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Environmental Citizenship in Urban Communities: What Factors Determine It?

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ABSTRACT

This study examines the formation of environmental citizenship (EC) in the context of urban communities by integrating three main components: Environmental literacy (EL), community participation (CP), and environmental behavior. Given the complexity of ecological issues in Indonesian cities, particularly Pekanbaru, this study aims to understand how these three components interact to form a sustainable ecological citizenship identity. Using a quantitative approach with Structural Equation Modelling (SEM) techniques on 543 respondents, it was found that EL is the strongest predictor of pro-environmental behavior and the formation of EC. Meanwhile, CP has a moderate influence, and environmental behavior does not show a statistically significant direct effect on EC. The SEM model used was proven to be valid and reliable, reinforcing the reliability of the structural relationships between the variables tested. These findings confirm that strengthening the cognitive and participatory dimensions is key to building a robust environmental identity in urban communities. This study offers a new conceptual framework highlighting that the transformation toward EC is not sufficient with behavioral change alone but must be driven by strong knowledge and adequate social structural support.

1. INTRODUCTION

The concept of environmental citizenship (EC) has emerged as a key paradigm in responding to the ecological crisis of the 21st century [1-3]. It emphasizes that individuals and communities must take responsibility for maintaining environmental sustainability through proactive actions and ecological awareness [4-7]. However, implementing it at the local level, especially in developing cities, presents many challenges [8, 9]. One of these is that urban areas in Indonesia face numerous environmental issues due to their rapid economic growth. These include air pollution from land fires and river pollution from domestic and industrial waste [10].

The concept of EC is shaped through the interaction of three key dimensions: environmental behavior, community participation (CP), and environmental literacy (EL) [11-13]. Unfortunately, all three remain major challenges in urban area. Environmental behavior, for example, remains very low, as evidenced by the lack of waste sorting and the prevalence of illegal waste burning [14, 15]. This indicates that awareness of the negative impacts of environmentally unfriendly behavior has not yet been firmly established in society [16].

However, CP in environmental issues is usually inactive and only emerges when disasters such as haze occur but quickly disappears once conditions improve [17]. In addition, the lack of structural support, such as the lack of discussion space between the government and citizens and the absence of effective reporting mechanisms, contributes to this low level of participation [18, 19]. Efforts to improve the environment will not succeed without active CP [20, 21].

Conversely, EL among the public remains low [22, 23]. This lack of literacy exacerbates the problem because people find it difficult to make consistent decisions in their daily lives [24, 25]. These three components are interrelated: adequate literacy hinders the formation of environmentally friendly behavior, and collective efforts for environmental mitigation will be difficult without CP.

In the face of increasingly complex environmental issues, such as pollution, climate change, and ecosystem degradation, the concept of EC is becoming increasingly relevant [26, 27]. As environmental citizens, everyone not only has the right to enjoy natural resources but also has a responsibility to actively participate in conservation and sustainable development [3, 28]. EC has become an urgent necessity for a greener and more ecologically just future, as demonstrated by social movements, government policies, and public awareness. This concept remains relevant and continues to evolve in response to the demands of the times for a more responsible lifestyle towards the Earth.

This study was conducted in Indonesia and was necessary for three main reasons. First and foremost, urban areas have higher pollution levels than rural areas, mainly due to vehicle emissions and land fires. Health and the economy will deteriorate further if there is no community-based intervention. Second, mitigation efforts to date have relied too heavily on top-down measures through government

legislation, such as bans on land burning or penalties for industries that emit pollutants. These policies will not be successful in the long term without citizen participation. Third, previous research on environmental communities in Indonesia has only focused on a few regions, such as Java and Bali, while little research has been conducted in Sumatra, especially in dynamic cities such as Pekanbaru. As a result, this research is not only important to fill an academic gap but also to develop contextual solutions for Indonesian urban areas that have not been fully addressed.

This study offers novelty both conceptually and methodologically. Conceptually, it integrates three variables: environmental behavior, CP, and EL into the framework of EC, which have often been discussed separately. This integration is important for understanding how these three factors influence each other in the context of urban Indonesia.

2. METHODS

This study was conducted in Pekanbaru City, involving the entire population of Pekanbaru City spread across 15 sub-districts with a total population of 1,123,348 people. All population figures reported in this study are based on the same official municipal statistical dataset to ensure data consistency. The research sample was determined based on the Required Sample Size table using the following formula:

$$n = \frac{X^2 * \mathrm{N} * P * (1 - \mathrm{P})}{(\mathrm{Me}^2 * (N - 1) + (X^2 * P * (1 - P))}$$

where:

n = sample size

X^2 = Chi-square for the specified confidence level at 1 degree of freedom

N = Population Size

P = population proportion (50 in this table)

ME = desired Margin of Error (expressed as a proportion)

Based on the above formula and the Required Sample Size table with a confidence level of 98% and a margin of error of 5%, the required sample size is 543 people. The proportional sampling technique was used to determine the sample for this study. Table 1 shows the distribution of the sample in this study.

Table 1. Population distribution and research sample

District	Population	Proportion (%)	Sample
Payung Sekaki	99,589	4.84	26
Tuahmadani	161,132	14.34	78
Binawidya	80,132	7.13	39
Bukit Raya	107,347	9.56	52
Marpoyan Damai	150,313	13.38	73
Tenayan Raya	116,014	10.33	56
Kulim	57,603	5.13	28
Limapuluh	45,021	4.01	22
Sail	25,999	2.31	13
Pekanbaru Kota	26,744	2.38	13
Sukajadi	48,026	4.28	23
Senapelan	38,390	3.42	19
Rumbai	102,207	9.10	49
Rumbai Barat	29,205	2.60	14
Rumbai Timur	35,626	3.17	17
Total	**1,123,348**	**100**	**543**

This study employed a quantitative survey as the primary research method, supported by structured interviews conducted to capture contextual perceptions and participatory dynamics of urban residents in Pekanbaru City. The questionnaire distributed consists of three main sections: Section A contains demographic data on the respondents/research sample; Section B contains positive statements for each variable; and Section C contains the expectations of urban communities for achieving sustainable EC behavior.

To holistically analyze the relationships between variables and influencing factors in this study, the researcher applied descriptive statistical analysis and a Structural Equation Modelling (SEM) approach with the support of Smart Partial Least Squares **(**SmartPLS) 4 software. This approach aims to obtain a comprehensive picture of the influence of each variable. The complete SEM analysis model was presented in Figure 1.

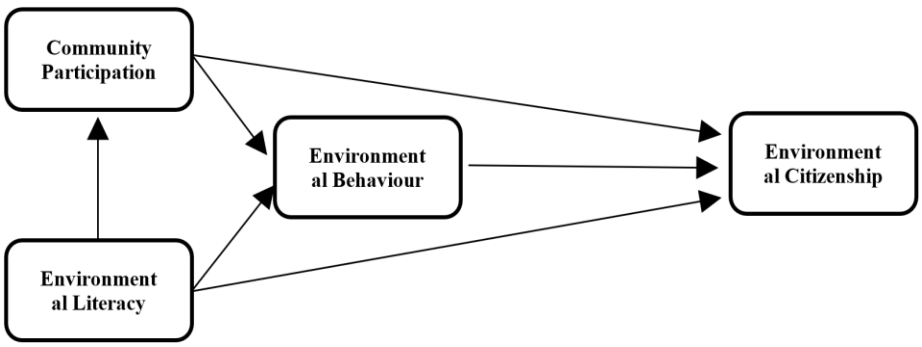

Figure 1. Conceptual framework of environmental citizenship formation

3. RESULTS AND DISCUSSION

3.1 Determinants of environmental citizenship in urban communities

At this stage, a series of SEM analyses were conducted using the SmartPLS4 application to answer the research questions, namely: (1) How significant is the contribution of environmental behaviour (EB), CP, and EL in the formation of EC in urban communities? and (2) What are the dominant factors influencing the formation of EC attitudes in urban communities?

This analysis technique was chosen because it could simultaneously analyse the interplay among the variables

examined. There are four main variables used: (1) CP; (2) EL; (3) EB; and (4) EC. The following presents the SEM analysis results for these four variables:

Based on the visualization in Figure 2, which illustrates the inter-variable relationships through the final SEM model, the next step is to analyze convergent validity (outer loading). This analysis aims to evaluate the strength of causal relationships between latent constructs. This process includes testing path coefficients, R-square (R^2) values that represent the contribution of independent variables to dependent variables, and significance tests (p-values) to determine whether the relationships between variables are statistically significant. The findings from this inner model analysis serve as the primary basis for addressing the research questions and identifying the key factors influencing the formation of EC attitudes among the community in urban area. The results of the convergent validity analysis (outer loadings) are presented in Table 2.

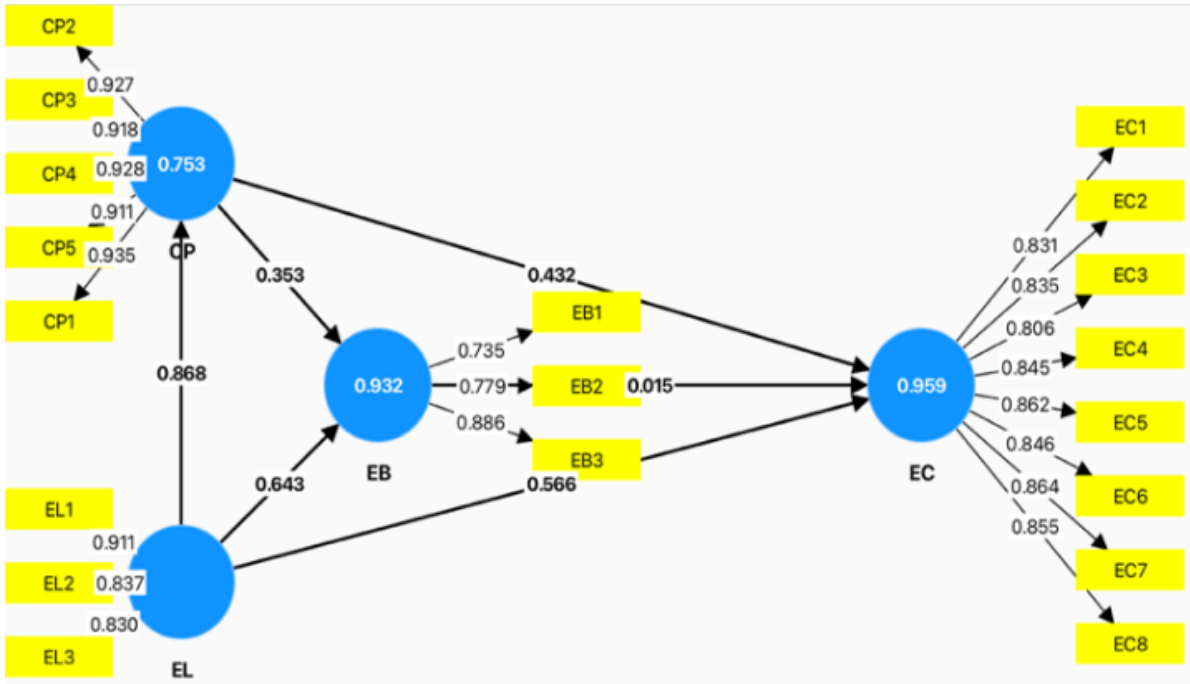

Figure 2. Final Structural Equation Modelling (SEM) results

Table 2. Convergent validity analysis results (outer loadings)

Construct Variable	Indicators	Outer Loading	Validity
Community Participation	CP1	0.911	Valid (≥ 0.70)
	CP2	0.927	Valid (≥ 0.70)
	CP3	0.918	Valid (≥ 0.70)
	CP4	0.928	Valid (≥ 0.70)
	CP5	0.935	Valid (≥ 0.70)
Environmental Literacy	EL1	0.911	Valid (≥ 0.70)
	EL2	0.837	Valid (≥ 0.70)
	EL3	0.830	Valid (≥ 0.70)
Environmental Behaviour	EB1	0.735	Valid (≥ 0.70)
	EB2	0.779	Valid (≥ 0.70)
	EB3	0.886	Valid (≥ 0.70)
Environmental Citizenship	EC1	0.831	Valid (≥ 0.70)
	EC2	0.835	Valid (≥ 0.70)
	EC3	0.806	Valid (≥ 0.70)
	EC4	0.845	Valid (≥ 0.70)
	EC5	0.862	Valid (≥ 0.70)
	EC6	0.846	Valid (≥ 0.70)
	EC7	0.864	Valid (≥ 0.70)
	EC8	0.855	Valid (≥ 0.70)

Table 3. Average Variance Extracted (AVE) reconstruction results

Construct Variable	AVE	Composite Reliability (CR)	Interpretation
Community Participation (CP)	0.58	0.86	Valid & Reliable
Environmental Literacy (EL)	0.62	0.89	Valid & Reliable
Environmental Behaviour (EB)	0.53	0.83	Valid & Reliable
Environmental Citizenship (EC)	0.49	0.80	Acceptable (CR-supported)

Convergent validity analysis shows that all indicators measuring the constructs of CP, EL, EB, and EC have very high measurement power, with all outer loading values exceeding the threshold of 0.70. This indicates that each indicator is not only relevant but also capable of accurately representing the essence of the construct. CP is supported by five indicators with very high strength (0.911–0.935), reflecting that CP in environmental issues is not merely a formality but rather structured and substantial engagement. EL also performs strongly, indicating that environmental understanding and awareness have been conceptually established among respondents. In EB, the EB3 indicator with a value of 0.886 confirms that environmental behavior is not sporadic but stems from internalized awareness. Meanwhile, EC as the main construct shows remarkable consistency, with eight strong valid indicators (0.806–0.864), confirming that EC values are strongly embedded in attitudes and actions. These findings indicate that the overall measurement model demonstrates adequate convergent validity and provides a reliable empirical basis for examining the integrative dynamics among EL, CP, environmental behavior, and EC. After ensuring that convergent validity has been fulfilled through adequate outer loading values above, the results of Average Variance Extracted (AVE) reconstruction are presented to evaluate convergent validity. The results are presented in Table 3.

The AVE analysis results show that three of the four main constructs in this study CP, EL, and EB meet the criteria for convergent validity with AVE values above 0.5 (0.58, 0.62, and 0.53, respectively), indicating that these constructs are able to explain more than 50% of the variance in their measurement indicators and have good reliability. Although the AVE value for EC (0.49) is slightly below the recommended threshold of 0.50, the construct demonstrates adequate internal consistency reliability, with a Composite Reliability (CR) value exceeding 0.80. Following established SEM-PLS guidelines, constructs with marginal AVE values may be retained when supported by sufficient CR. These findings collectively demonstrate the strength of the measurement model, with the caveat that EC may require refinement through the addition of indicators or instrument revision to achieve optimal convergent validity, while also emphasizing the importance of examining discriminant validity to ensure that each construct is truly unique and distinct from one another.

After obtaining the results of convergent validity and AVE analyses, the focus shifted to the relationship between constructs through path coefficient values. The results of the analysis are presented in Table 4.

The results of the path coefficient analysis above reveal the dynamics of the relationships between constructs, reflecting the structural strength of the model in a sharp and measurable way. EL has the strongest influence on EB with a coefficient of 0.643 and on EC with a coefficient of 0.566, indicating that environmental understanding and awareness play a dominant role in shaping ecological behavior and EC identity. CP also makes a significant contribution to EB (0.353) and EC (0.432), affirming that active CP is a crucial element in shaping collective awareness and EC identity. However, the relationship from EB to EC only shows a coefficient of 0.015, which is very weak and practically insignificant, indicating that environmental behavior, without the support of literacy and participation, is not strong enough to directly shape EC awareness. These findings confirm that the transformation towards EC cannot rely solely on individual behavior but must be systematically supported by improvements in literacy and collective community engagement.

After identifying the indirect effects between constructs, the analysis continued by examining the extent to which the constructs in the model could explain the target variable through the coefficient of determination (R^2). The results of the coefficient of determination analysis are presented in Table 5.

Table 4. Results of inter-construct relationship analysis (path coefficient)

Relationships Between Constructs	Path Coefficient	Significance
CP → EB	0.353	Significant
EL → EB	0.643	Significant
CP → EC	0.432	Significant
EL → EC	0.566	Significant
EB → EC	0.015	Not Significant

Table 5. Coefficient of determination (R^2)

Dependent Variable	R^2	Influence	Interpretation of Predictive Power
Environmental Behaviour (EB)	0.58	Strong	EB variation explained by CP + EL
Environmental Citizenship (EC)	0.43	quite strong	EC variation is explained by CP + EL + EB

The analysis results indicate that the SEM model explains 58% of the variance in EB through the combined effects of CP and EL, reflecting strong predictive capacity. In contrast, 43% of the variance in EC is explained by CP, EL, and EB, suggesting the influence of additional unmeasured contextual and structural factors. The larger R^2 value for EB compared to EC (0.58 vs 0.43) reinforces the dominance of EL and CP in shaping environmental behavior while simultaneously revealing the complexity of EC formation that requires a more holistic approach. The remaining unexplained variance (42% for EB and 57% for EC) poses a challenge to explore other mediator or moderator variables to refine the model in the future.

Based on the SEM analysis results, the formation of EC in urban areas is primarily shaped by the interaction between cognitive and social factors. EL emerges as the main driver ($\beta = 0.31$ to EC; $\beta = 0.42$ to EB), indicating that scientific understanding of environmental issues is a critical prerequisite for sustainable actions. This is in line with the characteristics of increasingly information-literate urban societies, where access to environmental knowledge (through formal education/media) creates a rational basis for behavioral

change. However, these findings also highlight the gap between knowledge and real action, where environmental behavior does not directly translate into EC, indicating that individual motivation must be supported by stronger cognitive frameworks and participatory structures. On the other hand, CP shows a significant influence (β = 0.28 on EC), but it is weaker compared to EL. This reflects the challenges of citizen participation in Pekanbaru, which may still be symbolic or fragmented. The moderate R^2 value of EC (0.43) reveals that 57% of the variance in EC remains unexplained. Therefore, EL emerges as the strongest contributing factor influencing the formation of EC in urban communities.

The results of the SEM analysis in this study reveal an interesting structural relationship between CP, EL, EB, and EC. Key findings indicate that EL is the main driver, with the highest path coefficients towards environmental behavior (β = 0.643) and EC (β = 0.566). Meanwhile, CP also has a significant impact, albeit weaker (β = 0.353 on EB; β = 0.432 on EC). The most surprising finding is the insignificant effect of EB on EC (β = 0.015), despite EB being strongly influenced by EL and CP.

The strong influence of EL on EC aligns with previous research emphasizing that environmental awareness (knowledge, ecological anxiety, and understanding of impacts) is a prerequisite for sustainable actions [29-32]. In the urban context, descriptive analysis indicates that 76.4% of respondents reported feeling anxious about increasing environmental pollution in Pekanbaru City, while the majority also demonstrated high levels of environmental consciousness and environmental awareness. This finding is reflected in the respondents' answers presented in Table 6.

Table 6. Summary of respondents' environmental perceptions

Indicators	Agreement Level (Agree & Strongly Agree)	Percentage (%)
Environmental Consciousness	Agree / Strongly Agree	81.9
Environmental Anxiety	Agree / Strongly Agree	76.4
Environmental Awareness	Agree / Strongly Agree	100.0

This indicates that literacy is not only cognitive but also emotional, where anxiety drives proactive responses. These findings reinforce previous research that found that generations with high EL tend to adopt sustainable behaviors [33-37].

This research also shows that EL not only influences EB but also directly shapes EC. These findings are consistent with previous studies that state that internalizing environmental values is part of citizenship identity [38-40]. The implication is that literacy enhancement programs, such as media campaigns or the integration of environmental curricula, should be designed not only to convey information but also to build a collective narrative about environmental responsibility as part of urban citizenship identity.

CP has a significant influence on EC (β = 0.432), but it is weaker compared to EL. This result is interesting because, empirically, CP in environmental actions in urban area appears to be very high (100% of respondents are willing to participate in clean-up activities, and 98% feel their voices are heard). However, high participation does not always correlate with transformative impact. Previous studies explain that effective participation requires real community control over resources and decisions, not just symbolic involvement [41-44].

In this context, data shows that CP in urban area is still dominated by short-term activities (such as community service) and lacks involvement in long-term policy-making. For example, only 46.6% of respondents actively evaluate environmental programs, and there is no data showing the extent to which community input is accommodated in policies. These findings suggest that participation needs to be elevated to a more strategic level, such as involving citizens in industrial waste monitoring or green space planning. Without this, participation will only become a social ritual without systemic impact [45-47].

The most surprising finding is the weak influence of EB on EC (β = 0.015), despite 78.1% of respondents claiming to have engaged in environmentally friendly actions such as saving energy or sorting waste. This phenomenon raises a fundamental question: Why do seemingly pro-environmental behaviors not automatically form a strong EC identity? The explanation can be traced through three theoretical perspectives, namely the concept of tokenistic behavior, cognitive dissonance, and feedback loops, supported by previous research [48-50].

This research also shows that individual behavior alone is not enough to form EC. What is more important is how environmental knowledge and participation are transformed into shared values within the community [51-53]. These findings challenge the old view that automatic behavioral changes create environmental identity [54-56]. On the contrary, environmental identity grows from social processes and collective norms that live within society [57-60].

Holistically, the findings of this research indicate that EC in the urban area is most strongly influenced by EL, which includes awareness, knowledge, and concern about environmental issues. CP also plays an important role, but its influence is moderate and not yet fully transformative. Meanwhile, environmental behavior does not significantly influence the formation of EC identity, indicating that individual actions without the support of collective values and social processes are not sufficient to form a robust EC. This identity is formed not merely from the accumulation of behaviors, but from the internalization of shared values within the community. Therefore, strengthening EL based on values and emotions, as well as expanding participatory spaces that promote norms and social collaboration, is key to strengthening sustainable EC.

4. CONCLUSIONS

This study confirms that the formation of EC in urban areas is not a direct result of individual behavior but rather a complex construct influenced by cognitive and participatory dimensions. EL functions as a key contributor within the broader interaction of cognitive and participatory factors. CP also contributes positively, but its influence remains limited due to the nature of involvement, which tends to be short-term and symbolic rather than structural and strategic. Meanwhile, environmental behavior does not show a strong direct

influence on the formation of citizenship, indicating a gap between individual actions and collective responsibility towards the environment.

These findings are important because they provide direction for urban policy and environmental education design. Strengthening EC requires integrated interventions that not only encourage environmentally friendly habits but also instill ecological awareness in public discourse, institutional systems, and everyday citizenship practices. The relevance of these results is particularly high in developing cities in the Global South facing ecological pressures amid rapid urbanization.

The limitations of this study lie in its limited geographical focus on a single city and the use of perceptual data, which may affect the accuracy of generalizations. Further research is recommended to adopt a longitudinal and cross-city comparative approach to explore broader social and cultural dynamics. Additionally, future studies could explore mediating variables such as environmental identity, digital activism, and institutional trust to further clarify how knowledge and participation translate into sustained civic commitment.

Although the proposed model explains a substantial proportion of the variance in EC ($R^2 = 0.43$), a considerable portion remains unexplained. This unexplained variance may be attributed to context-specific factors that were not explicitly captured in the model, such as levels of institutional trust, local governance effectiveness, and culturally embedded norms shaping civic engagement in Pekanbaru City. As an urban area facing complex environmental governance challenges, Pekanbaru exhibits social and institutional dynamics that may influence EC beyond individual literacy, participation, and behavior. Future research should incorporate these contextual and structural dimensions to provide a more comprehensive explanation of EC formation in urban settings.

This study examined the formation of EC in urban communities using a SEM-based approach and demonstrates that EC is shaped through the interaction of cognitive, behavioral, and participatory dimensions. Overall, the findings indicate that EL emerges as the strongest contributing factor in the formation of EC in urban communities. These results suggest that urban environmental policies and civic interventions should prioritize knowledge-based strategies alongside participatory mechanisms to foster more sustainable and resilient forms of EC.

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REFERENCES

[1] Hernández Guzmán, D., Hernández García de Velazco, J. (2024). Global citizenship: Towards a concept for participatory environmental protection. Global Society, 38(2): 269-296. https://doi.org/10.1080/13600826.2023.2284150

[2] Hadjichambis, A., Paraskeva-Hadjichambi, D., Georgiou, Y., Adamou, A. (2024). How can we transform citizens into 'environmental agents of change'? Towards the citizen science for environmental citizenship (CS4EC) theoretical framework based on a meta-synthesis approach. International Journal of Science Education, Part B, 14(1): 72-92. https://doi.org/10.1080/21548455.2023.2199129

[3] Shutaleva, A. (2023). Ecological culture and critical thinking: Building of a sustainable future. Sustainability, 15(18): 13492. https://doi.org/10.3390/su151813492

[4] Sampene, A.K., Li, C., Wiredu, J., Agyeman, F.O., Brenya, R. (2024). Examining the nexus between social cognition, biospheric values, moral norms, corporate environmental responsibility and pro-environmental behaviour. Does environmental knowledge matter? Current Psychology, 43(7): 6549-6569. https://doi.org/10.1007/s12144-023-04832-6

[5] Shah, S.S., Asghar, Z. (2024). Individual attitudes towards environmentally friendly choices: A comprehensive analysis of the role of legal rules, religion, and confidence in government. Journal of Environmental Studies and Sciences, 14(4): 629-651. https://doi.org/10.1007/s13412-024-00913-5

[6] Sahar, N.E., Zawawi, D., Jaharuddin, N.S., Abbasi, M.A. (2025). Responsible leadership and organisational citizenship behaviour for the environment: Mediated by environmental corporate social responsibility. International Journal of Ethics and Systems, 41(2): 353-371. https://doi.org/10.1108/IJOES-04-2023-0090

[7] Hariram, N.P., Mekha, K.B., Suganthan, V., Sudhakar, K. (2023). Sustainalism: An integrated socio-economic-environmental model to address sustainable development and sustainability. Sustainability, 15(13): 10682. https://doi.org/10.3390/su151310682

[8] Olowoyo, J.O., Okoya, A.A., Adesiyan, I.M., Awe, Y.T., Lion, G.N., Agboola, O.O., Oladeji, O.M. (2025). Environmental health science research: Opportunities and challenges for some developing countries in Africa. International Journal of Environmental Health Research, 35(3): 720-744. https://doi.org/10.1080/09603123.2024.2370388

[9] Hussain, M., Rehman, R.U., Bashir, U. (2024). Environmental pollution, innovation, and financial development: An empirical investigation in selected industrialized countries using the panel ARDL approach. Environment, Development and Sustainability, 26(11): 29217-29248. https://doi.org/10.1007/s10668-023-03860-3

[10] Hanami, Z.A., Amin, M., Hustim, M., Putri, R.M., Torabi, S.E., Ramadhani, A.A.T., Suryati, I. (2025). Spatial–temporal changes in air pollutants in four provinces of Sumatra Island, Indonesia: Insights from sentinel-5P satellite imagery. Urban Science, 9(2): 42. https://doi.org/10.3390/urbansci9020042

[11] Ryan, M., Giesbers, E., Heffernan, R., Stock, A., Droy, S., Blanchet, T., Stec, S., Abat, A., Gurzawska, A., Warso, Z. (2024). Developing normative criteria for meaningful citizen participation and deliberation in environmental policy. Innovation: The European Journal of Social Science Research, 37(3): 794-831. https://doi.org/10.1080/13511610.2023.2217520

[12] Przywojska, J., Podgórniak-Krzykacz, A., Warwas, I. (2023). Environmental education of the elderly–towards

an active, inclusive and trust-based ecosystem. Innovation: The European Journal of Social Science Research, 36(3): 453-480. https://doi.org/10.1080/13511610.2022.2134984
[13] Chan, Y.W. (2023). Developing youth toward pluralistic environmental citizenship: A Taiwanese place-based curriculum case study. Environmental Education Research, 29(1): 121-147. https://doi.org/10.1080/13504622.2022.2093334
[14] Muheirwe, F., Kihila, J.M., Kombe, W.J., Campitelli, A. (2023). Solid waste management regulation in the informal settlements: A social-ecological context from Kampala city, Uganda. Frontiers in Sustainability, 4: 1010046. https://doi.org/10.3389/frsus.2023.1010046
[15] Ameen, M., Anwar-Ul-Haq, M., Sohail, M.I., Akmal, F., Siddiqui, A. (2023). Mismanagement of waste in developing countries. In Waste Problems and Management in Developing Countries, pp. 31-72. https://doi.org/10.1201/9781003283621
[16] Wu, J., Guo, Y., Wu, M.Y., Morrison, A.M., Ye, S. (2023). Green or red faces? Tourist strategies when encountering irresponsible environmental behavior. Journal of Tourism and Cultural Change, 21(4): 406-432. https://doi.org/10.1080/14766825.2022.2106789
[17] Cook, B.R., Cornes, I., Satizabal, P., de Lourdes Melo Zurita, M. (2025). Experiential learning, practices, and space for change: The institutional preconfiguration of community participation in flood risk reduction. Journal of Flood Risk Management, 18(1): e12861. https://doi.org/10.1111/jfr3.12861
[18] Hofer, K., Wicki, M., Kaufmann, D. (2024). Public support for participation in local development. World Development, 178: 106569. https://doi.org/10.1016/j.worlddev.2024.106569
[19] Aldegheishem, A. (2023). Community participation in urban planning process in Saudi Arabia: An empirical assessment. Journal of Urban Management, 12(3): 221-230. https://doi.org/10.1016/j.jum.2023.04.003
[20] Alimoradiyan, H., Hajinezhad, A., Yousefi, H., Giampietro, M. (2024). Fostering community participation in sustainable municipal solid waste management at multiple scales in Tehran, Iran. Results in Engineering, 22: 102174. https://doi.org/10.1016/j.rineng.2024.102174
[21] Dushkova, D., Ivlieva, O. (2024). Empowering communities to act for a change: A review of the community empowerment programs towards sustainability and resilience. Sustainability, 16(19): 8700. https://doi.org/10.3390/su16198700
[22] Lin, S.H., Sah, A.K., Hong, Y.M. (2025). Environmental Literacy among the general public in Chiayi County, Taiwan. Sustainability, 17(7): 3108. https://doi.org/10.3390/su17073108
[23] Li, S., Huo, X., Si, R., Zhang, X., Yao, Y., Dong, L. (2024). Exploring the role of environmental literacy and social norms in farmers' LMTT adoption: Evidence from China. International Journal of Climate Change Strategies and Management, 16(4): 1-25. https://doi.org/10.1108/IJCCSM-12-2021-0138
[24] Vallée, M. (2024). How and why US universities fail to impart environmental literacy to all students. International Journal of Sustainability in Higher Education, 25(9): 60-77. https://doi.org/10.1108/IJSHE-07-2022-0241
[25] Takyi, S.A., Asibey, M.O., Amponsah, O., Opoku, F. (2023). Creating eco-consciousness from the perspective of students: An assessment of the level of environmental literacy among students in Kumasi. International Research in Geographical and Environmental Education, 32(4): 323-338. https://doi.org/10.1080/10382046.2023.2200200
[26] Mravcová, A. (2023). The potential of environmental citizenship in facing environmental challenges and the limits of individual environmental responsibility. Current Challenges of Environmental Philosophy, 3: 173-207. https://doi.org/10.1163/9789004679955_008
[27] Christodoulou, A., Grace, M. (2024). Becoming 'wild citizens': Children's articulation of environmental citizenship in the context of biodiversity loss. Science & Education, 34: 969-997. https://doi.org/10.1007/s11191-024-00558-4
[28] Casmana, A.R., Dewantara, J.A., Timoera, D.A., Kusmawati, A.P., Syafrudin, I. (2023). Global citizenship: Preparing the younger generation to possess pro-environment behavior, mutual assistance and tolerance awareness through school engagement. Globalisation, Societies and Education, 21(1): 15-32. https://doi.org/10.1080/14767724.2021.2013167
[29] Srisathan, W.A., Malai, K., Narathawaranan, N., Coochampoo, K., Naruetharadhol, P. (2024). The impact of citizen science on environmental attitudes, environmental knowledge, environmental awareness to pro–environmental citizenship behaviour. International Journal of Sustainable Engineering, 17(1): 360-378. https://doi.org/10.1080/19397038.2024.2354269
[30] Xiong, Z., Song, Y., Zhu, R. (2025). Pedagogical strategies for teaching environmental literacy in secondary school education: A systematic review. Sustainability, 17(20): 9104. https://doi.org/10.3390/su17209104
[31] Khan, S., Zhang, Q., Khan, I.U., Khan, S.U., Mehmood, S. (2025). Tourists' pro-environmental behaviour in an autonomous vehicle's adoption: Aligning the integration of value-belief-norm theory and the theory of planned behaviour. Current Issues in Tourism, 28(4): 604-621. https://doi.org/10.1080/13683500.2024.2325491
[32] Naparin, M., Karsudjono, A.J. (2025). Wetland conservation tourism marketing: The effects of perceived sustainability and biodiversity knowledge on environmental awareness and pro-environmental behavior in Bakut Island. Cogent Social Sciences, 11(1): 2486552. https://doi.org/10.1080/23311886.2025.2486552
[33] Kurowski, Ł., Rutecka-Góra, J., Smaga, P. (2025). Promoting environmentally and socially responsible investing: Interplay between climate and financial literacy. Climate Policy, 1-16. https://doi.org/10.1080/14693062.2025.2511261
[34] Lin, Z., Wong, I.A., Wu, S., Lian, Q.L., Lin, S.K. (2025). Environmentalists' citizenship behavior: Gen Zers' eudaimonic environmental goal attainment. Journal of Sustainable Tourism, 33(6): 1038-1058. https://doi.org/10.1080/09669582.2022.2108042
[35] Halibas, A., Akram, U., Hoang, A.P., Thi Hoang, M.D. (2025). Unveiling the future of responsible, sustainable, and ethical consumption: A bibliometric study on Gen Z and young consumers. Young Consumers, 26(7): 142-171. https://doi.org/10.1108/YC-11-2024-2327

[36] Arpaci, I., Karataş, K., Zeybek, G., Haktanir, A. (2024). Environmental attitude, global social responsibility, and digital literacy: Predictors of green purchase intentions among emerging adults. Current and Future Trends on Intelligent Technology Adoption, 2: 79-96. https://doi.org/10.1007/978-3-031-61463-7_5
[37] Peng, Y., Gaspari, J., Marchi, L. (2024). Exploring residential energy behaviour of the younger generation for sustainable living: A systematic review. Energies, 17(12): 3043. https://doi.org/10.3390/en17123043
[38] Yang, Y., Yuan, Y., Liu, P., Wu, W., Huo, C. (2024). Crucial to me and my society: How collectivist culture influences individual pro-environmental behavior through environmental values. Journal of Cleaner Production, 454: 142211. https://doi.org/10.1016/j.jclepro.2024.142211
[39] Wang, L., Zhang, Q., Wong, P.P.W. (2024). Reexamination of consumers' willingness to stay at green hotels: Rethinking the role of social identity theory, value-belief-norm theory, and theory of planned behavior. Journal of Hospitality Marketing & Management, 33(4): 547-581. https://doi.org/10.1080/19368623.2023.2292639
[40] Slimani, M., Lange, J.M., Håkansson, M. (2021). The political dimension in environmental education curricula: Towards an integrative conceptual and analytical framework. Environmental Education Research, 27(3): 354-365. https://doi.org/10.1080/13504622.2021.1879023
[41] Monsalve, L.F.D., Valladares, C.P.N., Díaz, J.S. (2024). Relationship between political participation and community resilience in the disaster risk process: A systematic review. International Journal of Disaster Risk Reduction, 111: 104751. https://doi.org/10.1016/j.ijdrr.2024.104751
[42] Gearin, E., Hurt, C.S. (2024). Making space: A new way for community engagement in the urban planning process. Sustainability, 16(5): 2039. https://doi.org/10.3390/su16052039
[43] Kusumastuti, H., Pranita, D., Viendyasari, M., Rasul, M.S., Sarjana, S. (2024). Leveraging local value in a post-smart tourism village to encourage sustainable tourism. Sustainability, 16(2): 873. https://doi.org/10.3390/su16020873
[44] Le, V.T.H., Tran, T.A., Rola-Rubzen, M.F. (2023). How subjectivities and subject-making influence community participation in climate change adaptation: The case of Vietnam. Climatic Change, 176(11): 156. https://doi.org/10.1007/s10584-023-03625-x
[45] Suryawan, I.W.K., Lee, C.H. (2025). Green transition management: The key role of community participation in developing resilient waste management policies for coastal and inland communities. Environmental Science and Pollution Research, 32: 27523-27540. https://doi.org/10.1007/s11356-025-36185-x
[46] Ulhasanah, N., Suhardono, S., Lee, C.H., Faza, A.S., Zahir, A., Suryawan, I.W.K. (2025). Modelling participation in waste bank initiatives at public transport hubs to advance circular economy development. Discover Sustainability, 6(1): 153. https://doi.org/10.1007/s43621-025-00940-4
[47] Kosoe, E.A., Ogwu, M.C. (2025). Sustainable urban planning and environmental management. In Evaluating Environmental Processes and Technologies, pp. 463-485. https://doi.org/10.1007/978-3-031-85327-2_14
[48] Willison, J., Draper, C., Fornarino, L., Li, M., Sabri, T., Shi, Y., Zhao, X. (2024). Metacognitively ALERT in science: Literature synthesis of a hierarchical framework for metacognition and preliminary evidence of its viability. Studies in Science Education, 60(2): 153-189. https://doi.org/10.1080/03057267.2023.2207147
[49] Harris, F., Lyon, F., Sioen, G.B., Ebi, K.L. (2024). Working with the tensions of transdisciplinary research: A review and agenda for the future of knowledge co-production in the Anthropocene. Global Sustainability, 7: e13. https://doi.org/10.1017/sus.2024.11
[50] Sumner, T.D. (2024). The way the portal wrote: Datafication and subjectivity in Patricia Lockwood's No One Is Talking About This. Interdisciplinary Science Reviews, 49(2): 252-268. https://doi.org/10.1177/03080188241256446
[51] Velempini, K. (2025). Assessing the role of environmental education practices towards the attainment of the 2030 sustainable development goals. Sustainability, 17(5): 2043. https://doi.org/10.3390/su17052043
[52] Ali, M.A., Kamraju, M. (2024). The role of community participation in sustainable integrated water resources management: Challenges, opportunities, and current perspectives. Integrated Management of Water Resources in India: A Computational Approach, 129: 325-344. https://doi.org/10.1007/978-3-031-62079-9_18
[53] Iribarren, L., Guerrero Tamayo, K., Garelli, F., Dumrauf, A. (2024). Wetlands in resistance: Critical environmental education and community participation in the lower paraná delta. In Urban Wetlands in Latin America: Protection, Conservation, Innovation, Restoration, and Community for Sustainable and Water Sensitive Cities, pp. 183-195. https://doi.org/10.1007/978-3-031-69590-2_12
[54] Yazdanpanah, M., Homayoon, S.B., Zobeidi, T., Woosnam, K.M., Löhr, K., Sieber, S. (2025). Bridging farmers' non-cognitive and self-conscious emotional factors to cognitive determinants of climate change adaptation in southwest Iran. Climate and Development, 17(2): 119-133. https://doi.org/10.1080/17565529.2024.2332380
[55] Doherty, T., Artman, S., Homan, J., Keluskar, J., White, K.E. (2024). Environmental identity-based therapies for climate distress: Applying cognitive behavioural approaches. the Cognitive Behaviour Therapist, 17: e29. https://doi.org/10.1017/S1754470X24000278
[56] Yachin, J. M., Margaryan, L., Lexhagen, M., Ioannides, D. (2024). Nudge plus in tourism: Reflexive behaviours and reflective attitudes. Journal of Sustainable Tourism, 33(12): 2773-2790. https://doi.org/10.1080/09669582.2024.2436907
[57] Bickerstaffe, T. (2024). A problem of generations? Habitus, social processes and climate change. Journal of Global Responsibility, 15(1): 111-124. https://doi.org/10.1108/JGR-01-2023-0010
[58] Sun, Y., Zhu, L., Zhang, N., Wu, H., Chen, Q., Wang, H. (2024). Study on pro-environmental behavior to enhance rural social-ecological resilience: The role of place identity and social cohesion as mediating mechanisms. Land, 13(12): 2144. https://doi.org/10.3390/land13122144
[59] Chokor, B.A. (2024). Cultural aspects of place

consciousness and environmental identity. In Environmental Perspectives, pp. 54-71.
[60] Fan, Y. (2024). Community identity as an indicator of quality of life: A theoretical model and empirical test. Applied Research in Quality of Life, 19(3): 1251-1270. https://doi.org/10.1007/s11482-024-10290-4