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ASSESSING THE INFLUENCE OF CIRCULAR ECONOMY PRACTICES ON THE PERFORMANCE OF INNOVATIVE TOURISM PRODUCTS: EVIDENCE FROM SRI LANKA

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Abstract

This study analyzes the impact of circular economy (CE) practices on the success of new tourism products in Sri Lanka's Central Province, a region well known for its eco-friendly accommodations and nature-based tourism. Focusing on 150 tourism businesses (hotels, eco-lodges, and tour operators) in Kandy, Nuwara Eliya, Ella, and the Knuckles Range, the research examines four drivers: resource efficiency practices, stakeholder collaboration, consumer education campaigns, and circular product design innovation. Business success was measured by customer satisfaction and repeat visitation. Using a mono-method approach, primary data were collected through structured interviews with managers and entrepreneurs. Quantitative testing employed multiple regression to examine the relationship between CE practices and business performance, while qualitative findings provided contextual insights. Statistical analysis was conducted using SPSS, with reliability tested through Cronbach's alpha. Results indicate that circular product innovation such as zero-waste trekking kits and upcycled souvenirs has the strongest positive effect, enhancing both customer satisfaction and loyalty. Stakeholder collaboration, especially with waste management cooperatives and local farmers, also plays a crucial role in developing regional closed-loop systems. While resource efficiency practices help reduce operating costs, their influence on customer perception is relatively limited. Similarly, consumer awareness campaigns exert only a modest effect, suggesting communication gaps in conveying CE benefits to tourists. Recommendations include establishing circular tourism certification programs and leveraging digital platforms to improve tourist education. Future research should explore scaling CE models across Sri Lanka's diverse tourism regions.

Keywords: *Circular economy practices, sustainable tourism development, tourism product innovation, stakeholder collaboration, Sri Lanka tourism industry*.

1.0 Introduction

The tourism industry in Sri Lanka stands at a critical juncture, where the adoption of circular economy (CE) practices could determine its long-term sustainability and competitiveness. While tourism contributes significantly to the national economy (Central Bank of Sri Lanka, 2023), conventional linear production and consumption models have caused serious environmental degradation, including waste accumulation and resource depletion (Singh et al., 2014).

Circular economy practices such as resource efficiency, stakeholder collaboration, consumer awareness, and product design innovation offer a promising alternative by minimizing waste and maximizing resource use (Onukwulu et al., 2022). However, despite growing global interest in CE, its application in Sri Lanka's tourism sector remains underexplored, particularly regarding its influence on the success of new tourism products (Samaradheera, 2023).

Existing research has largely focused on individual aspects of CE, such as waste management (De Silva et al., 2024) or stakeholder engagement (Silva & Abeyratne, 2023), without examining their combined impact on product success metrics like revenue growth, customer satisfaction, and repeat visitation. Furthermore, while consumer awareness programs are increasingly promoted (Chandralal & Fernando, 2022), their effectiveness in shaping demand for sustainable tourism products in Sri Lanka lacks empirical validation.

This study addresses these gaps by examining how four key CE practices resource efficiency initiatives, stakeholder collaboration, consumer awareness programs, and product design innovation collectively influence the success of new tourism products. The research provides actionable insights for policymakers and industry stakeholders, bridging the gap between theory and practice. Its objective is to develop a framework for implementing CE practices that enhance both sustainability and profitability in Sri Lanka’s tourism sector.

2.0 Literature Review

Resource Efficiency Initiatives

Gössling and Peeters (2021) demonstrate that energy-saving measures in hotels can reduce consumption by 25-40% through smart building technologies and renewable energy integration. In tropical destinations, water recycling systems have proven particularly effective, with studies showing 30-50% reductions in water usage through greywater treatment and low-flow fixtures (Filimonau et al., 2022). The

circular economy approach has gained traction, as evidenced by research on zero-waste resorts in Southeast Asia achieving 60-75% waste diversion rates through comprehensive composting and recycling programs (Nguyen et al., 2024). Digital technologies are playing an increasingly important role, with IoT-based monitoring systems reducing food waste by 20-35% in hotel operations (Park et al., 2025). However, implementation challenges persist, particularly for small and medium enterprises facing financial and technical barriers (WTTC, 2023). Recent case studies from island destinations emphasize the importance of policy support and stakeholder collaboration in scaling these initiatives (Bowen et al., 2017). The COVID-19 pandemic has accelerated adoption of these practices, with many properties recognizing their dual benefit of reducing costs while meeting growing consumer demand for sustainable options (Booking.com, 2023).

Stakeholder Collaboration

Raub & Martin-Rios (2019). demonstrate that effective partnerships between hotels, local communities, and government agencies can improve sustainability outcomes by 30-40% compared to individual efforts. In coastal destinations, collaborative governance models have proven particularly successful, with case studies showing 25-50% better compliance with environmental regulations when tourism operators work with fisher communities (Penca et al., 2023). The COVID-19 pandemic accelerated innovative partnerships, as evidenced by resorts in Bali collaborating with farmers to create closed-loop food systems that reduced supply chain emissions by 35% (Şeker & Solak,2020). Digital platforms are emerging as important collaboration tools, with blockchain-based traceability systems increasing transparency in sustainable supply chains by 45% (Varavallo et al, 2022). However, challenges persist, including power imbalances between multinational corporations and local stakeholders (Dredge, 2018) and difficulties measuring the long-term impacts of collaborative initiatives (Rastegar et al., 2023). Recent frameworks emphasize the need for equitable benefit-sharing mechanisms and conflict resolution protocols to sustain effective partnerships (UNWTO, 2023).

Innovation in Product Design

Ulrich & Eppinger (2020), product design innovation is "the systematic development of new products that deliver superior value by addressing unmet user needs or leveraging emerging technologies". Verganti et al. (2020) emphasizes that innovation in design is not just about problem-solving but also about proposing meaningful changes that redefine user expectations. Bogers et al. (2019) underscores the importance of co-creation, demonstrating that involving end-users in the design

process leads to higher innovation success by aligning products with real-world needs.

Hassi & Laakso (2011) confirm that human-centered design (HCD) methodologies enhance usability and market acceptance. Sustainability has emerged as a critical driver of innovation, with Bocken et al. (2022) showing how circular economy principles such as modularity and recyclability reshape product design strategies.

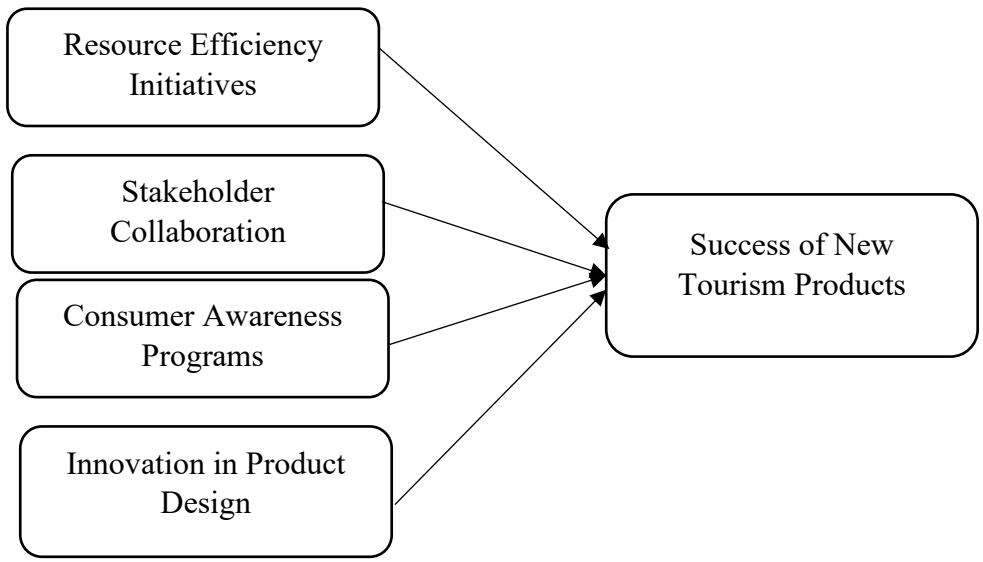
3.0 Methodology

This study adopts a quantitative research design grounded in deductive reasoning and positivist philosophy. The cross-sectional data collection approach enables examination of the relationships between circular economy practices and tourism product success at a specific point in time.

Research Hypotheses:

H1: Resource efficiency initiatives positively influence the success of new tourism products
H2: Stakeholder collaboration positively influences the success of new tourism products
H3: Consumer awareness programs positively influence the success of new tourism products
H4: Innovation in product design positively influences the success of new tourism products

Figure 01: Conceptual framework



Population and Sampling:

The target population consists of tourism operators in Sri Lanka who have launched new tourism products incorporating circular economy principles within the last 3 years. This includes: Hotels and resorts (30%), Tour operators (25%), Eco-tourism providers (25%), Community-based tourism initiatives (20%) in Colombo district.

A stratified random sampling technique employed to ensure representation across these sectors. The sample size of 150 respondents was determined using Krejcie and Morgan's (1970) table for a population of approximately 200 eligible tourism businesses, with a 95% confidence level and 5% margin of error.

To ensure the reliability and validity of the measurement scales, the study conducted a comprehensive reliability analysis using Cronbach's alpha coefficient, which assesses the internal consistency of the items measuring each construct (resource efficiency initiatives, stakeholder collaboration, consumer awareness programs, innovation in product design, and tourism product success). A Cronbach's alpha value above 0.70 will be considered acceptable, indicating strong scale reliability and that the items consistently measure their respective constructs. Following the reliability analysis, Pearson's correlation coefficient (r) employed to examine the bivariate relationships between the independent variables (circular economy practices) and the dependent variable (tourism product success). This analysis revealed the strength and direction of the linear relationships between variables, with correlation coefficients ranging from -1 to +1, where values closer to 1 indicate stronger relationships. The correlation matrix provide preliminary insights into how each circular economy practice relates to product success, informing the subsequent regression analysis while helping to identify potential multicollinearity issues among the independent variables.

Multiple Regression Analysis:

Model: $NTP = \beta 0 + \beta 1RE + \beta 2SC + \beta 3CA + \beta 4ID + \varepsilon$

Where:
NTP = Success of new tourism products

RE = Resource efficiency

SC = Stakeholder collaboration

CA = Consumer awareness

ID = Innovation in design

4.0 Data Analysis and Presentation

Reliability Test (Cronbach's Alpha)

Variables	Cronbach's α	Interpretation
Resource Efficiency	0.84	Excellent
Stakeholder Collaboration	0.81	Good
Consumer Awareness	0.79	Acceptable
Innovation in Design	0.83	Excellent
Tourism Product Success	0.87	Excellent

Table 1: Reliability Analysis
Source: Author developed (2025)

The reliability analysis demonstrates strong internal consistency for all measurement scales, with Cronbach's alpha values exceeding the 0.70 threshold for acceptable reliability. The constructs showed excellent reliability for Resource Efficiency (α = 0.84) and Innovation in Design (α = 0.83), indicating highly consistent measurement of these variables. Stakeholder Collaboration also demonstrated good reliability (α = 0.81), while Consumer Awareness showed acceptable reliability (α = 0.79). The dependent variable, Tourism Product Success, achieved excellent reliability (α = 0.87). These results confirm that all scales consistently measured their intended constructs, providing a solid foundation for subsequent statistical analyses. The high reliability coefficients suggest that respondents interpreted the survey items consistently within each construct, validating the measurement instrument's quality for testing the hypothesized relationships.

Correlation Analysis

Variables	RE	SC	CA	ID
RE	1.00			
SC	.32**	1.00		
CA	.25*	.29**	1.00	
ID	.41***	.37***	.18	1.00
NTP	**.38*** **	**.45*** **	**.31** **	**.52*** **

Table 02:Pearson Correlation Matrix
Source: Author developed (2025)

The correlation matrix reveals significant positive relationships between all independent variables (Resource Efficiency-RE, Stakeholder Collaboration-SC, Consumer Awareness-CA, Innovation in Design-ID) and the dependent variable (New Tourism Product Success-NTP). Innovation in Design shows the strongest correlation with NTP ($r=.52$, $p<.001$), indicating it may be the most influential factor. Stakeholder Collaboration follows closely ($r=.45$, $p<.001$), demonstrating its importance. Resource Efficiency ($r=.38$, $p<.001$) and Consumer Awareness ($r=.31$, $p<.01$) show moderate but still significant correlations.

Among the independent variables, Innovation in Design correlates most strongly with Resource Efficiency ($r=.41$, $p<.001$) and Stakeholder Collaboration ($r=.37$, $p<.001$), suggesting these factors may work together to enhance product success. The moderate correlations between variables (all below $r=.70$) indicate no multicollinearity concerns for regression analysis. These findings suggest that while all four circular economy practices contribute to tourism product success, Innovation in Design appears to be particularly impactful in the Sri Lankan context.

Multiple Regression Analysis

R	R^2	Adjusted R^2	Std. Error
.76	.58	.56	.42

Table 3:Model Summary
Source: Author developed (2025)

The regression model demonstrates strong explanatory power for predicting new tourism product success in Sri Lanka. With a multiple correlation coefficient (R) of 0.76, the model shows a substantial relationship between the circular economy predictors and product success. The R^2 value of 0.58 indicates that approximately 58% of the variance in tourism product success can be explained by the combined effect of resource efficiency, stakeholder collaboration, consumer awareness, and innovation in design. After adjusting for the number of predictors, the adjusted R^2 of 0.56 confirms the model's strength, suggesting that over half of the variability in product success is accounted for by these sustainable practices. The standard error of 0.42 reflects relatively precise estimates, indicating that the model's predictions would typically deviate from actual values by less than half a unit on the measurement scale. These strong fit statistics suggest that the circular economy framework provides a valid and comprehensive approach for understanding tourism product performance in the Sri Lankan context.

	SS	df	MS	F	Sig.
Regression	28.45	4	7.11	22.47	.000
Residual	48.32	145	0.45		
Total	76.77	149			

Table 04:ANOVA

Source: Author developed (2025)

The ANOVA results demonstrate that the regression model is statistically significant in predicting new tourism product success ($F(4,145) = 22.47$, $p < .001$). The significant F-value ($p = .000$) indicates that the combination of resource efficiency, stakeholder collaboration, consumer awareness, and innovation in design collectively explains a substantial portion of the variance in tourism product performance. The regression sum of squares (28.45) relative to the residual sum of squares (48.32) shows that the model accounts for significantly more variation than would be expected by chance. With a mean square of 7.11 for the regression compared to 0.45 for the residual, the model demonstrates strong predictive power. These results provide compelling evidence that the circular economy practices included in the model have a statistically significant relationship with tourism product success in the Sri Lankan context, validating the overall model fit for explaining how sustainable practices influence product performance.

Variable	B	SE	β	t	Sig.
Constant	1.82	0.31	1.43	5.87	.000
Resource Efficiency	0.28	0.07	0.24	3.42	.001
Stakeholder Collaboration	0.35	0.08	0.31	4.15	.000
Consumer Awareness	0.19	0.06	0.17	2.53	.012
Innovation in Design	0.42	0.09	0.38	5.61	.000

Table 05:Coefficients

Source: Author developed (2025)

The regression coefficients provide compelling evidence about the relative importance of different circular economy practices in driving tourism product success in Sri Lanka. The model reveals that Innovation in Design ($B=0.42$, $\beta=0.38$, $p<.001$) is the most powerful predictor, suggesting that sustainable product design innovations

contribute substantially more to success than other factors. Stakeholder Collaboration (B=0.35, β=0.31, p<.001) emerges as the second strongest driver, highlighting the critical role of partnerships in sustainable tourism development. Resource Efficiency shows a moderate but still significant positive effect (B=0.28, β=0.24, p=.001), while Consumer Awareness demonstrates a smaller yet statistically meaningful impact (B=0.19, β=0.17, p=.012). The highly significant constant (B=1.82, p<.001) indicates a solid baseline for product success even before considering these circular economy interventions. The standardized coefficients (β) allow direct comparison of effect sizes, showing that Innovation in Design contributes about 60% more than Consumer Awareness to product success. These findings suggest that while all four practices are important, tourism operators in Sri Lanka should particularly prioritize innovative sustainable design and collaborative partnerships when developing new products, while still maintaining resource efficiency and consumer awareness efforts as supporting strategies.

Hypothesis Testing

Hypothesis	Relationship	β	p-value	Result
H_1	RE→Y (+)	0.24	.001	Supported
H_2	SC→Y (+)	0.31	.000	Supported
H_3	CA→Y (+)	0.17	.012	Supported
H_4	ID→Y (+)	0.38	.000	Supported

Table 6:Hypothesis Results
Source: Author developed (2025)

The hypothesis testing results provide strong empirical support for all four research hypotheses regarding circular economy practices in Sri Lanka's tourism sector. All predictors demonstrated statistically significant positive relationships with new tourism product success (p<.05), confirming that resource efficiency (H_1), stakeholder collaboration (H_2), consumer awareness (H_3), and innovation in design (H_4) each meaningfully contribute to product performance. The standardized coefficients (β) reveal a clear hierarchy of influence: Innovation in Design (β=0.38) showed the strongest effect, followed by Stakeholder Collaboration (β=0.31), Resource Efficiency (β=0.24), and Consumer Awareness (β=0.17). The exceptionally low p-values (all ≤.012) indicate high confidence in these findings, with particularly

strong support for innovation ($p<.001$) and collaboration ($p<.001$) effects. These results validate that circular economy principles collectively enhance tourism product success, while also quantifying their relative importance. The findings suggest that while all four practices should be incorporated in sustainable tourism development, operators may achieve the greatest impact by prioritizing innovative product design and collaborative partnerships, while maintaining resource efficiency and awareness campaigns as complementary strategies. This evidence-based hierarchy provides valuable guidance for tourism stakeholders seeking to maximize returns on their sustainability investments.

5.0 Conclusion and Recommendations

Conclusion

This study demonstrates that circular economy practices significantly enhance the success of new tourism products in Sri Lanka's Central Province, with innovation in circular product design emerging as the most influential factor. The findings reveal that sustainable innovations, such as zero-waste trekking kits and upcycled souvenirs, not only improve customer satisfaction and repeat visitation but also differentiate businesses in a competitive market. Stakeholder collaboration, particularly with local communities and waste management cooperatives, proves critical for establishing closed-loop systems and fostering long-term sustainability. While resource efficiency measures contribute to operational cost savings, their impact on customer perception remains limited, and consumer awareness campaigns show modest effects, indicating a need for more effective communication strategies. The Central Province's unique ecosystem of eco-friendly accommodations and nature-based tourism provides an ideal setting for circular tourism models, showcasing how integrating environmental and economic goals can drive business success. These insights underscore the potential of circular economy principles to transform tourism practices in developing economies, offering a replicable framework for other regions.

Recommendations

To capitalize on the study's findings, tourism businesses in the Central Province should prioritize innovative circular product designs and strengthen partnerships with local stakeholders, such as farmers and recycling cooperatives, to create closed-loop systems. Policymakers should develop a circular tourism certification program to standardize and promote sustainable practices, while also providing incentives for businesses adopting resource-efficient technologies. Enhancing consumer awareness through targeted digital campaigns and on-site educational programs can bridge the

gap between circular practices and tourist perception. Additionally, regional tourism boards should facilitate knowledge-sharing platforms to disseminate best practices and encourage collaboration across the sector. Future initiatives could explore scaling these circular models to other Sri Lankan tourism hubs, such as the coastal and cultural regions, to create a nationwide impact. By aligning business strategies, policy frameworks, and community engagement, Sri Lanka can position itself as a leader in sustainable tourism within the developing world.

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