360° Immersive Ecotourism: Showcasing the Cultural and Environmental Heritage of the Orang Asli Jah Hut in Temerloh

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DOI: https://dx.doi.org/10.47772/IJRISS.2025.909000489

Received: 10 September 2025; Accepted: 15 September 2025; Published: 15 October 2025

ABSTRACT

This study explores the potential of 360° immersive video in promoting eco-tourism while preserving the cultural and environmental heritage of the Orang Asli Jah Hut community in Temerloh, Malaysia. The project had two main objectives: (1) to design and produce a 360° immersive eco-tourism experience highlighting Jah Hut cultural practices and natural surroundings, and (2) to evaluate its impact on viewers' cultural appreciation and environmental awareness. A prototype immersive video was developed through participatory content selection with the community and showcased to a group of viewers. Feedback was collected through surveys and brief interviews. Findings suggest that immersive video enhances engagement, deepens cultural appreciation, and increases awareness of environmental sustainability. The study highlights the role of digital storytelling in supporting indigenous communities through sustainable eco-tourism initiatives.

Keywords— 360° immersive video, eco-tourism, Orang Asli Jah Hut, cultural heritage

INTRODUCTION

Eco-tourism has emerged as a sustainable approach to tourism that integrates environmental protection, cultural preservation, and the empowerment of local communities [1]. In Malaysia, the Orang Asli play a significant role in shaping eco-tourism experiences, yet their cultural and ecological heritage often remains underrepresented in tourism promotion [2]. The Jah Hut, an Orang Asli subgroup residing in Temerloh, Pahang, are known for their unique traditions, crafts, and close relationship with the forest [3].

At the same time, immersive technologies such as 360° video are increasingly being adopted in the tourism sector [4]. Research has shown that immersive media can increase user presence, foster empathy, and enhance cultural learning [5, 6]. In tourism promotion, 360° video enables audiences to explore places virtually, creating stronger emotional connections than conventional photographs or 2D videos. However, the application of immersive technologies for indigenous eco-tourism in Southeast Asia remains limited.

Existing ecotourism efforts often rely on conventional photos, documentaries, or brochures, which may not fully capture the lived experience of indigenous communities. For the Jah Hut in Temerloh, whose traditions and environment are deeply intertwined, there is a risk of cultural marginalisation if more engaging and sustainable approaches are not introduced. Thus, the problem addressed in this study is how 360° immersive video can be utilized as a tool for promoting ecotourism while preserving cultural and environmental heritage.

This study addresses this gap by focusing on two objectives: (1) to design and produce a 360° immersive eco-

tourism experience that showcases Jah Hut heritage, and (2) to evaluate its impact on viewers' cultural appreciation and environmental awareness.

LITERATURE REVIEW

The literature review contextualises the study within three main areas: ecotourism and indigenous communities, immersive technologies in tourism, and cultural documentation of Orang Asli groups. Together, these strands provide the conceptual foundation for the 360° Roots initiative.

Eco-tourism and Indigenous Communities

The term Orang Asli literally means "original people" and refers to the indigenous populations of Peninsular Malaysia [7]. As Malaysia's earliest inhabitants, they constitute less than 1% of the national population, approximately 198,000 people [8]. The Orang Asli are classified into three broad groups: Negrito, Senoi, and Proto-Malay, with further subdivision into 18 subgroups. The Jah Hut, a Proto-Malay group residing mainly in Temerloh, Pahang, are recognised for their unique woodcarving and animist traditions [9].

Indigenous communities like the Orang Asli are often at the heart of ecotourism discourse due to their close connection with natural environments and traditional ecological knowledge [10]. Ecotourism, broadly defined as responsible travel to natural areas that conserves the environment and sustains the well-being of local people [11], has been categorized into several models relevant to indigenous participation.

1. Community-based ecotourism (CBET): Emphasises community ownership and management of tourism activities, where profits and decision-making remain within the community [12].

2. Nature-based ecotourism: Focuses on wildlife, forests, rivers, and other ecosystems, often involving guided tours or conservation activities [13].

3. Cultural ecotourism: Highlights traditions, crafts, rituals, and storytelling, positioning culture itself as an attraction alongside nature [14].

4. Educational/ecological ecotourism: Prioritises awareness and learning, offering visitors knowledge about biodiversity, conservation, and sustainable practices [15].

For the Orang Asli Jah Hut, ecotourism often combines cultural and community-based models, since their identity is deeply intertwined with the forest environment and artisanal practices. While such initiatives can generate income and foster cultural pride, scholars caution that they must avoid risks of exploitation, dependency, and cultural commodification [16, 17]. Therefore, ensuring community empowerment, cultural authenticity, and environmental sustainability is essential for ecotourism projects involving indigenous peoples.

Immersive Technologies in Tourism

Technological innovations are reshaping tourism, with immersive media such as 360-degree video, virtual reality (VR), and augmented reality (AR) offering new possibilities for visitor engagement [18]. 360-degree videos, in particular, provide panoramic perspectives that simulate "being there," thereby creating a stronger sense of presence compared to traditional media [19].

The use of immersive media in tourism aligns with broader trends in experiential consumption, where tourists seek interactive, emotional, and memorable encounters [20]. Research has shown that 360-degree experiences can enhance empathy towards cultural subjects [18], improve knowledge retention [19], and influence travel intentions [21]. These features make 360-degree technology particularly suitable for ecotourism, where fostering environmental and cultural awareness is central.

Furthermore, immersive technologies have been praised for their potential to reduce the negative impacts of physical tourism. For example, sensitive ecological or cultural sites can be presented virtually, thereby protecting them from over-visitation [22]. At the same time, critics caution that immersive media may inadvertently

oversimplify or romanticise indigenous cultures if not produced collaboratively [23]. This highlights the importance of participatory design, ensuring that communities have agency in how their stories are told.

Cultural Documentation and the Orang Asli

Cultural documentation is essential for indigenous groups whose traditions and practices are at risk due to modernisation, urbanisation, and globalisation. For Malaysia's Orang Asli, who comprise less than 1% of the national population, safeguarding cultural heritage is especially urgent [7]. The Jah Hut subgroup, located in Temerloh, Pahang, is known for its distinctive woodcarving, oral storytelling, and animist traditions [9]. These practices, however, face threats from assimilation policies and declining intergenerational transmission.

Digital technologies offer new avenues for cultural preservation. Projects using photography, film, and digital archives have helped record and disseminate indigenous knowledge to broader audiences [24]. 360-degree media extends this by allowing viewers to experience traditions in an immersive manner, fostering empathy and deeper understanding [19] Importantly, cultural documentation through digital means must remain sensitive to issues of representation, ownership, and consent.

For the Jah Hut, immersive storytelling not only documents heritage but also creates opportunities for economic sustainability through eco-tourism. By presenting their environment and practices in engaging formats, 360° Roots positions the community as active knowledge-holders rather than passive subjects. This aligns with calls for indigenous research methodologies that emphasise collaboration, reciprocity, and respect.

RESEARCH METHOD

Research Design

This study adopted a practice-based approach. The main focus was to create a prototype of a 360-degree ecotourism product featuring the Orang Asli community and their natural environment.

Data Collection

The data collection process involved three stages:

Fieldwork and Media Capture:

The research team conducted a site visit to the Jah Hut settlement in Temerloh, Pahang. During the visit, photos and 360-degree videos were recorded, focusing on natural landscapes, traditional activities, and cultural artefacts.

Product Development:

The collected materials were processed and compiled into an immersive 360-degree video product called 360° Roots. The prototype aimed to highlight both the ecological environment and cultural heritage of the Orang Asli Jah Hut.

Feedback Gathering:

The prototype was shown to five respondents, selected based on their interest in culture and ecotourism. Data was collected through short surveys and informal interviews to gather their opinions on immersion, cultural learning, environmental awareness, and areas for improvement.

Data Analysis

The feedback was analysed thematically. Descriptive summaries were generated from survey responses, while qualitative remarks were categorised into key themes: (i) immersion, (ii) cultural appreciation, (iii) environmental awareness, and (iv) suggested improvements.

FINDINGS AND DISCUSSION

TABLE 1: Respondents' Feedback on the360° Roots Prototype

Respondent	Immersion (Feeling of "being there")	Cultural Appreciation	Environmental Awareness	Suggestions for Improvement
R1	Felt very engaged; enjoyed panoramic view of the forest.	Learned about Jah Hut woodcarving for the first time.	Recognised the forest's role in Orang Asli life.	Suggested adding voice narration.
R2	Described the experience as "different from normal videos."	Noted that cultural rituals were interesting.	Said it made them think about deforestation issues.	Wanted higher video resolution.
R3	Reported feeling "as if inside the village."	Appreciated traditional storytelling scene.	Highlighted importance of rivers in daily life.	Suggested adding subtitles for clarity.
R4	Found the 360° effect "exciting and fresh."	Gained respect for Orang Asli craftwork.	Reflected on human–nature connection.	Suggested more background music.
R5	Said the product was "eye-opening and immersive."	Understood Orang Asli lifestyle better.	Became more aware of natural biodiversity.	Recommended longer video duration.

The feedback from five respondents highlighted several recurring themes related to immersion, cultural appreciation, environmental awareness, and areas for improvement. It can be seen from the above table.

Immersion and User Engagement

All respondents agreed that the 360° format created a stronger sense of "being there" compared to traditional media. For instance, R1 and R3 noted how the panoramic view made them feel "inside the village." This finding is consistent with [22], who argued that immersive technologies can simulate presence and offer users a heightened level of engagement. It is further supported by research that mentioned immersion through VR and 360° video fosters emotional connection and empathy [5, 6]. In the context of ecotourism, such immersive qualities are crucial because they enable visitors to experience cultural and natural settings even without physical travel. This may prove valuable for promoting Orang Asli culture to wider audiences in sustainable ways.

Cultural Appreciation

Respondents consistently mentioned that the prototype helped them appreciate Orang Asli culture, particularly woodcarving (R1), storytelling (R3), and rituals (R2). By showcasing authentic practices, the product avoided stereotypical or exoticised portrayals often found in tourism marketing [1]. Instead, it presented culture as lived experience, thereby aligning with the principles of community-based and cultural ecotourism [14]. These findings underscore the potential of 360° video as both an educational and cultural preservation tool.

Environmental Awareness

Another key theme was environmental consciousness. Respondents highlighted the role of rivers, forests, and biodiversity in Orang Asli life (R2, R3, R5). Several remarked that the immersive visuals reminded them of deforestation and conservation issues. This echoes [11] argument that ecotourism can promote environmental

awareness and support sustainable practices. The immersive format seems particularly effective here, as it allows users to see the interconnection between people and their natural surroundings.

Suggestions for Improvement

Despite the overall positive response, respondents identified areas for enhancement. Suggestions included higher video resolution (R2), narration or subtitles (R1, R3), background music (R4), and longer duration (R5). These technical and presentational improvements are aligned with challenges identified in immersive media studies, where accessibility and usability often determine the overall effectiveness of such products [23]. The feedback demonstrates that while 360° video can create powerful impressions, careful design decisions are required to ensure accessibility and clarity for diverse audiences.

Broader Implications

The findings have implications for both ecotourism practice and indigenous representation. First, immersive products such as 360° Roots can supplement physical tourism by providing accessible experiences to those unable to travel, thereby expanding market reach. Second, they can empower local communities by documenting and preserving cultural practices in ways that highlight authenticity rather than commodification [16]. However, sustainable development of such products requires collaboration with the Orang Asli themselves to ensure accuracy, agency, and shared ownership of cultural narratives.

CONCLUSION

This study developed and tested 360° Roots, an immersive ecotourism prototype featuring the Orang Asli Jah Hut in Temerloh. By capturing 360° photos and videos, creating a product, and seeking feedback from five respondents, the project demonstrated the potential of immersive media to enhance cultural appreciation and environmental awareness.

The discussion highlighted three main outcomes: (i) the 360° format effectively fostered a sense of presence and engagement; (ii) respondents gained new insights into Orang Asli cultural practices; and (iii) the immersive visuals raised awareness of environmental sustainability. Respondents' constructive suggestions also pointed to areas requiring refinement, particularly technical quality, narration, and accessibility features.

The project contributes to growing scholarship on immersive technologies in ecotourism by demonstrating how small-scale practice-based research can yield valuable insights. More importantly, it highlights the potential of 360° video as both a tourism innovation and a cultural preservation tool. Future work should involve larger participant groups, co-creation with Orang Asli communities, and integration with formal tourism strategies to maximise impact.

Study Limitations and Recommendations for Future Research

This study had several limitations. First, the sample size was very small, with only five respondents providing feedback, which limits the generalisability of the findings. Second, the study was exploratory in nature and did not involve the direct participation of the Orang Asli community in the design and narration of the 360° product. Third, technical constraints such as camera resolution and editing software restricted the quality of the prototype. These limitations should be considered when interpreting the findings, and they point towards areas for improvement in future research.

However, based on the findings of this study, several recommendations can be made for future research. Firstly, larger and more diverse groups of respondents should be engaged to strengthen the reliability and generalisability of the findings. The small sample size in this study provided valuable insights but limited the depth of analysis. Secondly, comparative research should be undertaken to examine how 360° immersive videos perform against traditional tourism media, such as brochures, photos, and documentaries, in terms of engagement, learning, and cultural appreciation. Finally, future work should investigate the impact of immersive ecotourism products on the economic empowerment of indigenous communities. This would provide a clearer understanding of how

such technologies could contribute not only to cultural preservation but also to sustainable livelihoods for marginalised groups.

Together, these recommendations highlight the importance of refining immersive tourism tools, ensuring community collaboration, and advancing research to strengthen the role of 360° video in promoting both cultural heritage and sustainable ecotourism.

ACKNOWLEDGMENT

The authors would like to express their sincere gratitude to Tok Empath Faizal and the Jah Hut community in Temerloh for their warm welcome and cooperation throughout this project.

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