impact International Journals and Publications

© IIJP 2026 | Volume 2, Issue 4, pp. 1287-1299 | ISSN: 2636-4484

INTEGRATING POLLUTION CONTROL AND RISK MANAGEMENT INTO SUSTAINABLE TOURISM AND ECONOMIC DEVELOPMENT

Bertha Ibinye Jaja[1] & Noble Chianigam Brown[2]
[1,2]*Department of Environmental Management, Ignatius Ajuru University of Education, Rumuolumeni, Port Harcourt, Rivers State, Nigeria*
Email: bertha.jaja@iaue.edu.ng[1], noble.brown@iaue.edu.ng[2]

ARTICLE INFO
Article No.: 0718
Accepted Date: 15/10/2026
Published Date: 27/11/2026
Type: Research

ABSTRACT
This study examined the integration of pollution control and risk management into sustainable tourism and economic development among tourism enterprises in Rivers State, Nigeria. The study was motivated by increasing environmental pollution, operational risks, and sustainability challenges confronting tourism destinations and enterprises. Four objectives guided the study: to examine the influence of pollution control measures on sustainable tourism development, determine the effect of risk management practices on tourism resilience, assess the relationship between sustainable tourism and economic development, and evaluate the combined influence of pollution control and risk management on sustainable tourism and economic development. The study adopted a cross-sectional survey research design. The population comprised 1,180 tourism enterprise personnel, and a sample of 400 was determined using the Yamane formula. Data were collected using a structured questionnaire and analysed using descriptive statistics, Pearson Product Moment Correlation, and Multiple Regression Analysis. Pollution control ($\beta = 0.441$, $p < 0.001$) and risk management ($\beta = 0.387$, $p < 0.001$) were each significant predictors of the combined sustainable tourism and economic development outcome, and respondents agreed that risk management practices contribute to tourism resilience (grand mean = 4.35). Sustainable tourism demonstrated a strong positive relationship with economic development ($r = 0.718$, $p < 0.001$). Together, pollution control and risk management explained 68.4% of the variation in sustainable tourism and economic development ($R^2 = 0.684$, adjusted $R^2 = 0.682$, $F(2, 283) = 306.3$, $p < 0.001$). The study concluded that pollution control and risk management are significant predictors of sustainable tourism and economic development. The study recommended strengthening environmental protection programmes, institutionalising tourism risk management systems, promoting sustainable tourism practices, and integrating pollution control with risk management frameworks to support long-term tourism sustainability and economic growth.

Keywords: Economic Development; Pollution Control; Risk Management; Sustainable Tourism; Tourism Resilience

© IIJP 2026 | Volume 2, Issue 4, pp. 1287-1299 | ISSN: 2636-4484

Introduction

Tourism has become one of the most important sectors contributing to economic growth, employment generation, foreign exchange earnings, and infrastructure development across the world. In 2025, travel and tourism contributed a record US$11.6 trillion to global gross domestic product (9.8% of the global economy) and supported 366 million jobs worldwide (World Travel & Tourism Council [WTTC], 2026). Sustainable tourism has increasingly gained attention as governments and tourism stakeholders seek to balance economic benefits with environmental conservation and social well-being. Sustainable tourism aims to ensure that tourism activities satisfy present economic and recreational needs without compromising environmental resources and opportunities for future generations (United Nations Environment Programme & United Nations World Tourism Organization [UNEP & UNWTO], 2005).

Despite the economic benefits associated with tourism development, tourism activities frequently generate environmental challenges such as air pollution, water pollution, solid waste accumulation, ecosystem degradation, and biodiversity loss. These environmental problems reduce destination attractiveness, threaten ecological sustainability, and undermine the long-term viability of tourism enterprises (UNEP & UNWTO, 2005). Consequently, pollution control has emerged as a critical component of sustainable tourism management.

Pollution control refers to the implementation of strategies, technologies, and policies designed to minimise environmental contamination and protect natural resources. Within the tourism sector, pollution control measures include waste management, wastewater treatment, emission reduction, environmental monitoring, and sustainable resource utilisation (International Organization for Standardization [ISO], 2015). Effective pollution control enhances environmental quality, supports visitor satisfaction, and strengthens destination competitiveness.

In addition to environmental concerns, tourism enterprises operate within increasingly uncertain environments characterised by security threats, natural disasters, climate-related hazards, public health emergencies, economic instability, and operational disruptions. These uncertainties necessitate effective risk management practices to ensure organisational resilience and business continuity (Hopkin & Thompson, 2022).

Risk management involves the systematic identification, assessment, mitigation, and monitoring of risks that may affect organisational objectives (Hopkin & Thompson, 2022). In tourism, risk management improves preparedness, minimises vulnerabilities, and enhances the capacity of destinations and enterprises to withstand disruptions. Integrating pollution control and risk management therefore provides a strategic framework for achieving sustainable tourism and economic development.

In Rivers State, Nigeria, tourism attractions, hospitality facilities, cultural festivals, and recreational centres contribute significantly to local economic activities. Hospitality operators, travel operators, cultural promoters and health-tourism promoters in the state have recently showcased Rivers State as a destination for leisure, business, and medical tourism (The Tide, 2025). However, environmental pollution, flooding, waste management challenges, and operational risks continue to threaten sustainable tourism development. A survey of tourists in Port Harcourt found that air pollution, particularly black soot, and flooding and extreme weather significantly influenced destination choice (Emmanuel & Elizabeth, 2026), while the 2022 floods placed Rivers State among the most affected states in Nigeria's South-South region (ThisDay, 2022). This study therefore investigated how pollution control and risk management are associated with sustainable tourism and economic development.

© IIJP 2026 | Volume 2, Issue 4, pp. 1287-1299 | ISSN: 2636-4484

Statement of the problem

Tourism development has continued to expand across many developing economies due to its contributions to employment, income generation, investment attraction, and community development. However, the expansion of tourism activities has been accompanied by increasing environmental pollution arising from improper waste disposal, water contamination, air pollution, and ecosystem degradation (UNEP & UNWTO, 2005). These environmental challenges threaten the sustainability of tourism destinations and reduce the quality of visitor experiences.

Furthermore, tourism enterprises are increasingly exposed to operational, environmental, security, and disaster-related risks that disrupt tourism activities and undermine economic benefits. Although pollution control and risk management have individually received attention in tourism studies, many tourism enterprises still implement them as separate management functions. This fragmented approach often limits the effectiveness of sustainability initiatives and resilience-building efforts.

Existing studies have largely examined pollution control, risk management, sustainable tourism, and economic development independently. Consequently, limited empirical evidence exists regarding their integrated influence on tourism sustainability and economic development, particularly within Rivers State, Nigeria. The problem is evident locally: low patronage and inadequate facilities have been reported at the Port Harcourt Tourist Beach (Odunlami & Ijeomah, 2016); Port Harcourt tourists identify black soot and flooded roads as barriers to visiting (Emmanuel & Elizabeth, 2026); and the 2022 floods, which affected Rivers State, were among the worst in Nigeria in more than a decade, displacing about 1.4 million people nationally (Channels Television, 2024; ThisDay, 2022). This gap has constrained the development of evidence-based policies capable of promoting environmentally responsible and resilient tourism systems.

Therefore, this study examined the integration of pollution control and risk management into sustainable tourism and economic development among tourism enterprises in Rivers State, Nigeria.

Objectives of the study

The main objective of the study was to examine the integration of pollution control and risk management into sustainable tourism and economic development.

The specific objectives were to:

1. Examine the influence of pollution control measures on sustainable tourism development.
2. Determine the effect of risk management practices on tourism resilience.
3. Assess the relationship between sustainable tourism and economic development.
4. Evaluate the combined influence of pollution control and risk management on sustainable tourism and economic development.

Research questions

1. How do pollution control measures influence sustainable tourism development?
2. What effect do risk management practices have on tourism resilience?
3. What relationship exists between sustainable tourism and economic development?
4. How do pollution control and risk management jointly influence sustainable tourism and economic development?

Research hypotheses

H01: Pollution control measures have no significant influence on sustainable tourism development.

H02: Risk management practices have no significant effect on sustainable tourism and economic development.
H03: There is no significant relationship between sustainable tourism and economic development.
H04: Pollution control and risk management have no significant joint influence on sustainable tourism and economic development.

Review of literature

Conceptual framework

Pollution control

Pollution control refers to the application of policies, technologies, and management practices aimed at preventing, reducing, or eliminating environmental pollution arising from human activities (ISO, 2015). In the tourism sector, pollution control encompasses solid waste management, wastewater treatment, emission reduction, noise control, environmental monitoring, and resource conservation. Effective pollution control contributes to environmental quality, protects tourism resources, and enhances destination attractiveness. Sustainable tourism destinations depend on pollution control measures to maintain ecological integrity and improve visitor experiences.

Risk management

Risk management is the systematic process of identifying, assessing, evaluating, controlling, and monitoring risks that may affect organisational objectives (Hopkin & Thompson, 2022). Within tourism enterprises, risk management focuses on environmental hazards, flooding, security threats, health emergencies, operational disruptions, and reputational risks. Effective risk management improves organisational preparedness, strengthens resilience, and enhances business continuity. Tourism destinations that adopt proactive risk management approaches are better positioned to withstand crises and maintain sustainable operations.

Sustainable tourism

Sustainable tourism refers to tourism development that balances environmental protection, economic growth, and social well-being while preserving natural and cultural resources for future generations (UNEP & UNWTO, 2005). Sustainable tourism promotes responsible visitor behaviour, environmental conservation, community participation, and economic viability. It seeks to maximise the positive impacts of tourism while minimising environmental and social costs.

Economic development

Economic development refers to sustained improvements in economic activities, employment opportunities, income generation, infrastructure provision, and overall quality of life within a society. Tourism contributes significantly to economic development through job creation, local business growth, government revenue generation, and investment attraction. Sustainable tourism supports economic development by ensuring that tourism benefits are maintained over the long term without degrading environmental resources.

Tourism resilience

Tourism resilience refers to the capacity of tourism destinations and enterprises to anticipate, absorb, adapt to, and recover from disruptions such as disasters, health emergencies, security threats, and economic shocks while maintaining their essential functions (Ritchie & Jiang, 2019). Resilient tourism systems are better able to sustain visitor confidence, protect livelihoods, and resume normal operations after a crisis.

Conceptual relationship among variables

The conceptual framework of the study posits that pollution control and risk management serve as independent variables; pollution control is expected to influence sustainable tourism development, while risk management is expected to enhance tourism resilience. Sustainable tourism is in turn expected to contribute to economic development through increased employment, revenue generation, infrastructure development, and investment opportunities. The integration of pollution control and risk management is expected to enhance tourism sustainability and strengthen the economic benefits derived from tourism activities.

Theoretical framework

Sustainable development theory

This study was anchored on Sustainable Development Theory derived from the 1987 report of the World Commission on Environment and Development (WCED). The theory advocates development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs (WCED, 1987).

The theory emphasises the integration of environmental protection, economic development, and social equity in development planning. According to the theory, long-term economic growth can only be achieved when environmental resources are managed responsibly and development activities are conducted sustainably.

The relevance of Sustainable Development Theory to this study lies in its recognition that environmental sustainability constitutes a prerequisite for long-term economic prosperity. Pollution control contributes to environmental conservation, while risk management enhances organisational and destination resilience. Together, these management approaches support sustainable tourism development and economic growth.

The theory further explains that tourism development should not focus solely on economic gains but should also incorporate environmental stewardship and risk reduction measures. Consequently, Sustainable Development Theory provides a suitable framework for understanding how pollution control and risk management relate to sustainable tourism and economic development.

Empirical review

Buckley (2012) critically reviewed sustainable tourism research and practice and underscored the importance of managing tourism's environmental impacts if sustainability outcomes are to be achieved.

Ritchie and Jiang (2019) reviewed research on tourism risk, crisis, and disaster management, mapped the main research themes and gaps, and proposed an agenda that gives prominence to preparedness, response, and recovery. The review supports the integration of risk management into tourism planning and management.

Gössling, Scott, and Hall (2021) assessed the implications of COVID-19 for tourism and global change. They highlighted the vulnerability of the tourism sector to global shocks and the need to build more resilient and sustainable tourism systems.

Odunlami and Ijeomah (2016) examined constraints to tourism development at the Port Harcourt Tourist Beach in Rivers State. They reported very low tourist patronage and identified inadequate facilities as among the factors limiting tourism development at the site.

Ogili (2023) examined the effect of tourism on socio-economic development in Enugu State, Nigeria, for 2015–2022, focusing on revenue generation, employment generation, and rural development. The study concluded that tourism promotes economic growth and is a growing source of revenue.

Emmanuel and Elizabeth (2026) studied climate change and outbound tourist destination choice at Port Harcourt International Airport, Rivers State. Using a survey of 200 completed questionnaires, they found that air pollution ($\beta = 0.198$, $p = 0.023$) and flooding and extreme weather ($\beta = 0.320$, $p < 0.001$) significantly influenced tourists' destination choices, and recommended improved flood management, pollution control, and the promotion of sustainable tourism practices.

Gap identification

The reviewed literature indicates that pollution control, environmental sustainability, risk management, and tourism development are closely related. Existing studies have demonstrated that environmental management is associated with better sustainability outcomes, while risk management enhances resilience and business continuity. However, most previous studies examined these variables independently rather than within an integrated framework.

Furthermore, many empirical studies were conducted in developed countries where tourism infrastructure and environmental management systems differ substantially from those in developing economies. Limited empirical evidence exists regarding the combined influence of pollution control and risk management on sustainable tourism and economic development within Nigeria.

In Rivers State specifically, studies investigating how pollution control and risk management jointly contribute to sustainable tourism and economic development remain scarce. This empirical and geographical gap necessitated the present study, which examined the integration of pollution control and risk management into sustainable tourism and economic development among tourism enterprises in Rivers State, Nigeria.

Methodology

Research design

The study adopted a cross-sectional survey research design. The design was appropriate because it enabled the collection of quantitative data from tourism enterprise personnel regarding pollution control, risk management, sustainable tourism, and economic development. The design also facilitated the examination of relationships among the study variables at a single point in time. Because the design does not establish temporal order, the findings are interpreted as associations rather than proof of causation.

Area of the study

The study was conducted in Rivers State, Nigeria. The state possesses diverse tourism resources, including cultural festivals, hospitality establishments, waterfront recreational centres, eco-tourism attractions, and heritage sites that contribute significantly to local economic activities.

Population of the study

The target population comprised managers and employees of registered tourism enterprises operating within Rivers State. The records of registered tourism enterprises compiled for the study covered hotels, resorts, recreational centres, eco-tourism facilities, and tour operators, and indicated a total population of 1,180 personnel.

Sample size determination

The sample size was determined using the Yamane (1967) formula:

$n = N / [1 + N(e)^2]$

Where:

n = Sample size

N = Population size

© IIJP 2026 | Volume 2, Issue 4, pp. 1287-1299 | ISSN: 2636-4484

e = Margin of error (5%, i.e. 0.05)

n = 399.67 ≈ 400

Therefore, the computed sample size was 399.67, which was rounded up to 400 respondents.

Sampling technique

A stratified random sampling technique was employed. Tourism enterprises were grouped into hotels, resorts, recreational centres, eco-tourism facilities, and tour operators. Respondents were thereafter selected proportionately through simple random sampling. The 400 respondents were allocated to the five strata in proportion to each stratum's share of the population.

Instrument for data collection

Data were collected using a structured questionnaire titled Pollution Control, Risk Management and Sustainable Tourism Development Questionnaire (PCRMSTDQ).

The instrument comprised two sections:

Section A: Demographic information.

Section B: Items measuring pollution control, risk management, sustainable tourism, tourism resilience, and economic development.

Responses were measured using a five-point Likert scale ranging from Strongly Agree (5), Agree (4), Undecided (3), Disagree (2), to Strongly Disagree (1). The criterion mean was 3.00 (the midpoint of the scale): item means of 3.00 and above were interpreted as agreement, while means below 3.00 were interpreted as disagreement.

Validity and reliability of the instrument

Experts in Environmental Management, Tourism Studies, and Measurement and Evaluation validated the instrument. Their observations were incorporated into the final version.

A pilot study conducted among 30 tourism personnel outside the study area yielded an overall Cronbach's alpha coefficient of 0.89, indicating high reliability and internal consistency. A coefficient of 0.70 or above is conventionally regarded as acceptable, so the instrument was considered reliable.

Ethical considerations

Participation in the study was voluntary, and respondents were informed of the purpose of the study before completing the questionnaire. Informed consent was obtained, anonymity was maintained by not collecting names or other identifying information, and responses were kept confidential and used solely for research purposes.

Method of data analysis

Data collected were analysed using the Statistical Package for the Social Sciences (SPSS Version 27). Mean and standard deviation were used to answer the research questions, with the criterion mean of 3.00 as the decision rule. Tourism resilience (research question 2) was assessed descriptively using item means. Pearson Product Moment Correlation was used to test H03, while multiple regression analysis was used to test H01, H02 and H04 at the 0.05 level of significance. For these tests, the dependent variable was the composite of sustainable tourism and economic development, and the predictors were pollution control and risk management. Standard errors of the standardised coefficients were computed as β divided by t.

Data presentation and analysis

Table 4.1: Questionnaire Administration and Retrieval

Questionnaire Status	Frequency	Percentage (%)
Distributed	400	100.0
Retrieved and Valid	286	71.5
Not Retrieved	114	28.5
Total	**400**	**100.0**

Of the 400 questionnaires distributed, 286 were retrieved and valid, giving a response rate of 71.5%, which was considered adequate for statistical analysis. All subsequent analyses are based on the 286 valid responses.

Objective one: Examine the influence of pollution control measures on sustainable tourism development

Table 4.2: Pollution Control Measures and Sustainable Tourism Development

Variables	Mean	Std. Deviation
Effective waste management improves tourism sustainability.	4.38	0.66
Water pollution control enhances destination attractiveness.	4.31	0.69
Air pollution reduction supports visitor satisfaction.	4.27	0.73
Environmental monitoring improves tourism quality.	4.34	0.68
Pollution control enhances environmental sustainability.	4.42	0.64
Grand Mean	**4.34**	**0.68**

The grand mean of 4.34 exceeds the criterion mean of 3.00, indicating that respondents agreed that pollution control measures influence sustainable tourism development.

Objective two: Determine the effect of risk management practices on tourism resilience

Table 4.3: Risk Management Practices and Tourism Resilience

Variables	Mean	Std. Deviation
Disaster preparedness improves resilience.	4.41	0.65
Security management enhances visitor confidence.	4.35	0.69
Emergency planning reduces disruptions.	4.28	0.72
Risk assessment improves preparedness.	4.33	0.70
Business continuity planning strengthens resilience.	4.37	0.67
Grand Mean	**4.35**	**0.69**

The grand mean of 4.35 exceeds the criterion mean of 3.00, indicating that respondents agreed that risk management practices improve tourism resilience.

Objective three: Assess the relationship between sustainable tourism and economic development

Table 4.4: Sustainable Tourism and Economic Development

Variables	Mean	Std. Deviation
Sustainable tourism increases employment opportunities.	4.39	0.66
Sustainable tourism promotes local business growth.	4.32	0.70
Sustainable tourism increases revenue generation.	4.28	0.72
Sustainable tourism supports infrastructure development.	4.36	0.68
Sustainable tourism improves community livelihoods.	4.41	0.65
Grand Mean	**4.35**	**0.68**

The grand mean of 4.35 exceeds the criterion mean of 3.00, indicating that respondents agreed that sustainable tourism contributes positively to economic development. The Pearson correlation between the two variables is presented in Table 4.5.

Table 4.5: Pearson Correlation between Sustainable Tourism and Economic Development

Variables	r	n	p-value	Decision
Sustainable Tourism – Economic Development	0.718	286	< 0.001	Significant

Objective four: Evaluate the combined influence of pollution control and risk management on sustainable tourism and economic development

Table 4.6: Multiple Regression Analysis

Predictor	Beta (β)	Std. Error (β/t)	t-value	p-value
Pollution Control	0.441	0.062	7.114	< 0.001
Risk Management	0.387	0.061	6.298	< 0.001

Dependent variable: Sustainable Tourism and Economic Development (composite).

Model Summary

Statistic	Value
R	0.827
R^2	0.684
Adjusted R^2	0.682
F-value	F(2, 283) = 306.3
Significance	< 0.001

The coefficient of determination (R^2 = 0.684) indicates that pollution control and risk management jointly explained 68.4% of the variation in sustainable tourism and economic development. Pollution control recorded the highest coefficient (β = 0.441). The adjusted R^2 (0.682) and F-value (306.3) were recomputed from R^2 = 0.684, n = 286 and two predictors.

Table 4.7: Summary of Hypotheses Testing

Hypothesis	Test Statistic	p-value	Decision
H01: Pollution control measures have no significant influence on sustainable tourism development.	β = 0.441	< 0.001	Rejected
H02: Risk management practices have no significant effect on sustainable tourism and economic development.	β = 0.387	< 0.001	Rejected
H03: There is no significant relationship between sustainable tourism and economic development.	r = 0.718	< 0.001	Rejected
H04: Pollution control and risk management have no significant joint influence on sustainable tourism and economic development.	F(2, 283) = 306.3	< 0.001	Rejected

Since all p-values were less than the 0.05 level of significance, the four null hypotheses were rejected. The findings indicate that pollution control and risk management are significant predictors of sustainable tourism and economic development among tourism enterprises in Rivers State, Nigeria.

Discussion of results

The findings revealed that pollution control measures were significantly associated with sustainable tourism development among tourism enterprises in Rivers State. This was evidenced by the grand mean score of 4.34 reported in Table 4.2 and the regression coefficient of β = 0.441

with a significance level of $p < 0.001$. The result indicates that effective waste management, water pollution control, air pollution reduction, environmental monitoring, and environmental sustainability initiatives are associated with sustainable tourism development. The implication of this finding is that tourism destinations and enterprises that implement pollution control measures are more likely to preserve environmental quality, enhance visitor satisfaction, and maintain destination attractiveness. Pollution control protects natural resources that constitute the foundation of tourism activities and therefore supports long-term tourism sustainability. This finding is consistent with Buckley (2012), who underscored the importance of managing tourism's environmental impacts for sustainability outcomes. It also agrees with Emmanuel and Elizabeth (2026), who found that air pollution and flooding significantly influenced tourists' destination choice in Port Harcourt, and with Odunlami and Ijeomah (2016), who reported constraints to tourism development at the Port Harcourt Tourist Beach. Therefore, the study indicates that pollution control is a significant predictor of sustainable tourism development.

The findings showed that respondents regarded risk management practices as contributing to tourism resilience, as shown by the grand mean score of 4.35 presented in Table 4.3. Risk management was also a significant predictor of the combined sustainable tourism and economic development outcome ($\beta = 0.387$, $p < 0.001$). Respondents agreed that disaster preparedness, security management, emergency planning, risk assessment, and business continuity planning contribute to tourism resilience. The finding suggests that tourism enterprises that implement comprehensive risk management systems are better equipped to respond to environmental hazards, security threats, operational disruptions, and other uncertainties that may affect tourism activities. Effective risk management strengthens organisational preparedness and enhances the capacity of tourism enterprises to sustain operations during crises. This finding is consistent with Ritchie and Jiang (2019), whose review gives prominence to preparedness, response, and recovery in tourism risk management. It also agrees with Gössling et al. (2021), who emphasised the vulnerability of tourism to global shocks and the need for more resilient tourism systems. Consequently, the study highlights the importance of risk management as a strategic tool for strengthening tourism resilience.

The findings revealed a significant positive relationship between sustainable tourism and economic development. This was evidenced by the grand mean score of 4.35 in Table 4.4 and the correlation coefficient of $r = 0.718$ ($p < 0.001$) in Table 4.5. Respondents agreed that sustainable tourism increases employment opportunities, promotes local business growth, generates revenue, supports infrastructure development, and improves community livelihoods. The implication of this finding is that sustainable tourism is closely linked to economic development. Tourism activities generate direct and indirect economic benefits that contribute to improved living standards and broader socio-economic development. Sustainable tourism helps ensure that these benefits are maintained over time through responsible environmental and resource management practices. This finding is consistent with Ogili (2023), who concluded that tourism promotes economic growth and is a growing source of revenue in Enugu State, Nigeria. Therefore, the study indicates that sustainable tourism is a promising pathway for achieving economic development.

The findings established that pollution control and risk management jointly and significantly predict sustainable tourism and economic development. The regression analysis presented in Table 4.6 revealed that the two variables jointly explained 68.4% of the variation in sustainable tourism and economic development ($R^2 = 0.684$; adjusted $R^2 = 0.682$). Pollution control recorded the highest beta coefficient ($\beta = 0.441$), while risk management recorded a beta

coefficient of $\beta = 0.387$. The overall regression model was statistically significant ($F(2, 283) = 306.3$, $p < 0.001$). The finding indicates that tourism enterprises that simultaneously implement pollution control and risk management strategies are more likely to report sustainable tourism outcomes and enhanced economic benefits. Pollution control protects environmental resources, while risk management strengthens organisational resilience and continuity. Together, these approaches provide a comprehensive framework for sustainable tourism and economic development. This finding is consistent with Gössling et al. (2021), who called for more resilient and sustainable tourism systems. The finding also supports Sustainable Development Theory, which emphasises the integration of environmental protection and economic development objectives. Therefore, the study indicates that pollution control and risk management are complementary predictors of sustainable tourism and economic development.

Limitations of the study

Several limitations should be noted. First, the cross-sectional design captures relationships at a single point in time and cannot establish causation. Second, the data were self-reported by enterprise personnel and may be affected by social desirability and common-method bias. Third, the study was limited to registered tourism enterprises in Rivers State, which restricts generalisation to other states or to unregistered operators. Fourth, the combined outcome of sustainable tourism and economic development was analysed as a composite, so the regression results cannot be interpreted separately for each construct, and tourism resilience was assessed descriptively rather than modelled. Fifth, only 71.5% of the distributed questionnaires were retrieved and valid, so non-response bias cannot be ruled out. Finally, the very high item means suggest that responses may be clustered towards agreement.

Conclusion

This study examined the integration of pollution control and risk management into sustainable tourism and economic development among tourism enterprises in Rivers State, Nigeria. The findings revealed that pollution control measures were significantly associated with sustainable tourism development through effective waste management, water and air pollution control, and environmental monitoring. These measures contribute to environmental quality, destination attractiveness, and long-term tourism sustainability. The study further established that risk management practices were significantly associated with tourism resilience by improving preparedness for disasters, security challenges, emergencies, and operational disruptions. Tourism enterprises that implement effective risk management frameworks are better positioned to maintain operational continuity and visitor confidence during periods of uncertainty. The findings also demonstrated that sustainable tourism is positively related to economic development through employment generation, revenue creation, business growth, infrastructure development, and improved community livelihoods. Furthermore, the study revealed that pollution control and risk management jointly explained a substantial proportion of sustainable tourism and economic development outcomes. The study therefore concludes that sustainable tourism and economic development can be supported through the integration of pollution control and risk management strategies. Tourism enterprises that effectively manage environmental pollution and organisational risks are more likely to achieve sustainability, resilience, competitiveness, and long-term economic growth. Given the cross-sectional design, these conclusions describe associations rather than established causal effects.

Recommendations

Based on the findings of the study, the following recommendations are made:

© IIJP 2026 | Volume 2, Issue 4, pp. 1287-1299 | ISSN: 2636-4484

1. Tourism enterprises should strengthen pollution control programmes by implementing effective waste management systems, water pollution control facilities, environmental monitoring mechanisms, and pollution prevention measures to support sustainable tourism development.
2. Managers of tourism enterprises should establish comprehensive risk management frameworks that incorporate disaster preparedness, emergency response planning, security management, risk assessment, and business continuity strategies to improve tourism resilience.
3. Tourism operators should promote sustainable tourism practices that support local employment, community participation, environmental conservation, and responsible resource utilisation in order to enhance economic development outcomes.
4. Government agencies and tourism enterprise managers should institutionalise integrated pollution control and risk management systems within tourism planning and operations to strengthen sustainable tourism development and long-term economic growth.

Suggestions for further research

Future studies should adopt longitudinal or mixed-method designs to test causal pathways between pollution control, risk management, sustainable tourism, and economic development. Separate models for sustainable tourism, tourism resilience, and economic development (in particular, a regression that treats tourism resilience as the outcome of risk management), or structural equation modelling, would allow the mediating role of sustainable tourism to be examined directly. Studies covering other Nigerian states and complementing survey data with objective indicators (such as pollution monitoring data, incident records, and enterprise financial performance) would also strengthen the evidence base.

References

Buckley, R. (2012). Sustainable tourism: Research and reality. *Annals of Tourism Research, 39*(2), 528–546.

Channels Television. (2024, August 27). *Floods kill at least 49, displace 41,344 in Nigeria*. https://www.channelstv.com/2024/08/27/floods-kill-at-least-49-displace-41344-in-nigeria/

Emmanuel, A. E., & Elizabeth, A. (2026). *Climate change and outbound tourist destination choice of Port Harcourt International Airport, Rivers State* [Unpublished undergraduate project]. Michael Okpara University of Agriculture. https://repository.mouau.edu.ng/works/climate-change-and-outbound-tourist-destination-choice-of-port-harcourt-international-airport-river-state-emmanuel-amarachi-e-7-2

Gössling, S., Scott, D., & Hall, C. M. (2021). Pandemics, tourism and global change: A rapid assessment of COVID-19. *Journal of Sustainable Tourism, 29*(1), 1–20. https://doi.org/10.1080/09669582.2020.1758708

Hopkin, P., & Thompson, C. (2022). *Fundamentals of risk management* (6th ed.). Kogan Page.

International Organization for Standardization. (2015). *ISO 14001: Environmental management systems—Requirements with guidance for use*. ISO.

Odunlami, S. S. S., & Ijeomah, H. M. (2016). Constraints of tourism development in Port Harcourt Tourist Beach, Rivers State, Nigeria. *Journal of Research in Forestry, Wildlife and Environment, 8*(4). https://ajol.info/index.php/jrfwe/article/view/150700

Ogili, A. (2023). Effect of tourism on socio-economic development in Nigeria: A study of Enugu State, 2015–2022. *Nigerian Journal of Social Development, 11*(1), 85–93.

Ritchie, B. W., & Jiang, Y. (2019). A review of research on tourism risk, crisis and disaster management. *Annals of Tourism Research, 79*, 102812.

The Tide. (2025). *FTAN marks Tourism Day with march, awards*. https://www.thetidenewsonline.com/?p=53107

ThisDay. (2022, September 23). *NEC approves measures to mitigate flooding nationwide*. https://thisdaylive.com/index.php/2022/09/23/nec-approves-measures-to-mitigate-flooding-nationwide

United Nations Environment Programme & United Nations World Tourism Organization. (2005). *Making tourism more sustainable: A guide for policy makers*. UNEP and UNWTO.

World Commission on Environment and Development. (1987). *Our common future*. Oxford University Press.

World Travel & Tourism Council. (2026). *Economic impact research: 2025 results*. WTTC. https://wttc.org

Yamane, T. (1967). *Statistics: An introductory analysis* (2nd ed.). Harper and Row.