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Natural or Reclaimed Coastal Areas? The Role of Environmental Awareness in Supporting Coastal Ecotourism

Azreen Rozainee Abdullah[1*], Yue Fen Hoe[2]

[1,2]UOW Malaysia KDU Penang University College, 32, Jalan Anson, 10400 George Town, Malaysia

ABSTRACT

Objective – This study was undertaken to analyze the relationship between perceived negative impacts on land reclamation (LR) and support for coastal ecotourism within fishing communities (CE), with environmental awareness (EA) as the mediating variable.

Methodology – This study utilized a convenience sampling technique to distribute questionnaires to 400 domestic tourists in coastal areas. Data analysis was conducted using Hayes's PROCESS in IBM Statistical Package for Social Science (SPSS v25.0).

Findings – Results showed that LR had a direct effect on CE [β= 0.183; 95% confidence interval (CI) 0.095–0.270; P= 0.000 <0.05]. Furthermore, a statistically significant indirect effect between LR and CE via EA was also observed (β= 0.269; 95% CI =0.192–0.351; P= 0.000<0.05), indicating partial mediation.

Novelty – These findings highlight that EA is important and essential to be promoted when considering sustainable development in both land reclamation and coastal ecotourism in fishing communities. Affected communities, usually with high environmental awareness, will comprehend the impacts of land developments and react to conserve the environment. In this case, as significant stakeholders with high environmental awareness, tourists are more inclined to support ecotourism, advocate for environmental conservation, and preserve local fishing cultures for appreciation.

Type of Paper: Empirical

JEL Classification: Q5, O13, P28, R5

Keywords: Sustainable development; land reclamation; coastal ecotourism; environment awareness

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1. Introduction

In response to land constraints, the Penang state government launched coastline reclamation projects to produce new land for urban expansion (Chee et al., 2017). With a projected growth of up to 1.9 million people by 2030 (Khoo, 2021) (Department of Statistics Malaysia, 2021), rapid developments using land reclamations along the Penang eastern coastline were seen as essential to accommodate population and development growth.

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* Corresponding author: Azreen Rozainee Abdullah
E-mail: azreen.rozainee@uow.edu.my
Affiliation: School of Hospitality, Tourism and Culinary Arts, UOW Malaysia KDU Penang University College, Malaysia

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The coastline now, stretching from the northeast to the south with over 13.53 square kilometers, resembles a concrete coastal pathway (Chee et al., 2017), only remaining with a few patches for coastal fishing communities and natural coastal ecotourism activities to take place. Land reclamations are seen to disrupt the sustainability of fishing communities on the island (Nambiar, 2023). During reclamation works, natural landscapes and seascapes are altered, affecting the authenticity of ecotourism's dependency on natural environment and its resources to attract customers. In addition to damaging natural landscapes, land reclamation activities are also found to reduce fish and other marine resources in the affected area by lowering the water oxygen level, vanishing fish spawning grounds and marine nursery habitats (Ding et al., 2020) (Xu et al., 2021). The Department of Fisheries (2022) reported a decline in registered fishermen in Penang from 8,009 to 5,520 in 2014 and 2021, respectively. The depletion of fish resources (Buncag, 2019) led some fishermen to favour ecotourism over fishing activities for supplementary income (Susilo et al., 2021). For example, fishermen provided fishing trip tours and converted their fishing houses into tourist accommodations to sustain their livelihood and reduce their dependency on declining marine resources (Stacey et al., 2021). Pineda et al. (2023) claimed that tourists participating in coastal ecotourism activities prefer exploring natural areas to facilitate their conservation and benefit the local community. As such, embedding ecotourism into fishing communities encourages the appreciation of natural areas that can develop environmental awareness (EA).

An individual's understanding of the natural environment and the subsequent measures undertaken to protect the natural environment imply EA. Such consciousness offers future generations a healthy and conducive environment (Kousar et al., 2022). Poor EA inevitably leads to low human involvement in alleviating the environmental issues affecting them (Salvador et al., 2017). Following past works, one's high cognition of the environmental problems improves intentional environmental behaviour (Mei et al., 2016). On another note, land reclamation activities proved detrimental to the landscape, its cultural imaginaries, and the identity of fishing communities (Cipriani, 2022). (Chiu et al., 2014) disclosed that tourists with high environmental values tend to act responsibly and support tourism development. Visiting fishing villages and natural coastal areas offers a unique experience for city dwellers. Sadly, many beautiful coastal regions in fast-developing cities are transformed into new concrete jungles or man-made attractions through land reclamation, mainly due to land scarcity. Affected communities, usually with high environmental awareness, will comprehend the impacts of land developments and react to conserve the environment. In this study, tourists, generators, and supporters of any tourism activities are chosen as participants in this study. Tourists' support will benefit the local industry and build opportunities for the destination (Mahboob et al., 2020). Hence, this study aims to examine EA as a mediator in influencing the perception of negative impacts towards land reclamation and support for coastal ecotourism in fishing communities.

2. Literature Review

2.1 Land Reclamation and Fishing Community

Land reclamation is creating artificial land from the sea (Rosman et al., 2020). Land reclamation requires a vast number of construction works (Huey et al., 2021) (Wu et al., 2020) with significant financial investment (Kaparawi & Abdul Latif, 1996) to provide coastal cities with land for urban development (Kodir et al., 2017). Several countries regard land reclamation as fostering socioeconomic growth by generating more coastal land for creating ports, piers, port-surrounding industrial areas, and logistics parks (Xu et al., 2021). Land reclamation may also assist in preventing tsunamis and reduce the flood risk caused by sea levels, waves, surges, or tides (Brown et al., 2020). Although land reclamation activities instigate significant economic returns, create employment opportunities, develop new metropolitan areas, increase food production, and offer investment prospects, these activities inevitably replaced mangrove forests, seagrass beds, saltmarshes, and mudflats with seawalls, rock armors, breakwaters, and marinas (AlQahtany et al.,

2022) with concrete jungles. These activities can potentially cause environmental degradation and change in natural erosion or accretion processes, leading to conflicts among the stakeholders involved (Brown et al., 2020).

One of the most affected stakeholders in the reclamation area is the fishing communities. They heavily depend on healthy coastal and marine ecosystems for their daily sustenance. In reclaiming land from the sea, changes in soil structure directly affect water quality and oxygen levels in the surrounding region (Huey et al., 2021). Such drastic changes in the marine ecosystem decreased fish productivity and fishing areas. Land reclamation activities may similarly limit the fishing communities' access to coastal and marine resources, reducing fishermen's income (Fabinyi, 2020) and making them vulnerable to poverty. One research in Batam, Indonesia, revealed that overall fish catch had decreased by 55% after the reclamation was carried out (Priyandes and Majid, 2009). On top of that, increased fishing costs due to searching for new fishing grounds in other areas farther away and other increased total variable costs have decreased profits for fishing communities (Ramadhan et al., 2019). Similar findings are also found in Malaysia as reclamation activities lead to plummeting fish catch, resulting in a decrease of 70% in their daily income (Mohamed & Razman, 2018), disrupting the livelihoods, sources of income, and human well-being of those living by the coastal areas (Chee et al., 2023).

2.2 Land Reclamation and Coastal Ecotourism

Alternative to mass tourism, ecotourism encompasses nature-based activities relative to unspoiled natural areas to enjoy and appreciate nature (Ceballos-Lascurain, 1996). At the same time, (Ceballos-Lascurain, 1996) also explained that ecotourism promotes conservation, has low negative visitor impact, and provides for beneficially active socio-economic involvement of local populations. Any alterations due to land reclamation in the natural coastal landscape may compromise tourists' anticipation of local experiences when visiting fishing villages, incurring additional losses for coastal fishing communities (Valenzuela et al., 2020). Undeniably, coastal ecotourism in fishing communities necessitates tourist support. With low fish catch due to reclamation works, some fishermen resorted to venturing into restaurant businesses or serving coastal tourists with high-quality seafood and local fishery products for additional income (Fabinyi et al., 2022), while others converted their fishing vessels and houses into tour-guiding boats and tourist accommodations (Stacey et al., 2021) (Fabinyi, 2020).

Most fishermen communities depend on tourist support to sustain their livelihood. In Indonesia, tourism on Komodo Island led local fishing communities to entirely depend on tourism activities (Lasso & Dahles, 2018). Recent research has underscored the essentiality of tourists in developing tourism destinations (Cheng & Wu, 2015) (Chiu et al., 2014) (Joo et al., 2019) (Su & Swanson, 2017). As individuals who visit destinations treasure their resources and assets and use tourism products and services (Lee, 2010), tourists maximize the positive impacts and experiences of tourism and minimize its negative implications (Cheng & Wu, 2015) (Chiu et al., 2014). Tourists can become aware of cultural and environmental impacts on their behavior (Cheng & Wu, 2015) (Chiu et al., 2014) (Su & Swanson, 2017). For example, tourists supported tourism activities in the hinterlands of the Gold Coast, provided that the activities allowed the visitors to explore the natural elements of the area without affecting it (Nicholas & Thapa, 2010). Past works denoted tourists' ability to benefit from the fishing village of Yujiale, Changdao in China by allowing them to experience the fishing village lifestyle and actively engage in tourism activities within the community, such as traditional cooking and seafood preparation and shell art workshops (Su et al., 2017). The importance of tourists' perspectives regarding coastal ecotourism development renders them key stakeholders in supporting coastal ecotourism activities within fishing communities.

Hypothesis 1. *Perceived negative impacts of land reclamation positively influence support for coastal ecotourism within fishing communities.*

2.3 Land Reclamation and Environmental Awareness as a Mediator

The significance of environmental awareness (EA) is evidenced in some studies, where tourists with high EA would be motivated to engage in environmental protection (Jalani, 2012) voluntarily. High EA increases an individual's appreciation and understanding of environmental investments, such as waste recycling (Chan, 1998), waste management infrastructure (Kirkman & Voulvoulis, 2017), and farming activities (Bradby et al., 2014) (Hinojosa et al., 2018). Thus, mediating variables define the relationship between two variables in some domains (MacKinnon, 2011). Meanwhile, coastal cultural elements must be well conserved to sustain and promote coastal culture and heritage tourism based on local identity and ethnicity, such as fishing communities (Khakzad, 2018; Khakzad et al., 2015). Regardless, coastal reclamation activities with a lack of livelihood promotion, environmental education, and environmental protection led to the cultural failure of the coastal tourism sector rather than urban development (Tans, 2021). This literature review underpinned the relationship between (i) the perceived negative impacts of land reclamation (LR), (ii) EA, and (iii) support for coastal ecotourism in fishing communities (CE). The discussions above led to the following hypotheses:

Hypothesis 2. *Perceived negative impacts of land reclamation positively influence environmental awareness.*

Hypothesis 3. *Environmental awareness positively influences support for coastal ecotourism within fishing communities.*

Hypothesis 4. *Environmental awareness mediates the influence of perceived negative impacts of land reclamation and support for coastal ecotourism within fishing communities.*

3. Research Methodology

The current study collected data through questionnaires from local domestic tourists on Penang Island. Questionnaires were distributed face-to-face at seven Penang Island tourist coastal spots using convenience sampling. The coastal spots include Batu Feringghi, Queensbay Coast, Gertak Sanggul, Tanjung Tokong, Teluk Bayu, Teluk Bahang, and Pantai Esen. These places are famous among tourists and mostly packed during weekends. This study managed to distribute to 450 Malaysian tourists aged 18 years old and above, with the condition that they know the meaning of land reclamation and be aware of reclamation works undergoing on Penang Island.

Of the 450 survey questionnaires distributed, 50 were unable to be used as the respondents had incomplete answers, resulting in a response rate of 88.89%. The questionnaire was divided into four sections, encompassing the background of the participants, perceived impacts of land reclamation activities, support for coastal ecotourism within fishing communities, and environmental awareness. A five-point Likert scale was applied, ranging from 'strongly agree' to 'strongly disagree'. And the construct variable details are shown in Table 1.

Table 1. Construct variables and their sources.

Construct (Indicator)	Sources (modified and adapted)
Perceived Negative Impacts of Land Reclamation Activities	(Adam et al., 2021) (Poudyal et al., 2019) (Hanafiah et al., 2016); (Macusi et al., 2020) (Aphunu & Nwabeze, 2012); (Huey et al., 2021); (Cramer et al., 2018); (Reilly et al., 2015); (Stylidis et al., 2014)
Support for Coastal Ecotourism within Fishing Communities	(Hanafiah et al., 2013) (Woo et al., 2015) (Rasoolimanesh et al., 2017) (Muresan et al., 2016) (Stylidis et al., 2014)
Environmental Awareness	(Lee, 2010) (Safari et al., 2018) ; (Bassi et al., 2019); (Yucedag et al., 2018)

This study applied regression-based bootstrapping analyses using PROCESS v4.1 by Andrew F. Hayes in IBM Statistical Package for Social Science version 25 (SPSS v25.0) to analyze the data generated from this study. Regression analysis was used to investigate the relationships between dependent and independent variables (Sarstedt & Erik, 2019). Linear regression analysis was chosen, and according to Wood et al. (2008), this analysis is the most widely used mediation technique in empirical studies. Secondly, the bootstrap test was applied to test the indirect effect in mediation models (Alfons et al., 2022). Bootstrapping is a computationally intensive procedure that involves sampling rows of data with replacement to create a new sample of size from the original sample (Hayes, 2018). Finally, the observed effect of the mediator on the relationship between X (LR) and Y (CE) was investigated using a full or partial mediation model. According to (Abu-Bader & Jones, 2021), a full mediation model occurs when X no longer statistically significantly affects Y after controlling for M, while a partial mediation model occurs when the effect of X on Y is still statistically significant.

4. Results

A total of 400 questionnaires were successfully collected from the participants. All participants were Malaysians, with male participants comprising 48.5% and female participants at 51.50%. Most of the participants were Chinese (52.8%), followed by Malays (34.5%), Indian (12%), and other minority ethnicities (0.9%). General questions were asked of the participants regarding their perception of land reclamation and coastal ecotourism. Table 2 shows that many of the participants believed that land reclamation activities would destroy the marine environment (75.3%). On the other hand, 11.3% of the participants denied the claim, while 13.5% were unsure. Interestingly, 93% of the participants believed that the preservation of marine ecosystems is important for coastal ecotourism. Only 12% of the participants believed that preserving the marine ecosystem is not essential while 4% were unsure. Table 2 also shows that most participants (81.5%) agreed that the culture and heritage of fishing villages, if well-maintained and preserved at its natural state, will attract tourists. However, 13.8% of the participants were unsure and 4.8% disagreed. When asked about land reclamation in their area, 68% of the participants disagreed, 14.5% were not sure, and 17.5% agreed to have reclamation projects in their areas.

Table 2. General Questions on Land Reclamation and Coastal Ecotourism.

Questions		Frequency	Percentage
Land reclamation activities will destroy the coastal environment	Yes	301	75.3
	No	45	11.3
	Not Sure	54	13.5
Preservation of the coastal ecosystem is essential for tourism activities	Yes	372	93.0
	No	12	3.0
	Not Sure	16	4.0
The culture and heritage of fishing villages, if well-maintained and preserved in its natural state, will attract tourists	Yes	326	81.5
	No	19	4.8
	Not Sure	55	13.8
Will accept to have land reclamation in your area	Yes	70	17.5
	No	272	68.0
	Not Sure	58	14.5

Each individual relationship, including hypothesized mediation pathways, is shown in Figure 1. In the first step, regression analysis has found that LR is significant and positively influences EA (a) (β = 0.488, p = 0.000 < 0.05). EA is also found to be substantial and positively influence CE (β = 0.552, p = 0.000 < 0.05). These results confirmed the EA mediational hypothesis. Then, the bootstrap estimation approach with a 95% confidence interval was used to test the indirect, direct, and total effects. The results indicated that the indirect impact for CE after controlling the mediator is found to be significant (b) (β = 0.269, SE = 0.040, 95% CI [0.192 to 0.351], p = 0.000 < 0.05]. LE is found to have a total effect on CE after controlling the mediator (c) (β = 0.453, SE = 0.039, 95% CI [0.376 to 0.528], p = 0.000 < 0.05). Besides that, LR has a direct effect on CE after controlling the mediator (c1) (β = 0.183, SE = 0.044, 95% CI [0.095 to 0.270], p = 0.000 < 0.05).

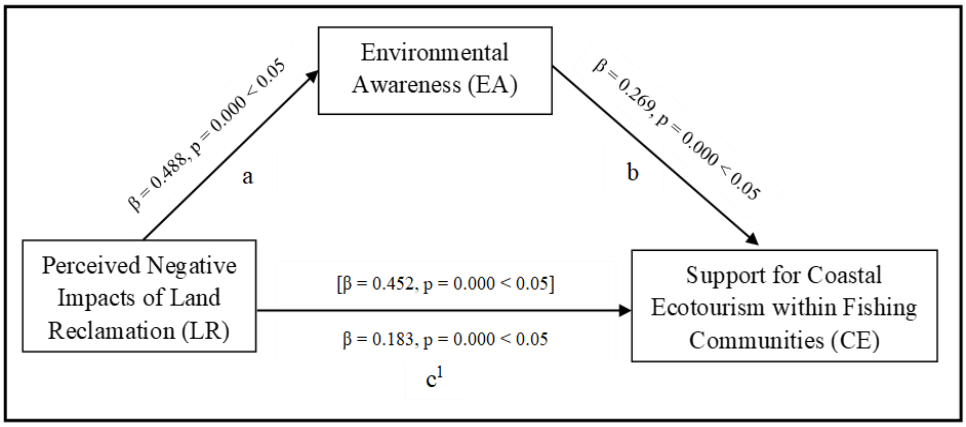

Figure 1. Conceptual diagram of the mediation hypotheses tested in this study. The result shows that the total effect of LR on CE is presented in brackets, with values representing the direct effect of LR on CE through EA below the arrow (c^1). The indirect impact is shown above the arrow (b).

5. Discussion

This study investigated the role of EA as a mediator in the relationship between LR and CE. EA is found to have a significant influence on CE, and LR is also found to have a significant influence on EA. This outcome signifies the partial mediation role of EA in this study. Partial mediation infers that there is a direct relationship between the independent and dependent variables, and at the same time, there is a significant relationship between the mediator and the dependent variable (Hayes, 2018). The findings indicate that Malaysian tourists with high environmental awareness would likely support coastal ecotourism within fishing communities. According to Karatekin (2014), humans are greatly influenced by what they frequently observe and perceive. (Mei et al., 2016) revealed that most Malaysians know the consequences of land reclamation. Through the information in the news and media articles, tourists could fathom the impacts of land reclamation on the environment. Tourists may also discover that coastal fisheries play an important role in food security and nutrition, especially for the people whose livelihoods depend on the local seafood produce (Kawarazuka & Béné, 2010). For instance, land reclamation activities at Prai and Kuala Juru were seen to cause high levels of heavy metals and sedimentation in industrial zones, affecting cockle farming (Sany et al., 2019). A fisherman from Kuala Juru confirmed this, lamenting his daily cockle harvest dropped from 250 kg in 2014 to 50 kg per day in 2018 (Paulo, D. A., & Klimowicz, 2020). The plunging scale of cockle harvest has caused prices to hike, impinging many local hawkers to reduce or substitute cockles with other cheaper alternatives (Tan, 2022).

Coastal ecotourists are usually attracted to visit and experience unique ecosystems and precious coastal natural landscapes (Papageorgiou, 2016) and revealed that tourists prefer to see natural scenic and cultural

areas that are environmentally sensitive. Similarly to this study, findings revealed that the majority of the tourists believed that land reclamation would destroy the marine environment and that preservation of the coastal ecosystem is important for the coastal ecosystem. The identical case can be observed when tourists in Danga Bay, Johor Bahru, acknowledged that land reclamation destroyed the natural beauty and ecosystems (Yin & Scholar, 2016). It is agreed that the implementation of reclamation projects alters the original topography of natural coastal landscapes and damages the coastal ecosystem, hence jeopardizing coastal tourism destinations (Wang et al., 2014) (Yuxi & Linsheng, 2020). In addition, tourists with high environmental awareness would rather experience the natural environment and unique ecosystems (Yuxi & Linsheng, 2017). The findings in this study also confirm that deep concerns for environmental issues have led tourists to decline having reclamation in their area. Respondents in this study also believed that preservation of natural areas and the culture and heritage of fishing villages will attract more tourists. Hence, it can be seen that environmental awareness is a catalyst for cultivating positive attitudes and affection for positive environmental behaviour (Karatekin, 2014). Studies by Sekhokoane et al. (2017) and (Seyedehelham Sadatiseyedmahalleh et al., 2016) discovered that individuals with a high levels of environmental awareness would try to be environmentally sustainable and more responsible when traveling. A study by Lai et al. (2016) also noticed that tourists who went on a day trip on a fishing boat with local fishermen would consider preserving natural resources while giving artisanal fishermen extra income (Lai et al., 2016). When visiting natural areas, studies have shown that tourists will increase their appreciation of nature and create environmental awareness to keep the place intact and sustainable for future generations (Chakraborty et al., 2020). Environmental awareness usually comes from environmental education that enables people to understand the ecological balance and acquire the skills required for effective and responsible participation (Arslan & Albay, 2019).

6. Conclusion

Environmental awareness in this study is found to play the role of partial mediator in the relationship between LR and CE. With this finding, it can be predicted that when more tourists are aware of the environmental issues caused by land reclamation, more support will be seen in ensuring that the projects will also benefit fishing communities through ecotourism activities. However, further investigation is needed to understand other mediators that could enhance the support for coastal ecotourism within fishing communities. The study also shows that Malaysian coastal tourists prefer to retain and visit natural coastal areas instead of reclaimed coastal areas for their coastal activities. Sustainable policies, especially on developing reclaimed land, need to integrate effective conservation of environmental and natural resources without compromising the economic viability and social well-being of the coastal fishing communities. Furthermore, the variables and the constructs researched can be replicated in other coastal land reclamation areas to seek valuable inputs for sustainable land and coastal ecotourism development.

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