IMPACTS OF CIRCULAR ECONOMY ON THE DEVELOPMENT OF ECOTOURISM ASSOCIATED WITH ORGANIC AGRICULTURE

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ABSTRACT

The article examines the impact of circular economy on the development of ecotourism associated with organic agriculture in the Southeast region. The results of the study identified 5 influencing factors, including: (1) Waste management and recycling (WMR); (2) Use of renewable energy (REU); (3) Natural resource conservation (NRC); (4) Green Technology Application (GTA) and (5) Sustainability and Traceability Certification (SCT). Based on the research results, the author proposes solutions to strengthen the application of the circular economy model to promote the sustainable development of ecotourism combined with organic agriculture.

Keywords: Circular economy, ecotourism, organic agriculture, waste management, renewable energy, green technology.

1. INTRODUCTION

The circular economy has emerged as a critical paradigm for global sustainable development, particularly in the intersection of ecotourism and organic agriculture. The Ellen MacArthur Foundation (2019) defines the circular economy as an economic model that uses resources efficiently through waste reduction, reuse, and recycling, creating sustainable value for both economy and environment [1]. Recent studies by Kirchherr et al. (2017) [2] demonstrate that circular economy applications in tourism can reduce waste by 40-45% and increase resource efficiency by 30%.

In Vietnam, the integration of ecotourism with organic agriculture has shown remarkable growth. According to the Ministry of Agriculture and Rural Development (2024) [3], organic agriculture area increased by 25% in 2023, reaching 100,000 hectares, with 65% combined with ecotourism activities. Research by Le and Nguyen (2023) indicates this model creates 40% higher economic value compared to conventional agriculture while contributing to environmental protection and sustainable community development [4].

Statistics from Vietnam National Administration of Tourism (2024) show that ecotourism combined with organic agriculture attracted 3.2 million visitors in 2023 [5], a 35% increase from the previous year. However, circular economy principle application remains limited. Tran and Le (2023) [6] found that only 30% of organic eco-agricultural tourism establishments fully implement circular economy principles, lower than the 55% Southeast Asian average.

International research by Korhonen et al. (2018) on circular economy impacts on sustainable tourism demonstrates that this model can help ecotourism destinations reduce operating costs by 50% and increase visitor satisfaction by 35% [7]. When combined with organic agriculture, economic and environmental efficiency multiplies through closed-loop value chain creation.

This research on circular economy impacts on ecotourism development associated with organic agriculture in Southeast Vietnam holds significant importance. Results will provide scientific foundation for policy development and solutions promoting sustainable development of organic eco-agricultural tourism following circular economy principles.

2. THEORETICAL BASIS AND RESEARCH OUTLINE

2.1. Theoretical Foundation

2.1.1. Circular Economy Theory

The circular economy represents a transformative economic paradigm that shifts from linear "take-make-dispose" models to regenerative systems designed to maximize resource productivity and eliminate waste. Blomsma and Brennan (2017) conceptualize the circular economy as a framework focused on prolonging resource utility through innovative design thinking and systemic approaches [8]: (1) Design out waste and pollution through strategic product development; (2) Keep products and materials in continuous use via reuse, repair, and recycling strategies; (3) Regenerate natural systems through restorative practices. Geissdoerfer et al. (2017) developed a theoretical framework for circular economy in tourism, emphasizing resource loop closure and emission reduction roles [9].

2.1.2. Ecotourism and Organic Agriculture Integration Theory

Ecotourism is defined as responsible travel to natural areas that conserves environment and improves local people's well-being (TIES, 2015) [10]. When combined with organic farming, this model creates added value through visitor experiences and high-quality agricultural products. Zhang et al. (2020) developed integrated ecotourism-organic agriculture theory, indicating this combination creates synergistic effects economically, socially, and environmentally [11].

2.2. Literature Review

Research on circular economy impacts on ecotourism associated with organic agriculture has flourished recently. Main research directions focus on: waste management's role in sustainable value creation, renewable energy's impact on operational efficiency, relationships between resource conservation and tourism development, green technology applications in tourist experience improvement, and sustainability certification importance.

Martinez et al. (2022) studied waste management and recycling roles in European ecotourism combined with organic agriculture [12]. Results show facilities applying circular waste management systems reduce waste treatment costs by 60% and create organic fertilizer sources for agricultural activities, increasing crop yields by 25%.

Luo et al. (2021) analyzed renewable energy impacts on ecotourism sustainable development [13]. Research demonstrates that solar, wind, and biomass energy use not only reduces CO_2 emissions by 70% but creates environmental highlights attracting eco-conscious tourists, increasing visitor numbers by 40% and revenue by 35%.

Bramwell and Lane (2013) researched natural resource conservation in ecotourism-organic agriculture development contexts [14]. They found destinations applying conservation principles had 45% higher biodiversity indices and attracted 50% more tourists than destinations without conservation strategies.

García-Pozo et al. (2018) focused on green technology's role in transforming ecotourism models [15]. Results show IoT, AI, and blockchain applications in organic farm management and tourism services can increase operational efficiency by 30% and reduce resource waste by 40%.

In Vietnam's context, Pham and Nguyen (2023) studied ecotourism establishments' readiness for circular economy-organic agriculture application [16]. Results show although 80% of businesses recognize benefits, only 35% actually implement due to capital and technology constraints.

Kumar and Patel (2022) developed frameworks assessing sustainability certification and traceability impacts on ecotourism development [17]. Research shows establishments with international sustainability certifications and transparent traceability systems attract 60% more international visitors and achieve 25-30% higher prices than non-certified establishments.

2.3. Research Model and Hypotheses

Based on the theory and overview of relevant studies, the author proposes a research model on the impact of circular economy on the development of ecotourism associated with organic agriculture in the Southeast region with 5 influencing factors including: (1) Waste Management and Recycling (WMR); (2) Use of renewable energy (REU); (3) Natural resource conservation (NRC); (4) Green Technology Application (GTA) and (5) Sustainability and Traceability Certification (SCT).

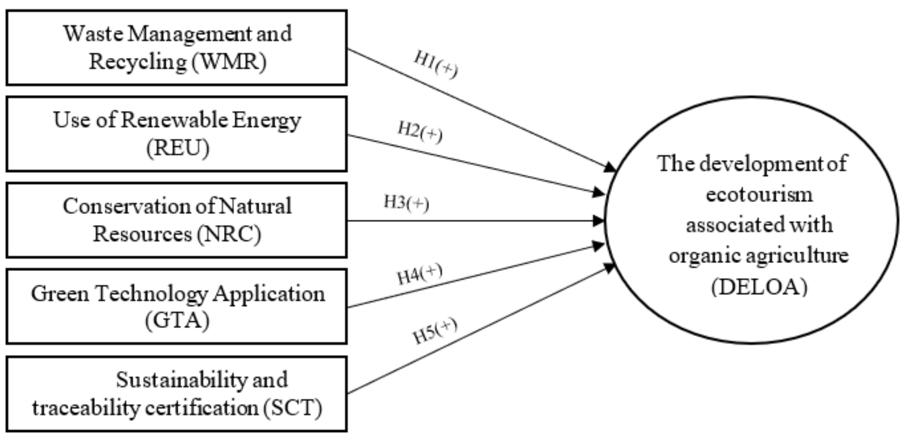

Figure 1. Proposed research model

Source: Recommended author

H1: WMR has the same relationship with the development of ecotourism associated with organic agriculture.

H2: REU has the same relationship with the development of ecotourism associated with organic agriculture.

H3: NRC has the same relationship with the development of ecotourism associated with organic agriculture.

H4: GTA has the same relationship with the development of ecotourism associated with organic agriculture.

H5: SCT has the same relationship with the development of ecotourism associated with organic agriculture.

3. METHODOLOGY

This study employs a mixed-methods approach combining qualitative and quantitative research. The qualitative phase conducted in-depth interviews with 15 experts and managers from ecotourism and organic agriculture businesses to refine measurement scales. Quantitative data was collected from 270 ecotourism establishments combined with organic agriculture in Southeast Vietnam through survey questionnaires from March 1-April 30, 2025, yielding 248 valid responses (91.85% response rate). Data analysis used SPSS 29.0 software.

4. RESULTS

4.1. Reliability Analysis

Cronbach's Alpha Reliability Test

The results of the Cronbach's Alpha test show that all factors have a Cronbach's Alpha coefficient > 0.7 and the total variable correlation coefficient of the observed variables > 0.3 (Table 1). Therefore, the measurement variables meet the reliability requirements and are used for exploratory factor analysis (EFA).

Table 1. Results of scale reliability analysis

TT	Factor	Initial Observation Variable	Remaining Observation Variables	Cronbach's Alpha Coefficient	Eliminated variables
1	Waste Management and Recycling (WMR)	*5*	*5*	*0,839*	
2	Use of Renewable Energy (REU)	*4*	*4*	*0,863*	
3	Conservation of Natural Resources (NRC)	*5*	*5*	*0,841*	
4	Green Technology Application (GTA)	*4*	*4*	*0,887*	
5	Sustainability and traceability (SCT) certification	*4*	*4*	*0,876*	
6	The development of ecotourism associated with organic agriculture (DELOA)	*5*	*5*	*0,757*	
Sum		**27**	**27**		

Source: Author (2025)

4.2. Exploratory Factor Analysis (EFA)

Table 2. KMO and Bartlett's Test for Independent Variables

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.849
Bartlett's Test of Sphericity	Approx. Chi-Square	3042.571
	Df	210
	Sig.	<.001

Source: Author (2025)

Table 3. Rotation matrix for independent variables

Rotated Component Matrixa					
	Component				
	1	2	3	4	5
REU2	.832				
REU3	.821				
REU5	.762				
REU4	.749				
REU1	.741				
GTA2		.866			
GTA4		.847			
GTA3		.839			
GTA1		.780			
NRC2			.812		
NRC4			.806		
NRC3			.798		
NRC1			.783		
WMR2				.836	
WMR4				.813	
WMR3				.804	
WMR1				.756	
SCT2					.827
SCT1					.758
SCT4					.756
SCT3					.699
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.					
a. Rotation converged in 5 iterations.					

Source: Author (2025)

Table 4: KMO testing and Bartlett's test for dependent variables

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.752
Bartlett's Test of Sphericity	Approx. Chi-Square	271.480
	Df	6
	Sig.	<.001

Source: Author (2025)

Table 5. Rotation matrix for dependent variables

Component Matrixa	
	Component
	1
DELOA3	.828
DELOA2	.826
DELOA1	.700
DELOA4	.687

Source: Author (2025)

For the dependent variable, the results show that KMO = 0.752 > 0.5, the factor analysis is appropriate. The Bartlett test has Sig. = 0.000 < 0.05. Eigenvalue coefficient = 2.330 > 1, indicating that the extraction factor has good significance. Total variance = 58.246% > 50%, meaning that 1 extraction factor explains 58.246% of the variation in the data.

4.3. Multiple Regression Analysis

Table 6. Regression results

Ingredient	Unadjusted coefficient		Adjusted multiplier	t	Significance Level – Sig.	Multiline statistics	
	B	Standard Error	Beta			Acceptance	VIF
Constant	-.266	.165		-1.613	.108		
WMR	.131	.034	.142	3.809	<.001	.852	1.174
REU	.340	.037	.357	9.119	<.001	.779	1.284
NRC	.290	.036	.312	8.167	<.001	.813	1.230
GTA	.221	.031	.280	7.061	<.001	.760	1.316
SCT	.137	.038	.167	3.575	<.001	.548	1.825
R2 adjustment = 0.68							
F = 114.155 (Sig. ANOVA = 0.01)							

Source: Author (2025)

The VIF variance magnification coefficient of the variables ranges from 1.174 to 1.825 < 3, indicating that there is no severe multi-collinear phenomenon. A corrected R^2 coefficient = 0.68 shows that the model explains 68% of the variability of the dependent variable.

ANOVA analysis shows that F = 114.155 with Sig. = 0.000 < 0.05, demonstrating that the regression model is consistent with the collected data and independent variables have an impact on the dependent variable.

The degree of influence of the factors is arranged in descending order through the normalized regression equation:

DELOA = -0.266 + 0.357×REU + 0.312×NRC + 0.280×GTA + 0.167×SCT + 0.142×WMR

5. DISCUSSION AND IMPLICATIONS

5.1. Renewable Energy Use (REU) Implications

REU shows strongest impact on ecotourism development with organic agriculture (Beta = 0.357). Establishments should prioritize diversified renewable energy system investments suitable for Southeast regional conditions.

Businesses should install solar power systems on rooftops, parking areas, greenhouses, and auxiliary structures. Recent studies indicate these systems can meet 60-80% of power needs, significantly reducing operating costs and carbon emissions. Simultaneously, developing biogas systems from agricultural by-products and organic waste provides cooking and hot water energy while creating high-quality organic fertilizers, implementing recycling principles.

Beyond production aspects, businesses should design renewable energy experiential tours allowing visitors to learn about and participate in clean energy production processes. This creates unique highlights while raising awareness and inspiring sustainable lifestyles.

5.2. Natural Resource Conservation (NRC) Implications

NRC is the second strongest factor (Beta = 0.312) affecting development. Establishments need comprehensive conservation strategies protecting and restoring natural ecosystems.

Establishing mini-sanctuaries maintaining natural ecosystems, biodiversity, and native species is essential. Businesses should create ecological corridors connecting natural areas, facilitating safe wildlife movement. Thompson and Bramwell (2013) research indicates destinations adopting conservation strategies have 45% higher biodiversity levels and attract 50% more visitors [18].

In agricultural production, applying regenerative farming methods like diversified crop rotation, cover cropping, and no-till soil management helps restore soil, increase water retention, and carbon sequestration.

5.3. Green Technology Application (GTA) Implications

GTA is the third important factor (Beta = 0.280). Businesses should actively invest in green technology improving operational efficiency and creating unique visitor experiences.

Primary focus should be developing IoT-based smart agriculture systems with sensor networks measuring soil moisture, temperature, and precipitation parameters. Combined with automatic drip irrigation and drone crop health monitoring, this technology optimizes water and fertilizer use while minimizing environmental impact.

5.4. Sustainability and Traceability Certification (SCT) Implications

SCT is the fourth factor (Beta = 0.167) in the development model. Establishments should pursue multi-certification strategies including international and domestic certifications like GSTC, USDA Organic, EU Organic, Fairtrade, VietGAP, and OCOP.

Building blockchain-based traceability systems allows visitors to scan QR codes on products accessing complete information about origin, production methods, farmers, certifications, and environmental impact.

5.5. Waste Management and Recycling (WMR) Implications

Despite lowest weight (Beta = 0.142), WMR remains integral to comprehensive circular economy strategies. Establishments should implement "Zero Waste" strategies with specific roadmaps and goals, eliminating single-use plastics and replacing with environmentally friendly materials.

Building innovative recycling centers transforming waste into artwork, handicrafts, and useful items creates additional income sources while providing educational visitor experiences.

6. CONCLUSIONS

This study identified five circular economy factors affecting ecotourism development associated with organic agriculture in Southeast Vietnam, ranked by impact strength: (1) Renewable Energy Use; (2) Natural Resource Conservation; (3) Green Technology Application; (4) Sustainability and Traceability Certification; (5) Waste Management and Recycling. The model explained 68% of dependent variable variance, demonstrating high relevance.

Results provide practical guidance for ecotourism establishments seeking sustainable development through circular economy principles. Future research should examine implementation barriers and success factors in different regional contexts.

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TÓM TẮT

TÁC ĐỘNG CỦA KINH TẾ TUẦN HOÀN ĐẾN SỰ PHÁT TRIỂN CỦA DU LỊCH SINH THÁI GẮN VỚI NÔNG NGHIỆP HỮU CƠ

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Bài viết tập trung phân tích tác động của mô hình kinh tế tuần hoàn đến sự phát triển của du lịch sinh thái kết hợp với nông nghiệp hữu cơ tại khu vực Đông Nam Bộ. Kết quả nghiên cứu đã xác định 5 yếu tố ảnh hưởng chính, bao gồm: (1) Quản lý chất thải và tái chế (WMR); (2) Sử dụng năng lượng tái tạo (REU); (3) Bảo tồn tài nguyên thiên nhiên (NRC); (4) Ứng dụng công nghệ xanh (GTA); và (5) Chứng nhận về tính bền vững và khả năng truy xuất nguồn gốc (SCT). Dựa trên các kết quả thu được, tác giả đề xuất một số giải pháp nhằm tăng cường ứng dụng mô hình kinh tế tuần hoàn, góp phần thúc đẩy phát triển bền vững loại hình du lịch sinh thái gắn với nông nghiệp hữu cơ tại khu vực nghiên cứu.

Từ khóa: Kinh tế tuần hoàn, du lịch sinh thái, nông nghiệp hữu cơ, quản lý chất thải, năng lượng tái tạo, công nghệ xanh.