieri VEL. Exploring the application of environmental impact assessment to tourism and recreation in protected areas: a systematic literature review. *Environ Dev Sustain* 2025; 27(7):15053-15075. <https://doi.org/10.1007/s10668-024-04532-6>
- Pope J, Wessels JA, Douglas A, Hughes M, Morrison-Saunders A. The potential contribution of environmental impact assessment (EIA) to responsible tourism: the case of the Kruger National Park. *Tour Manag Perspect* 2019; 32:100557. <https://doi.org/10.1016/j.tmp.2019.100557>
- Qu D, Shevchenko T, Yan X. University curriculum education activities towards circular economy implementation. *Int J Sci Technol Res* 2020; 9(5):200-206.
- Ramkissoon H. Perceived social impacts of tourism and quality-of-life: a new conceptual model. *J Sustain Tour* 2023; 31(2):442-459. <https://doi.org/10.1080/09669582.2020.1858091>
- Rasoolimanesh SM, Jaafar M. Sustainable tourism development and residents' perceptions in World Heritage Site destinations. *Asia Pac J Tour Res* 2017; 22(1):34-48. <https://doi.org/10.1080/10941665.2016.1175491>
- Rasoolimanesh SM, Jaafar M, Kock N, Ahmad AG. The effects of community factors on residents' perceptions toward World Heritage Site inscription and sustainable tourism development. *J Sustain Tour* 2017a; 25(2):198-216. <https://doi.org/10.1080/09669582.2016.1195836>
- Rasoolimanesh SM, Jaafar M, Ahmad AG, Barghi R. Community participation in World Heritage Site conservation and tourism development. *Tour Manag* 2017b; 58:142-153. <https://doi.org/10.1016/j.tourman.2016.10.016>
- Renfors SM. Education for the circular economy in higher education: an overview of the current state. *Int J Sustain High Educ* 2024; 25(9):111-127. <https://doi.org/10.1108/IJSHE-07-2023-0270>
- Ribeiro MA, Pinto P, Silva JA, Woosnam KM. Examining the predictive validity of SUS-TAS with maximum parsimony in developing island countries. *J Sustain Tour* 2018; 26(3):379-398. <https://doi.org/10.1080/09669582.2017.1355918>
- Rossi RJ, Gilmartin KJ. The handbook of social indicators: sources, characteristics, and analysis. New York: Garland STPM, 1980.
- Sabah Parks. (2025a). Kinabalu UNESCO Global Geopark. Retrieved March 27, 2026 from <https://kinabalugeopark.sabahparks.org.my/aspiring-kinabalu>
- Sabah Parks (2025b). Kinabalu Park. Retrieved March 27, 2026 from <https://www.sabahparks.org.my/kinabalu-park>
- Schroeder T. The relationship of residents' image of their state as a tourist destination and their support for tourism. *J Travel Res* 1996; 34(4):71-73. <https://doi.org/10.1177/004728759603400411>
- Shani A., Pizam A. Community participation in tourism planning and development. In: Uysal M, Perdue R, Sirgy M, eds. Handbook of tourism and quality-of-life research: enhancing the lives of tourists and residents of host communities. Dordrecht: Springer, 211:547-564.
- Stylidis D, Shani A, Belhassen Y. Testing an integrated destination image model across residents and tourists. *Tour Manag* 2017; 58:184-195. <https://doi.org/10.1016/j.tourman.2016.10.014>
- Stylidis D. Using destination image and place attachment to explore support for tourism development: the case of tourism versus non-tourism employees in Eilat. *J Hosp Tour Res* 2020; 44(6):951-973. <https://doi.org/10.1177/1096348020919157>
- Stylidis D, Quintero AMD. Understanding the effect of place image and knowledge of tourism on residents' attitudes towards tourism and their word-of-mouth intentions: evidence from Seville, Spain. *Tour Plan Dev* 2022; 19(5):433-450. <https://doi.org/10.1080/21568316.2022.2049859>
- Tiippana-Usvasalo M, Pajunen N, Maria H. The role of education in promoting circular economy. *Int J Sustain Eng* 2023; 16(1):92-103. <https://doi.org/10.1080/19397038.2023.2210592>
- Tournois L, Djerić G. Evaluating urban residents' attitudes towards tourism development in Belgrade (Serbia). *Curr Issues Tour* 2019; 22(14):1670-1678. <https://doi.org/10.1080/13683500.2018.1465030>
- Tosun C. Expected nature of community participation in tourism development. *Tour Manag* 2006; 27(3):493-504. <https://doi.org/10.1016/j.tourman.2004.12.004>

- United Nations Educational, Scientific and Cultural Organization. (May 24, 2023). Kinabalu UNESCO Global Geopark. <https://www.unesco.org/en/igpp/geoparks/kinabalu?hub=67817>
- United Nations Educational, Scientific and Cultural Organization. (June 20, 2025). List of UNESCO Global Geoparks and Regional Networks. <https://www.unesco.org/en/igpp/geoparks>
- Uslu A, Erul E, Santos JAC, Obradović S, Custódio Santos M. Determinants of residents' support for sustainable tourism development: an empirical study in Midyat, Turkey. *Sustainability* 2023; 15(13):10013. <https://doi.org/10.3390/su151310013>
- Velenturf AP, Purnell P. Principles for a sustainable circular economy. *Sustain Prod Consum* 2021; 27:1437-1457. <https://doi.org/10.1016/j.spc.2021.02.018>
- Wang Y, Pfister RE. Residents' attitudes toward tourism and perceived personal benefits in a rural community. *J Travel Res* 2008; 47(1):84-93. <https://doi.org/10.1177/0047287507312402>
- Woosnam KM. Using emotional solidarity to explain residents' attitudes about tourism and tourism development. *J Travel Res* 2012; 51(3):315-327. <https://doi.org/10.1177/0047287511410351>
- Xu J, Chan TL, Pratt S. Destination image of Taiwan from the perspective of Hong Kong residents: revisiting structural relationships between destination image attributes and behavioral intention. *Int J Hosp Tour Adm* 2018; 19(3):289-310. <https://doi.org/10.1080/15256480.2017.1324339>
- Xu S, Hu Y. How do residents respond to negative environmental impacts from tourism? the role of community participation in empowering residents' environmentally responsible behavior. *Int J Tour Res* 2021; 23(6):1099-1111. <https://doi.org/10.1002/jtr.2471>
- Yin J, Ji Y, Ni Y. How does cultural confidence awaken community citizenship behaviors? the moderating effect of cultural involvement. *J Hosp Tour Manag* 2023; 55:425-434. <https://doi.org/10.1016/j.jhtm.2023.05.014>
- Yiu CY, Cheung KS. Urban zoning for sustainable tourism: a continuum of accommodation to enhance city resilience. *Sustainability* 2021; 13(13):7317. <https://doi.org/10.3390/su13137317>
- Zhang Y, Xiao X, Cao R, Zheng C, Guo Y, Gong W, Wei Z. How important is community participation to eco-environmental conservation in protected areas? from the perspective of predicting locals' pro-environmental behaviours. *Sci Total Environ* 2020; 739:139889. <https://doi.org/10.1016/j.scitotenv.2020.139889>
- Zorpas AA, Voukkali I, Loizia P. The impact of tourist sector in the waste management plans. *Desalin Water Treat* 2015; 56(5):1141-1149. <https://doi.org/10.1080/19443994.2014.934721>