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MOA Antecedents of Sustainable Ecotourism Development

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ABSTRACT

This research aims to find out the relationship between the three variables: motivation, opportunity and ability (MOA) with the participation of the indigenous community in the process of creating sustainable ecotourism development. A quantitative cross-sectional survey was conducted with 113 members of the Jahai indigenous community in Kampung Sungai Tiang and Kampung Sungai Kejar located in the Royal Belum State Park (RBSP), Malaysia. Partial least squares of structural equation modelling and importance-performance map analysis were used to analyse the data. Motivation was not a significant factor in influencing the level of participation of the indigenous community members in RBSP as opportunity and ability were strong and significant positive predictors of indigenous community participation. Moreover, indigenous community participation was ascertained as a strong predictor of sustainable ecotourism development (SED) and was found to significantly mediate the relationships between both opportunity and ability and SED. The findings caution against treating indigenous participation as a motivational problem. The central policy challenge in RBSP is structural, in that the Jahai community needs genuine opportunities, participatory structures, access to training, financial assistance and the freedom to make decisions which will allow them to enable the immense potential of ecotourism to turn into realistic ecotourism results. The study contributes to the MOA model in an indigenous ecotourism context and suggests an Opportunity-Ability-Participation Sustainable Ecotourism Development (OAP-SED) Framework as a

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practical avenue towards indigenous participation and livelihood improvement via cultural resilience and biodiversity conservation.

Keywords: Indigenous community participation, Life on Land (SDG 15), MOA model, Royal Belum State Park, sustainable ecotourism development

INTRODUCTION

The developmental image of tourism is not taken for granted anymore. However, despite being one of the biggest foreign exchange earners in the country, the growth of this sector has been less defensible in the face of ecological costs and inequitable community benefits (Gidebo, 2023). This predicament has become more apparent in recent crises as tourism is sensitive to both external shocks and climate change and fluctuating demand while benefits from tourism are often reaped by those close to capital, infrastructure and policymaking (Bahamonde-Rodríguez et al., 2023; Teo et al., 2025;). Mass tourism in many tourism destination sites has exacerbated the negative impacts of tourism on vulnerable ecosystems, while offering them limited benefits, particularly for marginalised local communities (Ivasciuc & Ispas, 2023; Prayitno et al., 2024). Sustainable tourism and ecotourism have thus become not just a feasible alternative but a long-term solution of a tourism model that has in the past often detached economic growth from ecological care and social justice (Gidebo, 2023; Gomes & Lopes, 2023). Xu et al. (2022) and Yanying et al. (2026) stated that it only works when all three conservations, community welfare and cultural protection are used in tandem as opposed to being mentioned individually in policy debates. Recent systematic reviews in rural tourism highlighted an increasing attention to the valorisation of rural areas, with the focus on intangible cultural heritage because if no direct economic upliftment is achieved, the ecotourism model often fails (Ramli & Kamal, 2026; Zhang et al., 2025).

This contradiction is most evident in Malaysia. According to Teo et al. (2025), tourism contributed RM86.1 billion in receipts in 2019 prior to the Covid-19 pandemic but the pandemic has led to a decline in tourism receipts, which fell to RM0.23 billion in 2021. This has created an increased interest in community and nature-based tourism, specifically in protected areas such as the Royal Belum State Park (RBSP) in Perak. At 117,500 ha, RBSP is part of a tropical rain forest system that is believed to be approximately 130 million years old which is around the same age as the Amazon and Congo basins. It also home to endangered species such as the Malayan tiger, Asian elephant (Gwee et al., 2019; Schwabe et al., 2015; Zhang et al., 2025). It does not have a negligible conservation economy as the annual direct non-consumptive recreational value of the park is estimated at RM14.66 million, with future cash flows of up to RM1.86 billion over the next century (Gwee et al., 2019). These numbers are a testament to RBSP's

ecological and economic importance. However, the more critical questions of development which are "Who is involved in creation of this value" and "Who is enjoying it?" are not addressed.

Such questions matter because RBSP is not merely a protected rainforest. It is also an indigenous landscape. The Malaysian indigenous people (Orang Asli) including the Jahai community have long inhabited these forests which are a source of their livelihood, vivid memories, cultural practice and ecological knowledge (Hamid et al., 2025; Kadir & Ni, 2024). Treating RBSP only as a conservation asset risk erasing the vast knowledge of the people whose relationship with the forest predates tourism planning and protected-area administration. Schwabe et al. (2015) postulated that earlier conservation and tourism arrangements have often restricted indigenous access to land, agriculture and forest resources, producing a familiar paradox. Similarly, Gidebo (2023) posited that indigenous communities are expected to support conservation, but they are normally not allowed to contribute their opinion to the formulation of conservation and tourism policies. For the Jahai community, the issue is not simply whether ecotourism exists in RBSP. The issue is whether participation is meaningful enough to include planning, decision-making, implementation, and benefit-sharing (Kadir & Ni, 2024). The literature has also not fully resolved this problem. Tourism studies have repeatedly affirmed that community participation is essential for sustainable tourism and ecotourism (Kim et al., 2021; Oleśniewicz et al., 2020). Nevertheless, the antecedents of participation, especially in indigenous and highly regulated protected-area contexts, remain inexplicable.

This study uses the Motivation-Opportunity-Ability (MOA) model as the conceptual platform because it is a model that explains participation as a result of internal disposition, external access, and practical capacity. The original behavioural version of the model involved views the three components of motivation, opportunity and ability as conditions that affect whether a person processes information and then acts accordingly (Batra & Ray, 1986; MacInnis et al., 1991; Ölander & Thøgersen, 1995). Subsequently, Hung et al. (2011) applied this rationale to the tourism domain, suggesting community participation is dependent on the extent to which people are willing to participate, allowed to participate, and able to participate. This tripartite logic is still useful and has been reiterated in recent tourism studies. Dong et al. (2024) discovered that farmers' intention to engage in agricultural heritage tourism was driven by opportunity and ability. On the same basis, Fan et al. (2024) revealed that the conditions of motivational, institutional, and capacity influenced the environmental governance of rural tourism residents. In the same vein, Xu et al. (2022) posited that MOA is a helpful lens to view community-based tourism behavior as motivation, opportunity and ability are significant factors driving farmers' participation and livelihood outcomes. Additionally, specific conditions,

especially opportunity, has been deemed to be necessary or "must-have" prerequisite for achieving functional outcomes by incorporating advanced methodologies such as Necessary Condition Analysis (NCA) with MOA and combined importance-performance map analysis (IPMA) (Hauff et al., 2024).

It is useful to differentiate between three conditions that are often confusing: willingness to participate, access to participative channels and the capacity to engage effectively (Dong et al., 2024; Fan et al., 2024; Hung et al., 2011; Nilsson & Ek Styvén, 2025). However, there is not enough empirical research to verify the functioning of these antecedents among indigenous communities in the Malaysian ecotourism context, especially in the RBSP landscape (Hamid et al., 2025; Kadir & Ni, 2024). There is another weakness which is conceptual. Participation is often assumed as the ultimate goal, instead of the means by which the conversion of "Motivation, Opportunity and Ability" to sustainable ecotourism outcomes occurs.

The originality of this study comes out of an effort to correct this conceptual gap. This research is an extension of previous MOA-based research on tourism by theoretically placing indigenous community participation in the middle ground as a seemingly mediating mechanism and not simply as a final outcome. It puts forward the view that the psychological and structural factors (motivation, opportunity, ability) that underline a learning phenomenon which is only activated when they are deliberately tapped through the active, participatory role of the host community. This is the structural redirection to make sure that the MOA framework represents the sequential reality of indigenous community empowerment (Situmorang et al., 2026).

The purpose of this article is to fill this gap by combining the model of Hung et al. (2011) (MOA) and the theory of community participation proposed by Tosun (2006) to elucidate what can be expected from the indigenous community members in sustainable ecotourism development. Therefore, this study's objectives are:

i. To investigate how motivation, opportunity and ability influence the participation of indigenous community in Royal Belum State Park;
ii. To evaluate direct impacts of motivation, opportunity, ability and indigenous community involvement on sustainable development of ecotourism; and
iii. To evaluate the role of indigenous community participation as a mediator between the MOA antecedents and sustainable development of ecotourism.

This paper's contribution lies in adapting the MOA model in a Malaysian ecotourism context and it also tests the indigenous community participation not as an outcome, but also as a mediator. Moreover, the study provides insights to guide authorities and policy makers on how to transform the immense potential of ecotourism to sustainable tourism development.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Theoretical Foundations

For the current study, “motivation” is the perceived benefits of the Jahai community in engaging with ecotourism and the willingness and readiness by the Jahai community to engage with ecotourism (Fan et al., 2024). “Opportunity” encompasses institutional openness, communication channels, participation opportunities as well as the extent to which RBSP governance allows the indigenous community to influence planning and implementation (Kadir & Ni, 2024). The elements of knowledge, awareness, skills, training and access to resources are associated with “Ability” (Dong et al., 2024). These dimensions are viewed as enablers for indigenous participation, which is defined as active participation in consultation, decision-making, implementation and benefit-sharing. This definition is more robust than merely attending tourism programmes, as participation without influence might easily be considered as tokenism (Gidebo, 2023; Kim et al., 2021; Yanying et al., 2026). The ladder of citizen participation, as developed by Arnstein (1969) is useful here in distinguishing between various levels of consultation, ranging from symbolic to the distribution of power and Tosun's (1999, 2006) typology on tourism participation is particularly relevant in protected-area and developing-country settings, where communities are often asked to endorse tourism but not necessarily to influence it. Advanced methodologies such as Necessary Condition Analysis (NCA) integrated with MOA and combined importance-performance map analysis (IPMA) have further proven that specific conditions, particularly opportunity, act as mandatory "must-have" prerequisites for generating functional outcomes (Hauff et al., 2024). Sustainable ecotourism development is the dependent variable. It is not "economic growth" but the perceived positive impacts on economic, socio-cultural and environmental aspects. Some scholars have stated the dire need of the link between community empowerment and cultural heritage conservation in sustainable tourism (Yanying et al., 2026) while others identified the potential of available information for sustainability to spur more responsible tourist behaviours (Gomes & Lopes, 2023).

Drawing upon Scheyvens's Empowerment Framework and the Triple Bottom Line (TBL) approach, true sustainability mandates that economic generation, cultural revitalisation and environmental conservation operate symbiotically (Bašan et al., 2025; Scheyvens & van der Watt, 2021). Actual sustainability requires economic generation, cultural revitalisation and environmental conservation working in symbiosis (Bašan et al., 2025; Scheyvens & van der Watt, 2021) and is built on the Empowerment Framework proposed by Scheyvens (1999) and the Triple Bottom Line (TBL) approach. Gidebo (2023) also suggested that community-based tourism offers an opportunity to link biodiversity conservation and livelihoods to protected areas. This

understanding is essential for RBSP as this is a conservation landscape and an indigenous community landscape. Although there is significant ecological and recreational value in RBSP, it does not necessarily imply that the Jahai community has a meaningful role in creating and managing this value (Gwee et al., 2019; Ramli & Kamal, 2026; Zhang et al., 2025).

MOA Antecedents of Indigenous Community Participation and Sustainable Ecotourism Development

In general, it is expected that motivation will promote participation as community members are more likely to participate if tourism is perceived as beneficial, meaningful, and consistent with the community's interests. The assumption has been substantiated by recent studies. Weak motivation was identified as a constraint to pro-environmental tourism behaviour among Gen Z tourists by Nilsson and Ek Styvén (2025) while Ivasciuc and Ispas (2023) revealed that pertaining to lifestyle values and local resources, intrinsic motivation can be a driver for sustainable tourism entrepreneurship. For community settings, motivation can be desired income, pride in their culture, improvement of their livelihood or conservation concern. Motivation could thus be both formal economic benefit and the desire to have ecotourism value the ecological and cultural knowledge of the Jahai community.

Motivation may also influence sustainable ecotourism development directly. Communities that perceive ecotourism as beneficial, culturally compatible and economically useful may evaluate its outcomes more positively (Yanying et al., 2026). However, motivation is not essentially adequate. Kadir and Ni (2024) opined that community participation in rural tourism development was not mediated by motivation, indicating that a positive attitude might not lead to development outcomes in the absence of other strong factors. By the same token, Dong et al. (2024) delineated that motivation did not significantly affect farmers' willingness to participate in agricultural heritage tourism, whereas opportunity and ability did. This makes it necessary to test motivation as a predictor of participation and as a direct predictor of sustainable ecotourism development. Thus, the developed hypotheses are:

H1 : Motivation has a significant positive effect on indigenous community participation in RBSP.

H2 : Motivation has a significant positive effect on sustainable ecotourism development in RBSP.

Opportunity is the most political aspect of the MOA model. It concerns not only the existence of tourism activities but whether indigenous communities are granted access to planning, consultation, proposal submission, programme implementation and decision-making. Recent studies indicated the paramount importance of this distinction. Fan et al. (2024) revealed that opportunity factors act as catalysts for residents' participation in rural tourism

environmental governance, while Tang et al. (2022) opined that participation opportunity significantly improves tourists' pro-environmental behaviour. In protected tourism destination sites, opportunity is even more sensitive because state agencies, park authorities and private operators often hold the legal and financial authority over tourism development. D'Arco et al. (2021) established that weak governance in tourism sites that are protected undermines sustainable tourism development because local authorities are not sufficiently engaged in decision-making.

Consequently, opportunity should affect both indigenous community participation and sustainable ecotourism development. If the Jahai indigenous community members are involved in planning, evaluation and programme design, their environmental knowledge and cultural priorities can be translated into tourism practices that are locally acceptable and ecologically responsible. In Malaysia, Kadir and Ni (2024) determined that MOA conditions remain important for rural tourism participation while Hamid et al. (2025) suggested that community resources are pertinent for sustainable indigenous tourism. On an international scale, studies from South Africa's Vhembe District demonstrate that rural tourism as a Local Economic Development (LED) strategy entirely hinges on the structural opportunities provided by local government facilitation (Ramukumba, 2024). Similarly, in Latin American countries, the lack of spatial opportunity often truncates the integration of cultural and biodiversity richness, stalling the realisation of biocultural ecotourism (Echeverri et al., 2025). For RBSP, opportunity is expected to operate as the bridge between governance structures and indigenous community members' actions. Hence, the developed hypotheses are:

H3 : Opportunity has a significant positive effect on indigenous community participation in RBSP.

H4 : Opportunity has a significant positive effect on sustainable ecotourism development in RBSP.

Ability refers to the capacity to participate effectively. It includes awareness, knowledge, skills, training, access to information, and financial resources. Recent MOA-based tourism work has repeatedly shown that capacity is not secondary. Xu et al. (2022) revealed that ability significantly influenced farmers' tourism participation while Kadir and Ni (2024) identified ability as a significant mediator in rural tourism development. Jiao and Wang (2025) used MOA theory in a pro-environmental tourism setting concluded that ability-related conditions such as environmental awareness and green self-efficacy elucidate behavioural outcomes. The outcome has palpable consequences for indigenous ecotourism as indigenous community members might considerable cultural and ecological knowledge, but they still need the fundamental tourism skills specifically guiding, managing safety, hospitality, financial literacy and digital marketing. Empirical evidence divulged that financial

literacy and financial behaviour are the core factors that determine the sustainability of SMEs in indigenous communities and directly reduce the enterprise failure risk (Molosiwa & Holland, 2025).

Ability can also directly influence the development of sustainable ecotourism. A trained, informed and resourced community can help with visitor interpretation, cultural presentation, conservation practice and local enterprise. Nevertheless, ability is not necessarily development. Exclusion of a knowledgeable community in planning results in ineffective policies and a low level of community participation while a trained community with no institutional access may be limited to lower-level operational positions. Therefore, ability needs to be assessed in both its direct impact and its impact via participation. Therefore, the developed hypotheses are:

H5 : Ability has a significant positive effect on indigenous community participation in RBSP.

H6 : Ability has a significant positive effect on sustainable ecotourism development in RBSP.

Indigenous Community Participation's Role in Sustainable Ecotourism Development

Community participation is a fundamental element of sustainable tourism as the success of community support. Knowledge and accountability are key factors in ascertaining whether tourism development is legitimate, durable, and environmentally responsible. Kim et al. (2021) delineated that resident participation contributes to enhancing the attitude toward tourism development while Prayitno et al. (2024) posited that social networks, trust and community norms are supporting factors in strengthening sustainable tourism development especially in tourism protected areas. Gidebo (2023) opined that community-based tourism has the potential to link livelihoods with conservation of biodiversity but not when it is outside of the governance of protected areas because this creates conflict and undermines conservation results. On the same basis, Oleśniewicz et al. (2020) denoted that national parks need to be responsibly managed, visitors need to be regulated, and conservation plans need to be implemented.

In indigenous ecotourism, involvement should not be limited to merely work or culture. It is more significant when communities are involved in decision making, there is a consensus of what is acceptable cultural expression, customary knowledge is safeguarded, and benefits are shared equitably. Yanying et al. (2026) accentuated the need for a greater linkage between cultural heritage preservation and community empowerment in sustainable tourism. In the context of Malaysian indigenous tourism, Hamid et al. (2025) stated that community resources play a crucial part in sustainable indigenous tourism. This is reflected via the successful case studies in the Global South, where co-management and participatory integration were effectively implemented and directly led to revitalisation of intangible cultural

heritage and local economies such as the Wiwa Indigenous Tourism and cultural programmes in Tanzania (Giandomenico, 2025). Thus, the mechanism for ecotourism to be economically useful, culturally respectful, and environmentally grounded is based on the participation level of the Jahai community in RBSP. Hence, the developed hypothesis is:

H7 : There is a significant impact of indigenous community participation on sustainable ecotourism development in RBSP.

An immediate consequence of the MOA framework is the mediation effect. Favourable conditions of motivation, opportunity and ability must be present if sustainable ecotourism outcomes are to be achieved, but it is not a foregone conclusion. They must be converted into concrete participation before they can shape planning, implementation, and benefit distribution. Xu et al. (2022) provided empirical support for this logic by revealing that tourism participation links MOA conditions to livelihood outcomes. Similarly, Kadir and Ni (2024) postulated that ability works through participation in rural tourism development while Dong et al., (2024) suggested that opportunity and ability can be more consequential than motivation in heritage tourism participation. In this study, indigenous community participation is thus not a decorative mediator. It is a process through which willingness, accessibility, and capacity become essentially significant. Therefore, the developed hypotheses are:

H8 : Indigenous community participation mediates the relationship between motivation and sustainable ecotourism development in RBSP.

H9 : Indigenous community participation mediates the relationship between opportunity and sustainable ecotourism development in RBSP.

H10 : Indigenous community participation mediates the relationship between ability and sustainable ecotourism development in RBSP.

METHODOLOGY

This study was conducted using a quantitative, cross-sectional survey design to examine the theory-specified model that includes Hung et al. (2011) MOA model, indigenous community participation and sustainable ecotourism development in RBSP. The design follows a positivist explanation-prediction method because the study examines hypothesised relationships among latent constructs using perceptual survey data and multivariate modelling rather than producing an ethnographic account of the Jahai tribe life (Hair et al., 2022; Saunders et al., 2023). The Jahai community members represent the unit of analysis as the constructs are related to perceptions of ecotourism benefits, participation access, ability to participate, community involvement and sustainable ecotourism outcomes. The respondents of the study were the Jahai indigenous community members living in RBSP. The accessible population was based on two



Figure 1. Location of Royal Belum State Park featuring the selected Jahai settlements (Zhang et al., 2025)

permanent settlements, Kampung Sungai Tiang and Kampung Sungai Kejar.

Figure 1 shows that both villages have year-round residents, active interfaces with ecotourism activities, and direct relevance to park-related participation. Kamal (2020) divulged that the accessible population consisted of about 158 residents comprising 75 from Kampung Sungai Kejar and 83 residents from Kampung Sungai Tiang.

The final sample sizes were the respondents in Kampung Sungai Tiang (60 respondents) and Kampung Sungai Kejar (53 respondents) based on purposive sampling. This distribution of respondents is a proportional representation of both villages. The sample size was justified based on the recommendation of Krejcie and Morgan (1970) for a known population of approximately 160 and further justified using G Power with a priori estimation based on a medium effect size, 0.05 alpha level, 0.90 statistical power and four main predictors of the structural model (Faul et al., 2009). A rigorous non-probability purposive sampling method was used in the study. Random sampling is a statistical ideal, but it is methodologically necessary and well-justified in field research conducted with hard to reach, marginalised rural and or indigenous populations. Structured probability sampling in geographically distant regions where workforce is highly mobile would have an insurmountable logistical bias as targeted purposive selection ensures that only indigenous community members who have lived through the phenomenon of ecotourism will be surveyed. The participant selection criteria were that the respondents must be adult members

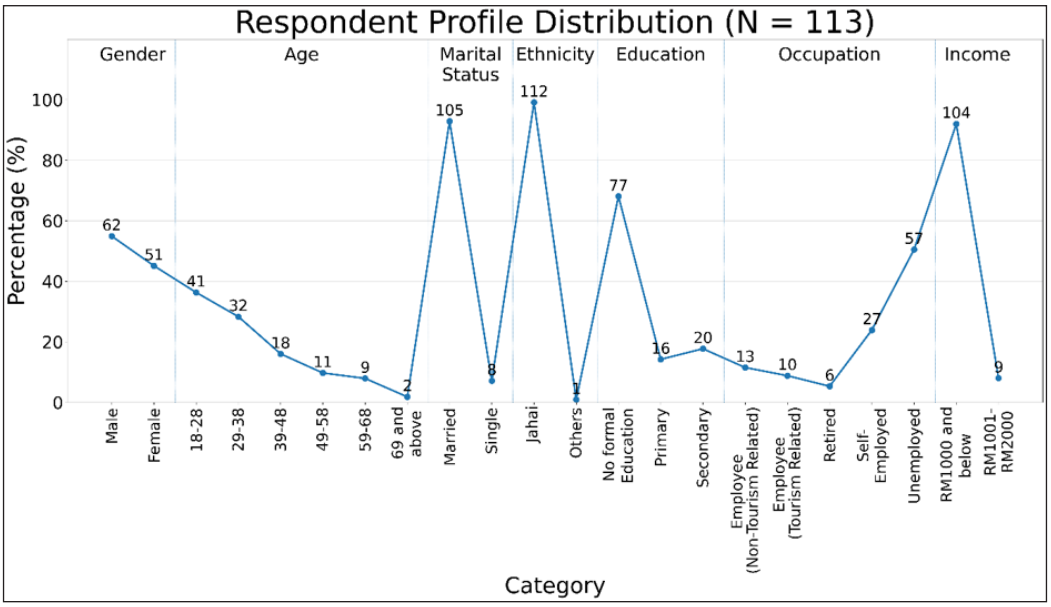

Figure 2. Respondents' profile distribution (Authors' Computation, 2026)

of the Jahai community tribe who were actively or passively involved in the tourism industry in the state park. Ethical approval was formally obtained before deployment in the field, while informed consent was obtained through verbal confirmation with the presence of local community leaders (Jameel et al., 2025). Figure 2 shows the respondents' profile distribution.

From Figure 2, it can be concluded that the respondents' profile is heavily skewed towards the Jahai community, having 112 respondents (99.1% of the respondents). Male respondents slightly outnumbered the female respondents, and the majority of respondents were in the age group 18-38 years. Most of the respondents were married (105). There is a very low level of education, with the majority of the respondents indicating that they had no formal education. Unemployment was the largest occupation, followed by self-employment. Income distribution was also a reflection of economic vulnerability as there were 104 respondents who earned RM1000 or less. The profile confirms that the study depicts a predominantly low-income and place-bound Jahai community.

A structured questionnaire was used for data collection. All constructs were measured with multi-item scales that were adapted with a five-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree. The items were taken from the sources listed in Table 1 and adapted to suit the Jahai and RBSP ecotourism context but maintained the original conceptual domains.

Common method bias was controlled by using procedural and statistical remedies

Table 1
Measurement constructs, acronyms and sources of items

Construct	Acronym	Measurement focus	Number of items	Sources
Motivation	MOT	Perceived benefits, readiness and willingness to engage in ecotourism	5	Hung et al. (2011)
Opportunity	OPT	Participation access, planning involvement, programme participation and ability to influence ecotourism development	7	Rasoolimanesh et al. (2017); Kunasekaran et al. (2022)
Ability	BLTY	Resources, training, knowledge and skills needed for ecotourism participation	5	Rasoolimanesh et al. (2017); Kunasekaran et al. (2022)
Indigenous Community Participation	ICP	Consultation, communication, equal opportunity, commitment and participation capacity	6	Arnstein (1969); Tosun (1999); Kunasekaran et al. (2022)
Positive Economic Impacts	EI	Income, employment, business opportunities and local economic benefits from ecotourism	5	Yoon et al. (2001); Rasoolimanesh and Jaafar (2016); Kunasekaran et al. (2022)
Positive Socio-Cultural Impacts	SC	Cultural preservation, community pride, social interaction and socio-cultural benefits from ecotourism	4	Yoon et al. (2001); Rasoolimanesh and Jaafar (2016); Kunasekaran et al. (2022)
Positive Environmental Impacts	EN	Environmental conservation, ecological awareness and protection of natural resources through ecotourism	4	Yoon et al. (2001); Rasoolimanesh and Jaafar (2016); Kunasekaran et al. (2022)
Sustainable Ecotourism Development	SED	Higher-order outcome represented by EI, SC and EN	13	Yoon et al. (2001); Rasoolimanesh and Jaafar (2016); Kunasekaran et al. (2022)

due to data being taken from a single survey instrument. Procedurally, respondents were told that participation was voluntary and confidential and questions were worded to minimise socially desirable responses and response pressure (Podsakoff et al., 2012; Jordan & Troth, 2020). The variance inflation factors (VIF) of the full collinearity were checked as a diagnostic for common method bias (CMB) statistically. Common method bias is not likely to bias the model estimates if full VIF values are less than the conservative threshold of 3.3 (Kock, 2015).

Since the study is prediction-oriented, tests for mediation include multiple latent constructs with a modest sample size (Hair et al., 2022; Sarstedt et al., 2021). The data were analysed using Partial Least Squares Structural Equation Modeling (PLS-SEM). It is the statistical robustness

in handling small sample data that does not meet the strict distributional assumptions which have led to the intense prominence of PLS-SEM in complex socioeconomic models (Hauff et al., 2024). Additionally, Sustainable Ecotourism Development (SED) was operationalised as a higher-order construct. This echoes the conceptual fact that economy, socio-cultural and environmental effects are unique and cannot be interchanged as they do combine to build sustainability. To be able to model this without the loss of the conceptual specificity of the lower-order dimensions, the disjoint two-stage approach was used. This two-stage procedure involves an explicit separation of the lower-order latent variable scores at the first stage, followed using these scores as indicators at the second stage and thus, creating a mathematically valid formative construct (Sarstedt et al., 2024).

Given that SED was modelled using its three dimensions (EI, SC and EN), the disjoint two-stage approach as recommended by Sarstedt et al. (2019) was used to estimate the higher order construct but retain the conceptual distinctness of the lower-order dimensions. Since SED was modelled through its three dimensions: EI, SC and EN, the disjoint two-stage approach in line with Sarstedt et al. (2019) was applied to estimate the higher-order construct without losing the conceptual distinctiveness of its lower-order dimensions.

The measurement model was assessed through indicator reliability, internal consistency reliability, convergent validity, discriminant validity, and collinearity. Cronbach's alpha, Dijkstra-Henseler's ρA and composite reliability (ρC) assessed internal consistency; average variance extracted (AVE) assessed convergent validity while The Heterotrait-Monotrait ratio (HTMT) and the Fornell-Larcker criterion established discriminant validity (Fornell & Larcker, 1981; Henseler et al., 2015). The structural model was evaluated using path coefficients, t-values, p-values, confidence intervals, R^2, direct effects and indirect effects. Bootstrapping with 10,000 resamples tested path and mediation significance (Hair et al., 2022). Predictive relevance and predictive performance were examined using PLS prediction and Cross-Validated Predictive Ability Test (CVPAT) (Liengaard et al., 2021; Shmueli et al., 2019). Furthermore, Importance-Performance Map Analysis (IPMA) identified practical improvement priorities (Ringle & Sarstedt, 2016; Hauff et al., 2024).

Descriptive Statistics and Correlations

Table 2 illustrates that motivation recorded the highest mean score (M = 4.25), followed by environmental impacts (M = 4.18) and socio-cultural impacts (M = 4.12). Ability recorded the lowest mean score (M = 2.93), suggesting that respondents perceived capacity, resources and training as more constrained than motivational readiness. This pattern is substantively important because it already points to a gap between positive orientation toward ecotourism and the practical capacity to participate in it. The strongest correlation involving

Table 2
Descriptive statistics and correlations

Construct	Mean	SD	MOT	OPT	BLTY	ICP	EI	SC	EN
MOT	4.25	0.61	1.00						
OPT	3.86	0.64	0.25**	1.00					
BLTY	2.93	1.12	0.09	0.51***	1.00				
ICP	3.64	0.79	0.09	0.64***	0.52***	1.00			
EI	3.89	0.66	0.28**	0.37***	0.22*	0.36***	1.00		
SC	4.12	0.66	0.32***	0.37***	0.05	0.37***	0.57***	1.00	
EN	4.18	0.68	0.27**	0.42***	0.14	0.29**	0.62***	0.74***	1.00

*Note***.** Stars (*) = *p < 0.05, **p < 0.01, ***p < 0.001. SD = Standard deviation
Source: Authors' Computation, 2026

indigenous community participation was with opportunity (r = 0.64, p < 0.001), followed by ability (r = 0.52, p < 0.001). Nonetheless, there was only a weak association between indigenous community participation and motivation. In the SED dimensions, there was a strong relationship between environmental and socio-cultural impacts, which indicates that environmental protection and cultural continuity are closely related in the Jahai context.

Measurement Model Assessment

The PLS-SEM algorithm output was examined in the first stage and the indicators were retained as well as the outer loadings and endogenous construct variance to ensure that they were in line with the suggested measurement model (Sarstedt et al., 2019) before assessing their reliability and validity. The measurement and structural configuration of the model assessment is shown in Figure 3.

Figure 3 shows that the retained indicators load satisfactorily on their respective constructs, with most outer loadings above acceptable thresholds. The model also explains 46.3% of ICP variance while EI, SC and EN show significant explained variance. These preliminary results suggest adequate model specifications. Therefore, detailed reliability, validity, and discriminant validity results are in Table 3.

Results of the measurement model indicate that the quality of the construct is satisfactory. Indicator loadings were between 0.66 and 0.90, indicating reliability of indicators for the retained items. All VIF values are below the conventional value of concern, suggesting that no collinearity problems existed in the measurement model. Cronbach's alpha, rho_A and composite reliability values exceeded 0.80 across constructs, confirming internal consistency. AVE values were above 0.50, which supports convergent validity. The square roots of AVE on the diagonal exceeded the corresponding lower-triangle correlations while HTMT values remained below the conservative 0.90 benchmark. Collectively, these results confirm that the constructs are

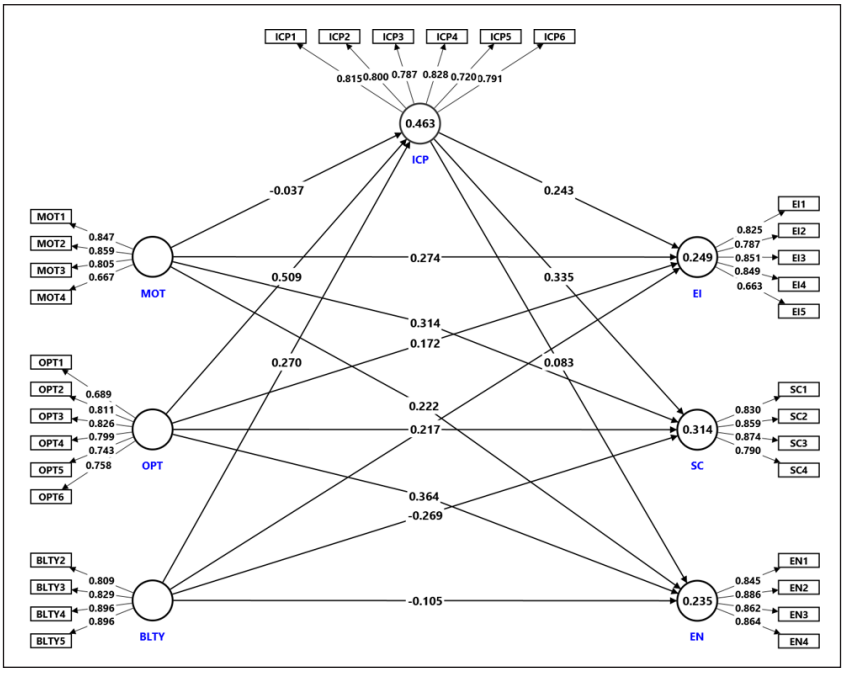

Figure 3. First stage measurement model (SmartPLS 4 output, 2026)

Table 3
Measurement model and discriminant validity

Construct	Loading	VIF	Cronbach's alpha	ρA	ρC	AVE	MOT	OPT	BLTY	ICP	EI	SC	EN
MOT	0.67–0.86	1.62–1.82	0.82	0.87	0.87	0.64	**0.80**	0.30	0.13	0.15	0.36	0.40	0.33
OPT	0.69–0.83	1.66–2.58	0.87	0.88	0.90	0.60	0.29	**0.77**	0.58	0.73	0.44	0.43	0.47
BLTY	0.81–0.90	2.53–2.77	0.88	0.92	0.92	0.74	0.12	0.52	**0.86**	0.58	0.25	0.11	0.17
ICP	0.72–0.83	1.79–2.37	0.88	0.88	0.91	0.63	0.14	0.64	0.53	**0.79**	0.42	0.42	0.33
EI	0.66–0.85	1.54–2.41	0.86	0.88	0.90	0.64	0.35	0.39	0.22	0.38	**0.80**	0.67	0.71
SC	0.79–0.87	1.82–2.43	0.86	0.86	0.90	0.70	0.39	0.38	0.06	0.37	0.58	**0.84**	0.84
EN	0.85–0.89	2.23–2.77	0.89	0.89	0.92	0.75	0.33	0.43	0.16	0.29	0.62	0.74	**0.87**

Note. Upper triangle = HTMT; diagonal = √AVE; lower triangle = Fornell-Larcker correlations.
Source: Authors' Computation, 2026

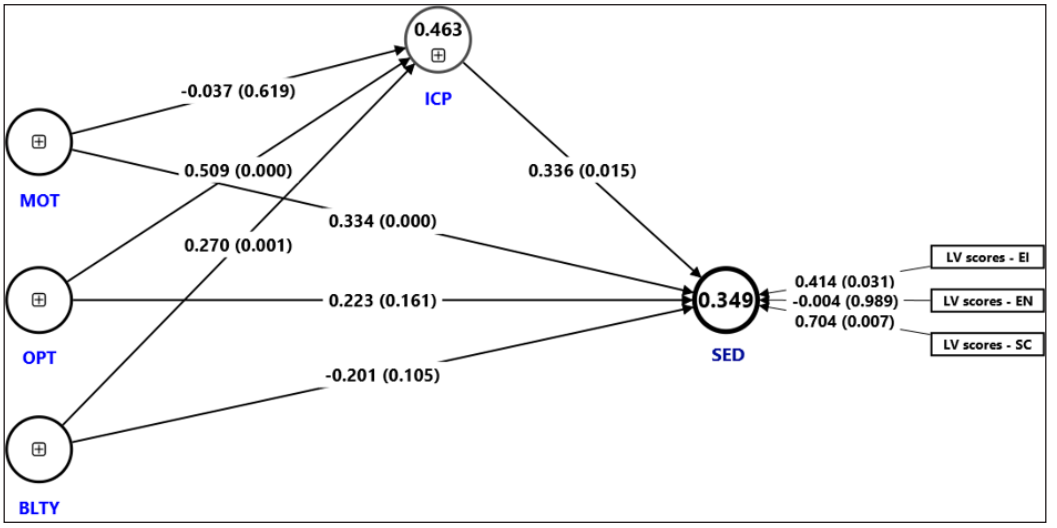

Figure 4. Second stage structural model (SmartPLS 4 output, 2026)

reliable, convergent, and empirically distinct enough for structural model assessment.

Structural Model and Hypothesis Testing

After confirming the adequacy of the measurement model in stage one, the structural model was examined in stage two, using the latent variables (LV) to evaluate the hypothesised direct and indirect relationships. Figure 4 presents the 10,000 resampled bootstrapped path coefficients, p-values, and explained variance for the endogenous constructs.

Figure 4 reveals opportunity and ability as significant predictors of indigenous community participation but not motivation. Sustainable ecotourism development is also significantly predicted by indigenous community participation. The model explains 46.3% of ICP and 34.9% of SED, suggesting moderate explanatory power. These visual results provide the foundation for formal hypotheses testing in Table 4.

Table 4 shows provide a sharper and more interesting result than a simple positive MOA model. Motivation did not significantly influence indigenous community participation (β = -0.037, p = 0.619). Therefore, H1 was not supported. However, motivation had a significant positive direct effect on sustainable ecotourism development (β = 0.334, p < 0.001), supporting H2. This indicates that favourable perceptions of ecotourism benefits may shape evaluations of sustainable development, but they do not necessarily influence the Jahai community into participatory action.

Opportunity significantly influenced indigenous community participation (β = 0.509, p < 0.001), supporting H3. However, opportunity did not significantly influence sustainable ecotourism

Table 4
Direct and mediating effects hypothesis testing

Hypothesis	Relationship	β	t-value	p-value	Decision
Mediating effects					
H1	MOT → ICP	-0.037	0.498	0.619	Not supported
H2	MOT → SED	0.334	3.706	<0.001	Supported
H3	OPT → ICP	0.509	5.489	<0.001	Supported
H4	OPT → SED	0.223	1.403	0.161	Not supported
H5	BLTY → ICP	0.270	3.415	0.001	Supported
H6	BLTY → SED	-0.201	1.620	0.105	Not supported
H7	ICP → SED	0.336	2.422	0.015	Supported
Mediating effects					
H8	MOT → ICP → SED	-0.012	0.433	0.665	No mediation
H9	OPT → ICP → SED	0.171	2.111	0.035	Full Mediation
H10	BLTY → ICP → SED	0.091	1.914	0.056	Full Mediation[+]

Note. = Marginal significance. Source: Authors' Computation, 2026

development directly (β = 0.223, p = 0.161), Therefore, H4 was not supported. Ability significantly influenced indigenous community participation (β = 0.270, p = 0.001), supporting H5 but its direct effect on sustainable ecotourism development was non-significant and negative (β = -0.201, p = 0.105). Hence, H6 was not supported. Finally, indigenous community participation significantly improved sustainable ecotourism development (β = 0.336, p = 0.015), supporting H7. Thus, the direct effects showed that opportunity and ability influence participation while motivation and participation affect SED. The outcome of the mediation corroborates this understanding. The indirect effect of 'Motivation on sustainable ecotourism development through the involvement of indigenous communities' was not significant (β = -0.012, p = 0.665). Therefore, H8 was not supported. The indirect effect of opportunity on sustainable ecotourism development via indigenous community participation was significant (β= 0.171, p= 0.035), thus supporting H9. The ability mediation path approached significance but did not meet the 0.05 threshold (β = 0.091, p = 0.056). Therefore, H10 was marginally supported. Substantively, this implies that "opportunity" and more cautiously "ability" are significant only when they are transformed into indigenous community participation.

Predictive Relevance, Explanatory Power and IPMA

Before assessing the practical implications of the model, predictive relevance and explanatory power were examined. The

Table 5
Predictive relevance, explanatory power and CVPAT tests

Endogenous construct	R^2	$Q^2_{predict}$	RMSE	MAE	PLS loss	IA loss	ALD	t-value	p-value
ICP	0.463	0.438	0.767	0.595	0.581	1.024	-0.443	3.784	<0.001
SET	0.349	0.218	0.909	0.681	0.829	1.017	-0.188	2.845	0.005
Overall					0.767	1.019	-0.252	4.101	<0.001

Note. ALD = average loss differences. Source: Authors' Computation, 2026

coefficient of determination was used to assess the model's explanatory capacity, while $Q^2_{predict}$, root mean square error (RMSE) and mean absolute error (MAE) were used to evaluate predictive relevance and prediction error as per the PLS-SEM prediction ability recommended by Shmueli et al. (2019) and Hair et al. (2022). Cross-validated predictive ability testing (CVPAT) was further applied to compare the PLS model against the indicator average (IA) benchmark as recommended by Liengaard et al. (2021). Table 5 presents the R^2, $Q^2_{predict}$, prediction error and CVPAT.

Table 5 denotes that the model explains 46.3% of the variance in indigenous community participation and 34.9% of the variance in sustainable ecotourism development. The values reflect a moderate level of explanatory power which is significant in the context of the social and institutional context of indigenous ecotourism. Predictive relevance was demonstrated because Q^2predict values were positive for both endogenous constructs. The CVPAT results are especially relevant in comparison with the average indicator benchmark of the PLS model. Losses for both ICP and SET were less for the PLS than the IA, and the differences in losses were negative and significant. This is to ensure that the model possesses satisfactory out-of-sample predictive power instead of merely in-sample explanatory power. Once the explanatory and predictive adequacy of the model has been established, the analysis was conducted using IPMA to identify which set of antecedents provides the most practical way to improve sustainable ecotourism development.

Figure 5 IPMA results show that opportunity has the highest importance for sustainable ecotourism development (importance = 0.394; performance = 60.620), followed by indigenous community participation (importance = 0.336; performance = 62.009) and motivation (importance = 0.321; performance = 67.476). Ability records the weakest position, with negative total importance and the lowest performance (importance = -0.111; performance = 48.284). The implication is clear. Although motivation performed the best, opportunity is the strongest improvement level. Therefore, the governing authority of RBSP, which is Perak State Park Corporation (PSPC), should prioritise institutional access, community

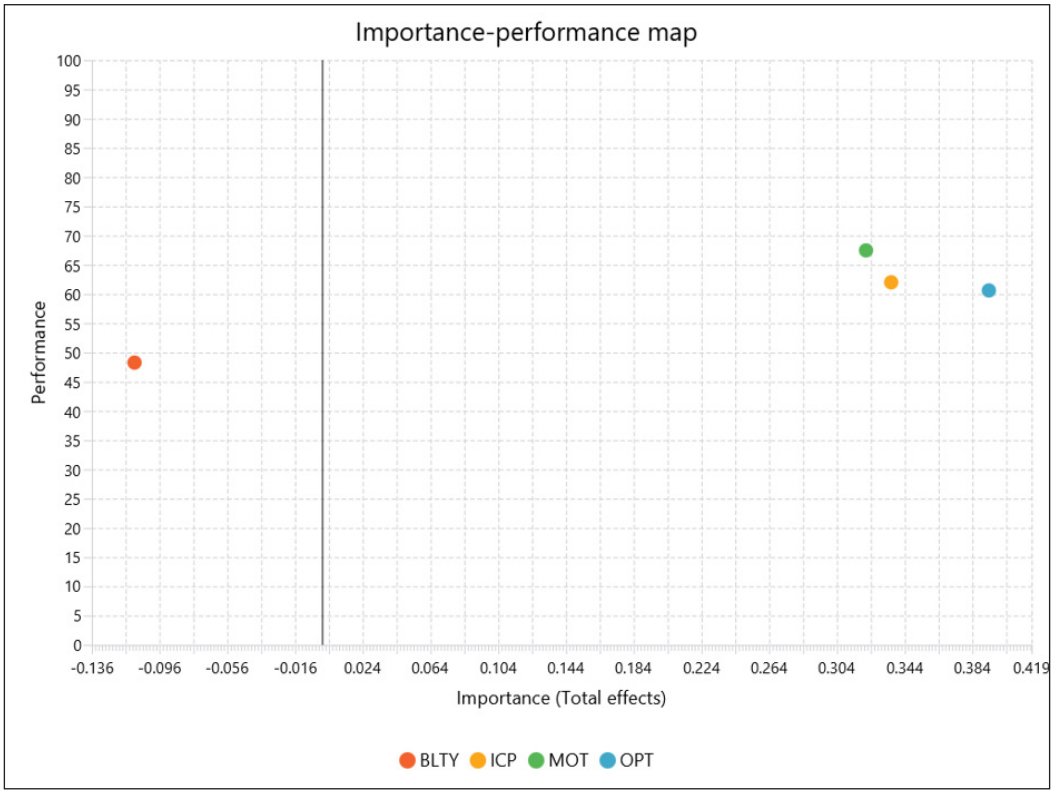

Figure 5. Importance-Performance Map for Sustainable Ecotourism Development (SmartPLS 4 output, 2026)

voice, and participatory planning rather than relying mainly on motivational campaigns.

RESULTS AND DISCUSSION

The findings are not so much confirmatory but more of a refinement of the MOA model. The model has two basic components: participation requires motivation and participation requires opportunity and ability as Hung et al. (2011) applied this model in tourism participation. However, the results of the current study indicate that the three MOA antecedents are not equally potent in indigenous ecotourism. Although indigenous community participation was not directly affected by motivation, motivation would be a contributing factor to the improvement of sustainable ecotourism development. Nonetheless, this leads to the question of whether it is just a simple attitudinal perspective of MOA because a positive attitude does not necessarily lead to participation as might be the case with the Jahai tribe. The result aligns with the findings of Dong et al. (2024) who delineated that opportunity and ability significantly affected farmers' willingness to participate in agricultural heritage tourism whereas motivation did not. It also supports the findings by Kadir and Ni (2024) that participation impacts were not sustained in rural tourism development due to insufficient motivation levels.

A deeper theoretical introspection is needed to understand this paradox. The result for the non-significant correlation between motivation and participation (H1) can be understood by the concept of structural tokenism. If institutional governance is a hurdle in highly marginalised populations, even the most willing community members to participate in sustainable ecotourism will be powerless in practice because they may be involved in consultation but not in the real decision-making process. A highly motivated community faces impenetrable legal and bureaucratic exclusion, and the behaviour of active participation is ultimately disassociated, creating cognitive dissonance. A highly motivated community experiences a clogged pathway of legal and bureaucratic exclusion, and the behaviour of active participation becomes disassociated, creating cognitive dissonance (Khumalo, 2026).

In an international context, similar mechanisms can be seen worldwide. Studies of the Colombian Wiwa Indigenous Tourism structures have shown how community empowerment and cultural revitalisation are highly dependent on the possibility of guiding co-management processes with minimal interference from the state (Giandomenico, 2025). In turn, a detailed analysis of institutional opportunities in local economic development strategies in the Vhembe District of South Africa has determined that institutional opportunity created by decentralised local governments is the fundamental predictor in elevating local tourism beyond subsistence levels (Ramukumba, 2024).

Ability was also a significant predictor of indigenous community participation further highlighting the continued importance of capacity. The Jahai tribe has strong ecological and cultural knowledge gained from living in RBSP. However, there are other skills and capacities needed for formal ecotourism such as guiding, hospitality, safety, marketing, financial management, and product development. This interpretation is corroborated by recent indigenous tourism activities. Hamid et al. (2025) suggested that community resources are essential to sustainable indigenous tourism while Kadir and Ni (2024) postulated that the role of ability is one of the mechanisms for rural participation in tourism. Nevertheless, ability had no direct and only indirect marginal impact on sustainable ecotourism development. This can result in unused skills if the Jahai community members do not have accessibility.

Moreover, the negative and non-significant, direct link between ability and sustainable ecotourism development (H6) is the introduction of the phenomenon of "capacity drain." Indigenous people may also gain a greater awareness of systemic inequities while learning modern hospitality and financial management skills. Without a strong participatory structure (mediator), the very competent Jahai community members are more likely to migrate to urban tourism sites in search of remuneration that commensurate with their skills. If training is provided without further strengthening the capacity of Jahai as stewards of the park, it can inadvertently "undermine" the park's indigenous stewards who are most

likely to be trained in sustainable practices (Giandomenico, 2025).

The marked impact of indigenous community involvement on sustainable development of ecotourism validates that participation is not ornamental. It is a vital aspect of sustainability. Gidebo (2023) proposed the idea of community-based tourism to link livelihoods and biodiversity conservation in tourism protected areas while Prayitno et al. (2024) suggested that trust, networks and community norms can enhance sustainable tourism development. Yanying et al. (2026) also emphasised that empowering the community and aligning tourism with cultural heritage preservation are essential for ensuring sustainable tourism. The results indicate that community willingness is not as important as institutional opportunity, usable ability, and substantive participation for sustainable ecotourism in RBSP.

Ability also significantly predicted indigenous community participation, confirming that capacity remains indispensable. The Jahai community possesses deep ecological and cultural knowledge through long residence in RBSP, but formal ecotourism requires additional competencies in guiding, hospitality, safety, marketing, financial management and product development. Recent indigenous tourism studies support this viewpoint. Hamid et al. (2025) opined that community resources are crucial for sustainable indigenous tourism, while Kadir and Ni (2024) emphasised ability as a key mechanism in rural tourism participation. However, ability did not directly influence sustainable ecotourism development, and its indirect effect was marginal. This means that skills without access risk are becoming unused.

Policy and Theoretical Implications

The findings support a Royal Belum State Park Sustainable Ecotourism Development (OAP-SED) Framework. A conscious hierarchy of action needs to be implemented in the implementation of this framework which is directly influenced by the combined Importance-Performance Map Analysis (IPMA). The data in IPMA methodology incorporates both sufficiency and necessity logics, which implies that the necessary structural opportunity is the first and most important "must-have" condition for everything that ensues (Hauff et al., 2024). The participation of the Jahai tribe should not be merely tokenistic but a key part of the governance process to empower them structurally (Kim et al., 2021; Yanying et al., 2026). This involves establishing village consultation councils, channels for submitting proposals, paid planning seats, guiding and enterprise training as well as community-led monitoring systems (Dong et al., 2024; Kadir & Ni, 2024;).

Priority 1: Policymakers should implement transfer of control to local Destination Management Organisations similar to other countries where co-management has been effective and legally protect indigenous land rights and intellectual property over traditional ecological knowledge (TEK). While there

are awareness and motivational campaigns for ecotourism, the Malaysian National Ecotourism Plan already has the intention to associate ecotourism with community welfare and environmental protection as shown in the current study. This resonates with findings that community-based tourism can contribute to conservation when community members are a part of decision making and benefits are shared (Gidebo, 2023; Yanying et al., 2026).

Priority 2: Localised Ability and Financial Literacy. Structural channels need to be solidified after which agencies need to address severely constrained Ability baselines (M=2.93.). Capacity building needs to go beyond general hospitality training to more advanced technical skills. Localised programmes need to provide strong training on micro-financing, digital marketing platforms and the monitoring software for an ecosystem because of the direct linkages between financial literacy and enterprise survival in indigenous SMEs. Given the direct correlations between financial literacy and enterprise survival in indigenous SMEs, localised programmes must deliver rigorous guidance in micro-financing, digital marketing platforms and ecosystem monitoring software (Molosiwa & Holland, 2025; Sharma et al., 2025).

Priority 3: Substantive Participation and Revenue Sharing. The culmination of the OAP-SED mechanism relies on transforming opportunity and ability into direct economic action. To mimic the robust Public-Private-Community Partnerships (PPCPs) observed in successful transitional ecotourism models, RBSP must mandate that private eco-resort operators engage in legally binding profit-sharing consortiums with the Jahai community (Wong & Thirumoorthi, 2026).

The conclusions drawn in this study lay the foundation for a model which is much broader than the boundaries of RBSP. When these findings were synthesised with global data, it has been observed that the need for institutional opportunity is a universal condition logic for sustainable community development from raw ecotourism potential across different biomes. The need for Public-Private-Community Partnerships (PPCPs) as spelt out in the recommendations is closely linked to the models for transitional governance that have been observed in other countries. There is a direct link between the formalised representation of community at the decision-making table and the sustainability of the enterprise when assessing the operational success of cultural tourism in rural and remote areas (Bašan, et al., 2025). Ecotourism often becomes a very extractive industry with the host community taking ecological risks and the external actors taking the financial risks when governance models do not accede to the devolution of power.

Succinctly, the OAP-SED Framework is an important corrective model. It clearly removes the onus of indigenous people "not having the motivation" to participate in the decision-making process and squarely puts the burden of the institutions that govern over indigenous people to create clear and equitable leadership opportunities.

Incorporating necessity logic into these assessments will help alleviate the false assumption that training or awareness can replace real economic and political empowerment (Hauff et al., 2024).

Properly implemented, as depicted in Figure 6, the OAP-SED Framework can potentially advance SDG 8 (Decent Work and Economic Growth) through decent livelihood opportunities, SDG 11 (Sustainable Cities and Communities) through cultural and community resilience, and SDG 15 (Life on Land) through biodiversity conservation (Kadir & Ni, 2024; Ramaano, 2026; Sachs et al., 2025).

Figure 6 presents the OAP-SED framework for translating Jahai community members' participation into sustainable ecotourism development in Malaysia. It shows policy making authorities create opportunities and strengthen ability through consultation councils, proposal channels, paid planning seats, training and capacity support. These inputs are channelled into indigenous community participation which then supports livelihood opportunities, cultural resilience and biodiversity conservation aligned with SDG 8, SDG 11 and SDG 15 (Ramaano, 2026; Sachs et al., 2025).

The mediation findings provided theoretical implications on how the MOA model operates in an indigenous ecotourism setting. Motivation may shape favourable perceptions of sustainable ecotourism, but it does not by itself create participatory agencies. Therefore, opportunity is theoretically decisive because it confirms Hung et al.'s (2011) argument that participation requires not only willingness

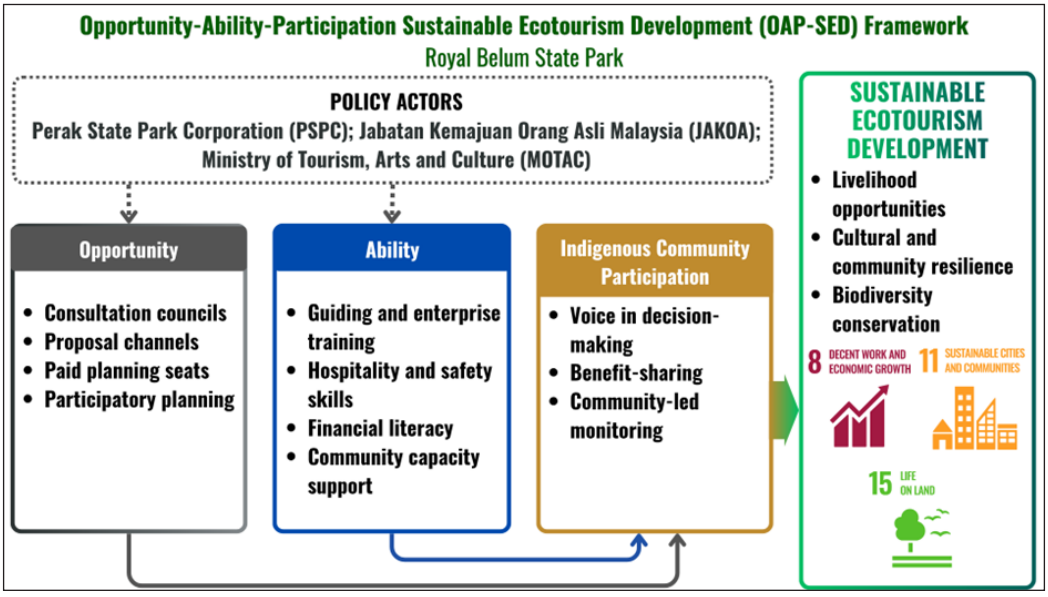

Figure 6. Opportunity-Ability-Participation Sustainable Ecotourism Development (Authors' Computation, 2026)

but enabling conditions. Its indirect-only effect also aligns with recent tourism studies showing that antecedents often become significant through participation mechanisms rather than direct effects alone (Dong et al., 2024; Kadir & Ni, 2024; Xu et al., 2022). Ability's marginal mediation further suggested that capacity-building is necessary but insufficient without institutional access. The results can be best analysed by combining Hung et al. (2011)'s MOA model and Tosun (2006)'s community participation theory. MOA adds value on how the Jahai community members can participate through motivation, opportunity and ability while Tosun's theory adds value on what type of participation it is. Ensuring participation that is only induced as consultative or outside of management is unlikely to lead to sustainable outcomes. Therefore, the substantial mediation of opportunity by indigenous community participation indicates that opportunity needs to go beyond accessibility to influence.

CONCLUSION

This study analysed the relationship of indigenous community participation in sustainable ecotourism development within Royal Belum State Park under the influence of three factors: motivation, opportunity and ability based on a total of 113 Jahai respondents. The study reveals that opportunity and ability are significant factors to explain indigenous community participation whereas motivation is not by using PLS-SEM, mediation analysis, disjoint two-stage approach, CVPAT and IPMA. Nonetheless, favourable perceptions of ecotourism are not necessarily translated into participatory action as they directly influence sustainable ecotourism development. The indigenous community plays a pivotal role in governance and is an important mechanism to enhance sustainable ecotourism development. The most significant contribution of the study is seen in the mediation results. The Opportunity factor has direct mediated relevance to influence the sustainable development of ecotourism that involve indigenous community participation, and ability has a marginal mediated relevance to influence the sustainable development of ecotourism that involve indigenous community participation. Theoretically, the findings improve the MOA model, demonstrating that in indigenous ecotourism, motivation, opportunity and ability are not interchangeable motivators. They also help to reinforce Tosun's theory of community participation that should go beyond consultation to influence, access and benefit-sharing in the planning stage. Evidently, in practical terms, the evidence is direct: RBSP needs an OAP-SED framework. The Jahai community members' opportunity and ability influence sustainable ecotourism participation, but sustainable ecotourism development is vital in ascertaining the Jahai tribe's livelihoods, cultural resilience and biodiversity conservation.

LIMITATION AND FUTURE RESEARCH

This study has limitations that should be taken as opportunities for further research rather than weaknesses in the design.

Firstly, the cross-sectional survey design does not allow for an understanding of how Jahai tribe's perceptions of motivation, opportunity, ability and participation change at different points in time as ecotourism governance develops. Longitudinal designs should be used in future studies to determine whether institutional opportunity results in sustained involvement or brief consultation. Secondly, the study is limited to two Jahai settlements in the Royal Belum State Park, providing greater in-depth understanding of the context but also limiting the extent of generalisation to other groups of Orang Asli or protected tourism areas in general. Comparative works within indigenous communities would fine tune the cultural and institutional lines of the OAP-SED framework. Thirdly, the use of self-reported data may be under-reporting political tensions in relation to participation. Future research should thus be a mixture of PLS-SEM and interviews, observation and policy document analysis to render the process of participation in practice. Lastly, future research may examine moderating variables such as trust, quality of governance, and security of land rights.

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