sustainability

MDPI

Article

Tourist Preparedness for Tsunami Hazards in Sustainable Coastal Tourism: A Protection Motivation Theory Approach in Pangandaran, Indonesia

Akhira Mutiara [1,*], Nurrohman Wijaya [2], Ryuji Kakimoto [3] and Bimo Bagaskara Wijaya [1]

[1] Graduate School of Science and Technology, Kumamoto University, Kumamoto City 8600862, Japan; 257d8374@st.kumamoto-u.ac.jp
[2] Department of Urban and Regional Planning, School of Architecture, Planning, and Policy Development, Bandung Institute of Technology, Bandung 40132, Indonesia; nurrohman.wijaya@itb.ac.id
[3] Center for Water Cycle, Marine Environment, and Disaster Management, Kumamoto University, Kumamoto City 8600862, Japan; kakimoto@kumamoto-u.ac.jp
* Correspondence: 242d9221@st.kumamoto-u.ac.jp

Besides the results reported in the manuscript, we also tested the correlation between socio-demographic characteristic and other constructs: risk perception and response efficacy. Table S1 shows that both constructs have non-significant correlation with the sociodemographic variables ($p > 0.05$).

Table S1. Supplementary Multiple Linear Regression Results.

Dependent Variable	Predictor Variable	B	SE	t-value	p-value	95% CI	Model Diagnostics
Risk Perception (RP)	Constant	4.115	0.090	45.718	< 0.001	[3.937, 4.292]	$R^2 = 0.012$
	Age group (GA2c)	-0.072	0.058	-1.236	0.218	[-0.186, 0.043]	Adjusted $R^2 = -0.009$
	Gender (GA3)	-0.046	0.051	-0.902	0.368	[-0.146, 0.055]	$F(4,186) = 0.565$
	Monthly income (GA7a)	-0.008	0.056	-0.136	0.892	[-0.119, 0.104]	$p = 0.6880$
	Travel purpose (GA11a)	0.006	0.080	0.073	0.942	[-0.151, 0.163]	
Response Efficacy (RE)	Constant	4.383	0.164	26.693	< 0.001	[4.059, 4.707]	$R^2 = 0.009$
	Age group (GA2c)	-0.081	0.106	-0.767	0.444	[-0.290, 0.128]	Adjusted $R^2 = -0.012$

Dependent Variable	Predictor Variable	B	SE	t-value	p-value	95% CI	Model Diagnostics
	Gender (GA3)	0.084	0.093	0.902	0.368	[-0.100, 0.267]	$F(4,186) = 0.438$
	Monthly income (GA7a)	-0.001	0.103	-0.006	0.995	[-0.204, 0.203]	$p = 0.7814$
	Travel purpose (GA11a)	-0.032	0.145	-0.224	0.823	[-0.319, 0.254]	

Table S2. Sensitivity Analysis Across Alternative Age Specifications (N = 191).

Dependent Construct	Age Specification	Grouping Rationale	B	SE	t-value	p-value	Model R2	Model p
Behavioral Intention	GA2a (Cutoff 50)	Table 5 Split (15--50 vs. 51--65)	-0.198	0.162	-1.227	0.221	0.051	0.0438
	GA2b (Cutoff 40)	Early/Mid Adulthood (15--40 vs. 41--65)	-0.406	0.140	-2.903	**0.004**	0.085	0.0023
	GA2c (Cutoff 30)	Young Adult / Student (15--30 vs. 31--65)	-0.448	0.149	-2.999	**0.003**	0.088	0.0018
	GA2d (Ordinal)	Continuous Linear (6 Tiers, 1–6)	0.148	0.054	2.716	**0.007**	0.080	0.0037
Actual Behavior	GA2a (Cutoff 50)	Table 5 Split (15--50 vs. 51--65)	-0.220	0.142	-1.542	0.125	0.066	0.0120
	GA2b (Cutoff 40)	Early/Mid Adulthood (15--40 vs. 41--65)	-0.417	0.123	-3.402	< **0.001**	0.110	0.0002

	GA2c (Cutoff 30)	Young Adult / Student (15--30 vs. 31--65)	-0.326	0.133	-2.447	**0.015**	0.084	0.0025
	GA2d (Ordinal)	Continu-ous Linear (6 Tiers, 1–6)	0.135	0.048	2.818	**0.005**	0.093	0.0011
Self-Effi-cacy	GA2a (Cutoff 50)	Table 5 Split (15--50 vs. 51--65)	-0.080	0.090	-0.889	0.375	0.088	0.0017
	GA2b (Cutoff 40)	Early/Mid Adulthood (15--40 vs. 41--65)	-0.073	0.079	-0.918	0.360	0.089	0.0016
	GA2c (Cutoff 30)	Young Adult / Student (15--30 vs. 31--65)	0.038	0.085	0.452	0.651	0.086	0.0022
	GA2d (Ordinal)	Continu-ous Linear (6 Tiers, 1–6)	0.017	0.031	0.537	0.592	0.086	0.0021
Perceived Obstacles	GA2a (Cutoff 50)	Table 5 Split (15--50 vs. 51--65)	-0.003	0.091	-0.036	0.971	0.100	0.0006
	GA2b (Cutoff 40)	Early/Mid Adulthood (15--40 vs. 41--65)	0.097	0.080	1.215	0.226	0.107	0.0003
	GA2c (Cutoff 30)	Young Adult / Student (15--30 vs. 31--65)	0.196	0.085	2.310	**0.022**	0.125	0.0001
	GA2d (Ordinal)	Continu-ous Linear (6 Tiers, 1–6)	-0.051	0.031	-1.640	0.103	0.113	0.0002

Note: All models simultaneously adjust for gender (GA3: 1 = Men, 0 = Women), monthly income (GA7a: 1 > IDR 4,000,000, 0 = ≤ IDR 4,000,000), and travel purpose (GA11a: 1 = Holiday trip, 0 = Others purposes). Reference groups for age indicators: GA2a (0 = 51-65), GA2b (0 = 41-65), GA2c (0 = 31-65), and GA2d (entered as an ordinal metric variable from 1 to 6). Bold values indicate significance at $p < 0.05$.

Methodological Interpretation of Sensitivity Results:

1. **Consistency of Preparedness Outcomes:** The positive associations between age and tourists' preparedness actions were robust across specifications. Older respondents showed significantly higher Behavioral Intention (BI) and Actual Behavior (AB) under the primary 30-year cutoff (GA2c), the 40-year cutoff (GA2b), and the 6-tier continuous ordinal scale (GA2d) (all $p < 0.01$).

2. **Impact of the Broad 50-Year Cohort Split (GA2a):** When age was partitioned at 50 years to mirror the broad descriptive categories in Table 5, the effects on BI ($p = 0.221$) and AB ($p = 0.125$) became statistically non-significant. This occurs because 75.9% ($n = 145$) of the sample falls into the single 21-50 cohort, aggregating early-career tourists and mature adults together and obscuring developmental differences that emerge during early adulthood.

3. **Threshold Specificity for Perceived Obstacles (Ob):** Perceived obstacles were statistically significant only under the 30-year cutoff (GA2c: $B = 0.196$, $p = 0.022$). this identifies a life-stage threshold effect, where situational constraints are concentrated specifically among younger adult/student tourists (≤ 30 years) rather than decreasing in a strictly linear manner).

4. **Invariance of Cognitive Efficacy:** Self-efficacy (SE) remained non-significantly related to age across all four tested specifications ($p > 0.35$).