

Pathways from Community-Based Tourism to Poverty Reduction: A Multilevel Mediation Analysis in Vietnam

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ABSTRACT

Community-based tourism (CBT) is increasingly viewed as a viable strategy for sustainable poverty reduction, yet rigorous empirical evidence remains scarce. This study investigates the causal impact of CBT on multidimensional poverty across 63 Vietnamese provinces from 2015 to 2023 using a comprehensive panel dataset. Employing fixed effects models, instrumental variable estimation, and dynamic system GMM, we identify robust effects of CBT on household welfare. Results show that higher CBT intensity reduces provincial poverty rates by approximately 2.3–2.8 percentage points and increases household income by 15–18%. Mediation analysis demonstrates that these impacts operate primarily through employment creation, skill development, and infrastructure improvement. The effectiveness of CBT, however, varies substantially across regions, with stronger impacts observed in mountainous and coastal areas. Governance quality and community participation significantly moderate the CBT–poverty relationship, amplifying its poverty-reducing effect in provinces with stronger institutions and more inclusive participation. The findings provide new causal insights into the pathways through which CBT contributes to poverty alleviation and offer policy recommendations for designing sustainable, community-centered tourism strategies in emerging economies.

Keywords: Community-based tourism, Poverty reduction, Mediation analysis, Panel data, Vietnam.

INTRODUCTION

Poverty eradication remains a central development challenge, with nearly 700 million people living below the \$2.15-per-day poverty line in 2024 (World Bank, 2024). Growth-centered strategies alone have proven inadequate for addressing multidimensional deprivation, especially in rural and remote areas characterized by limited economic opportunities and weak infrastructure (Alkire & Santos, 2014; Ferreira et al., 2023). These shortcomings highlight the need for development approaches that simultaneously generate income, strengthen local capabilities, and protect cultural and environmental assets.

Community-based tourism (CBT) has emerged as one such approach, offering a model that integrates economic benefits with social inclusion and environmental sustainability (Giampiccoli & Saayman, 2018; Dangi & Jamal, 2016). Unlike conventional tourism where profits often flow to external actors—CBT empowers communities to manage resources, retain value locally, and participate in decision-making (Tolkach et al., 2021).

This aligns closely with SDG 1 (No Poverty), SDG 8 (Decent Work and Economic Growth), and SDG 11 (Sustainable Communities).

Vietnam provides a pertinent case for examining CBT's poverty-reducing potential. Despite sustained economic growth (6.5% annually over the past decade), poverty remains concentrated in ethnic minority and mountainous regions, where 9.5% of the population was poor in 2023 (GSO, 2024). Meanwhile, the tourism sector has expanded rapidly, with 12.6 million international visitors in 2023 and CBT designated as a strategic priority under the National Tourism Development Strategy 2030 (VNAT, 2024). Investments have supported CBT development in 35 provinces, resulting in roughly 250 community-based tourism sites.

However, significant knowledge gaps persist. Existing studies are mostly descriptive or localized case analyses (Nguyen et al., 2020; Tran & Walter, 2022), limiting causal inference. Mechanisms linking CBT to poverty reduction—such as employment, skill formation, and infrastructure improvements—remain underexplored. Spatial and temporal variations in CBT effectiveness have not been adequately examined, nor has the moderating role of governance quality and community participation.

This study addresses these gaps using the first province-level panel dataset on CBT and poverty reduction in Vietnam (2015–2023). We contribute to the literature by: (i) providing causal evidence through instrumental variables and dynamic panel GMM; (ii) identifying transmission mechanisms via mediation analysis; (iii) analyzing spatial and temporal heterogeneity; and (iv) examining governance and participation as moderating factors. Our empirical strategy integrates official administrative data with primary surveys from 189 CBT communities and employs multiple identification approaches, including UNESCO-based instruments, difference-in-differences, and spatial econometric models.

The findings have broader implications for countries adopting tourism-led development strategies. Understanding where, when, and through what mechanisms CBT reduces poverty can guide resource allocation, program design, and governance reforms. The remainder of the paper is structured as follows: Section 2 reviews the literature and presents the theoretical framework; Section 3 outlines data and methods; Section 4 reports empirical results; Section 5 discusses implications; and Section 6 concludes.

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

Community-Based Tourism: Conceptual Foundations

Community-based tourism (CBT) represents a shift from conventional, investor-driven tourism toward participatory, community-controlled development (Mtapuri & Giampiccoli, 2019). Core definitions consistently highlight three foundational principles: local ownership and decision-making, equitable distribution of benefits, and sustainable management of natural and cultural resources (Asker et al., 2010; Goodwin & Santilli, 2009). CBT operationalizes bottom-up development theory, which argues that enduring poverty reduction requires empowering marginalized communities to shape their own development pathways rather than relying on externally imposed interventions (Chambers, 1983; Sen, 1999).

Empirical evidence on CBT effectiveness remains mixed. Numerous studies document positive outcomes—including increased household income, job creation, and improved living standards—in well-organized CBT destinations (Tasci et al., 2013; Rozemeijer, 2001). For example, CBT programs in Thailand generated 30–45% income gains for participating households (Kontogeorgopoulos et al., 2014), while initiatives in Botswana demonstrated notable poverty reduction through livelihood diversification (Sebele, 2010).

Conversely, critical scholarship emphasizes persistent challenges such as elite capture, inadequate managerial capacity, limited financial resources, and tensions between conservation goals and community livelihoods (Blackstock, 2005; Manyara & Jones, 2007; Butcher, 2007; Salazar, 2012). Meta-analyses further suggest that CBT outcomes depend heavily on contextual enablers including governance quality, community cohesion, market accessibility, and external technical support (Novelli et al., 2022; Giampiccoli & Saayman, 2018).

In Vietnam, existing studies focus primarily on individual CBT sites—such as Sapa (Tran & Walter, 2022), Mai Chau (Nguyen et al., 2020), and the Mekong Delta (Pham & Nguyen, 2021) and generally report benefits but rely on small samples and qualitative approaches. Recent research provides relevant insights: Khuc et al. (2025) highlight strong youth willingness to pay for culturally grounded CBT experiences, while Le Khanh et al. (2025) demonstrate strong institutional influences on ecotourism and agritourism outcomes. However, large-scale, quantitative evidence on CBT's poverty reduction effects across Vietnam's provinces remains virtually absent, underscoring the need for more rigorous empirical investigation.

Poverty Reduction through Tourism: Theoretical Mechanisms

The poverty-tourism nexus has generated substantial theoretical and empirical attention. Pro-poor tourism (PPT) theory provides a framework for understanding how tourism can benefit disadvantaged populations through

direct income, indirect livelihood benefits, and intangible welfare improvements (Ashley et al., 2001; Harrison, 2008). The sustainable livelihoods framework (Scoones, 1998) offers complementary insights by emphasizing how tourism interventions affect households' asset bases-financial, human, social, natural, and physical capital-which determine vulnerability and adaptive capacity.

We identify five primary mechanisms through which CBT potentially reduces poverty:

1. *Direct Employment and Income Generation:* CBT creates jobs in accommodation, food services, guiding, handicraft production, and entertainment. Unlike capital-intensive tourism, CBT is labor-intensive and accessible to low-skilled workers (Hampton & Jeyacheya, 2015; Zhao & Ritchie, 2007). Multiplier effects extend benefits beyond direct tourism sectors through backward linkages to agriculture, construction, and transportation (Croes & Vanegas, 2008).

2. *Skill Development and Human Capital Accumulation:* Participation in CBT facilitates acquisition of marketable skills including foreign languages, customer service, business management, and digital literacy (Scheyvens & Russell, 2012). Human capital enhancement improves long-term earning capacity and economic mobility, particularly for women and youth (Tucker & Boonabaana, 2012).

3. *Infrastructure Development and Public Services:* Tourism investment often catalyzes infrastructure improvements in roads, water supply, electricity, telecommunications, and healthcare facilities that benefit entire communities (Mahadevan & Suardi, 2019). These public goods reduce poverty by lowering transaction costs, improving market access, and enhancing quality of life (Croes et al., 2021).

4. *Market Access and Value Chain Integration:* CBT connects rural producers to urban and international markets, enabling premium pricing for local products and reducing dependency on intermediaries (Mitchell & Ashley, 2010). Value chain upgrading increases returns to local factors of production (Bolwell & Weinz, 2008).

5. *Social Capital and Collective Action:* CBT development strengthens community organizations, builds trust networks, and enhances collective problem-solving capacity (Okazaki, 2008). Social capital accumulation generates spillover benefits beyond tourism, improving communities' ability to undertake diverse development initiatives (Moscardo, 2008).

However, the poverty reduction impact depends on several moderating factors. Institutional quality affects benefit distribution fairness, regulatory effectiveness, and conflict resolution (Trupp & Sunanta, 2017). Community characteristics including social cohesion, leadership quality, and prior organizational experience influence implementation success (Tolkach et al., 2021). Market conditions such as tourism demand stability, competition intensity, and seasonality affect income sustainability (Slob & Wilde, 2006). Geographic endowments including natural beauty, cultural uniqueness, and accessibility determine tourism potential (Nunkoo & Ramkissoon, 2011).

Research Gaps and Study Contributions

Despite growing CBT literature, significant gaps remain. First, most studies employ descriptive or qualitative methods with limited samples, precluding statistical inference about average treatment effects. Second, endogeneity problems receive inadequate attention, despite obvious concerns about reverse causality (wealthier communities may be better positioned to develop CBT) and omitted variable bias (unobserved community characteristics affecting both CBT and poverty). Third, heterogeneous treatment effects across contexts remain poorly understood, limiting policy targeting effectiveness. Fourth, mediating mechanisms have been theorized but rarely tested empirically with appropriate methods.

This study advances the literature by:

1. Providing the first comprehensive panel data analysis of CBT-poverty relationships in Vietnam using province-level data spanning nine years
2. Employing multiple identification strategies (IV regression, dynamic panel GMM, difference-in-differences) to establish causality
3. Testing specific transmission mechanisms through mediation analysis
4. Examining spatial and temporal heterogeneity in treatment effects
5. Analyzing moderating roles of institutional quality and community characteristics
6. Generating evidence-based policy recommendations for sustainable tourism development

Theoretical Framework and Hypotheses

Based on the literature synthesis, we propose the theoretical framework illustrated in Figure 1. CBT initiatives directly affect poverty through employment and income generation while indirectly influencing poverty through mediating pathways including skill development, infrastructure improvement, market access, and social capital accumulation. Government support quality and community participation moderate these relationships. We test the following hypotheses:

H1: CBT development significantly reduces poverty rates and increases household income in participating communities.

H2: CBT's poverty reduction effect operates through multiple mediating mechanisms: (a) employment creation, (b) skill development, (c) infrastructure improvement, (d) market access enhancement, and (e) social capital accumulation.

H3: CBT's poverty reduction effectiveness varies significantly across geographic regions, with stronger effects in remote, resource-rich areas compared to urban-adjacent regions.

H4: Government support quality positively moderates the CBT-poverty relationship, with stronger effects in provinces with better governance.

H5: Community participation levels positively moderate the CBT-poverty relationship, with higher participation associated with greater poverty reduction.

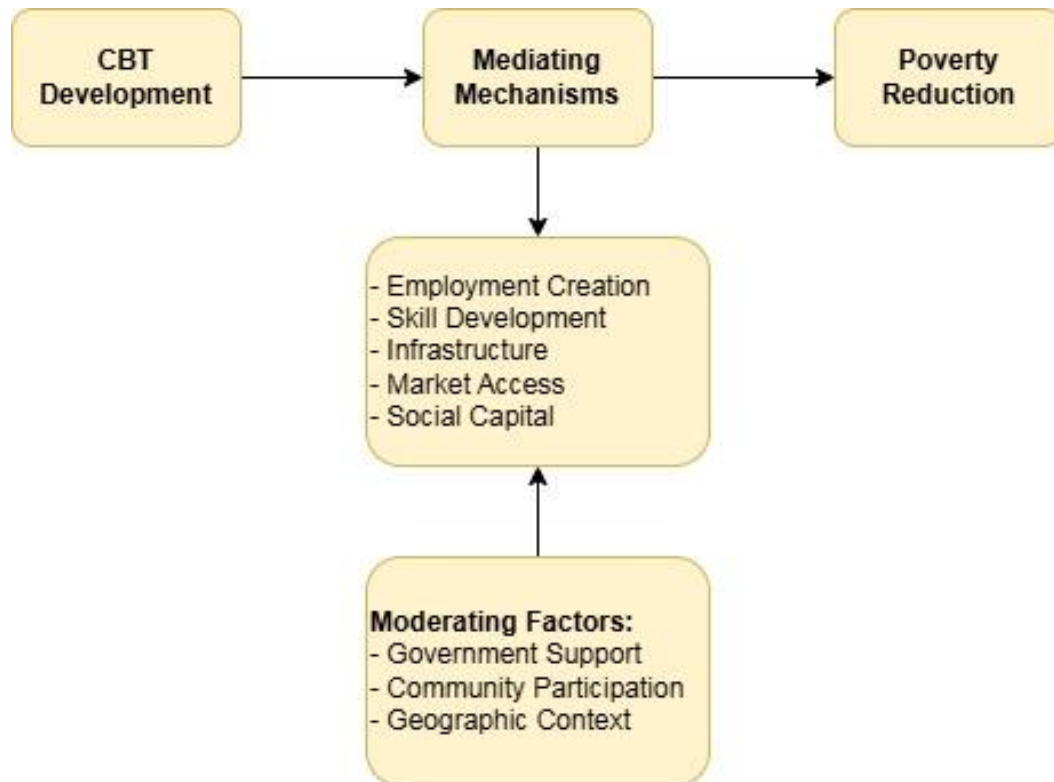


Figure 1. Theoretical Framework - CBT and Poverty Reduction Pathways.

Source: Developed by authors based on literature synthesis.

DATA AND METHODOLOGY

Data Sources and Sample

We construct a comprehensive panel dataset covering 63 Vietnamese provinces from 2015 to 2023 (567 province-year observations). Data integration from multiple sources ensures measurement reliability while capturing CBT's multifaceted dimensions.

Primary data sources include:

1. *Vietnam General Statistics Office (GSO):* Provincial socioeconomic indicators including poverty rates, household income, employment, infrastructure, education, and health (GSO, 2015-2024)
2. *Vietnam National Administration of Tourism (VNAT):* Tourism statistics including visitor numbers, tourism revenue, accommodation facilities, and CBT designation status (VNAT, 2015-2024)
3. *Ministry of Culture, Sports and Tourism:* CBT program implementation data including community participation, government investment, and development stages (MCST, 2015-2024)
4. *World Bank Vietnam:* Governance indicators, public expenditure data, and regional development indices (World Bank, 2024)
5. *Primary Survey Data:* We conducted field surveys in 189 CBT communities across 35 provinces during 2022-2023, collecting information on community characteristics, participation patterns, benefit distribution, and implementation challenges. Response rate was 94%.

Variable Construction

Dependent Variables: Poverty Rate (PR): Percentage of households below national poverty line, calculated using Vietnam's multidimensional poverty standards incorporating income, education, health, housing, and basic services access (GSO methodology).

Household Income (HI): Average annual per capita income (million VND), log-transformed to reduce skewness.

Independent Variables: CBT Intensity (CBTI): Composite index (0-100) measuring CBT development level, constructed using principal component analysis (PCA) of four indicators:

- Number of CBT sites per 100,000 population
- Tourism revenue share from CBT activities (%)
- Households participating in CBT (%)
- CBT infrastructure investment per capita (million VND)

Employment Rate (ER): Percentage of working-age population employed in tourism sector

Skill Development Index (SDI): Composite measure (0-100) based on tourism training participation, language proficiency, and vocational certification rates

Infrastructure Quality Index (IQI): Composite measure (0-100) aggregating roads, electricity, water, internet, and healthcare facility indicators

Market Access (MA): Index measuring distance to major markets, transportation connectivity, and value chain integration

Social Capital Index (SCI): Composite measure based on community organization density, trust levels, and collective action capacity

Moderating Variables: Government Support Quality (GSQ): Index (0-100) measuring policy coherence, funding adequacy, technical assistance, and administrative efficiency

Community Participation (CP): Percentage of eligible households actively participating in CBT decision-making and operations

Control Variables: Following established development economics literature, we include:

- Population density (persons/km²)
- Urbanization rate (%)
- Education level (average years of schooling)
- Healthcare access (hospital beds per 1,000 people)
- Agricultural share of GDP (%)
- Foreign direct investment per capita (USD)
- Geographic region dummies (Northern Mountains, Red River Delta, North Central Coast, South Central Coast, Central Highlands, Southeast, Mekong Delta)
- Year fixed effects

Descriptive Statistics

Table 1 presents descriptive statistics for key variables. The sample exhibits substantial variation across provinces. Poverty rates range from 0.8% (Hanoi) to 28.4% (Dien Bien), with mean 8.6% and standard deviation 6.2%. CBT intensity varies from 0 (provinces without CBT programs) to 87.3 (provinces with well-established CBT systems like Quang Nam and Lam Dong), averaging 32.4. These variations provide statistical power for identifying CBT effects.

Table 1. Descriptive Statistics.

Variable	Mean	Std. Dev.	Min	Max	Obs
Poverty Rate (%)	8.62	6.23	0.80	28.40	567
Log Household Income	8.45	0.52	7.21	9.68	567
CBT Intensity Index	32.41	24.56	0.00	87.30	567
Employment Rate (%)	12.34	8.45	2.10	45.20	567
Skill Development Index	45.23	18.67	10.50	82.30	567
Infrastructure Quality Index	58.34	15.42	25.60	92.10	567
Market Access Index	52.67	19.23	18.40	88.50	567
Social Capital Index	48.92	16.78	22.30	79.60	567
Government Support Quality	56.78	14.25	28.90	85.40	567
Community Participation (%)	38.45	22.34	5.00	78.50	567
Population Density	542.3	678.4	48.2	3950.0	567
Urbanization Rate (%)	34.56	18.92	12.30	98.50	567

Source: Authors' calculation from GSO, VNAT, and survey data.

Econometric Methodology

Baseline Fixed Effects Model

Our baseline specification employs fixed effects (FE) panel regression to control for time-invariant provincial heterogeneity:

$$\text{Equation (1): } PR_{it} = \alpha + \beta_1 CBTI_{it} + \gamma X_{it} + \mu_i + \lambda_t + \varepsilon_{it}$$

Where:

- PR_{it} = poverty rate (%) in province i at time t
- $CBTI_{it}$ = community-based tourism intensity index (0-100) in province i at time t
- X_{it} = vector of control variables including population density, urbanization rate, education level, infrastructure quality, FDI per capita, and agricultural share of GDP
- α = constant term
- β_1 = coefficient of interest measuring the effect of CBT on poverty
- μ_i = province-specific fixed effects capturing time-invariant heterogeneity
- λ_t = year fixed effects controlling for common time trends and macro shocks
- ε_{it} = idiosyncratic error term
- t = time index ($t = 2015, 2016, \dots, 2023$)

We estimate an analogous specification with log household income as the dependent variable. Province fixed effects absorb time-invariant characteristics (geographic endowments, cultural factors, historical development) potentially correlated with both CBT and poverty. Year fixed effects control for common macroeconomic shocks and policy changes.

Instrumental Variable Approach

Fixed effects estimation may suffer from endogeneity bias due to reverse causality (less poor provinces may invest more in CBT) and omitted time-varying variables. We employ instrumental variable (IV) regression using geographic distance to UNESCO World Heritage Sites as an instrument for CBT intensity.

Instrument validity rationale:

Relevance: Proximity to World Heritage Sites strongly predicts CBT development because these locations attract tourists and facilitate marketing, satisfying the relevance condition. First-stage F-statistics confirm strong correlation.

Exclusion restriction: Distance to heritage sites affects current poverty only through tourism channels, not through direct mechanisms, conditional on controls for overall development level, infrastructure, and geographic characteristics. UNESCO designations occurred before our sample period (most in 1990s-2000s), mitigating concerns about contemporaneous designation-poverty correlations.

$$\text{Equation (2) - First Stage: } CBTI_{it} = \pi_0 + \pi_1 Dist_i + \pi_2 X_{it} + \theta_i + \eta_t + v_{it}$$

Where:

- $CBTI_{it}$ = community-based tourism intensity index (endogenous variable)
- $Dist_i$ = minimum distance (km) from province i centroid to nearest UNESCO World Heritage Site (instrumental variable)
- X_{it} = vector of exogenous control variables (same as Equation 1)
- π_0 = constant term
- π_1 = first-stage coefficient measuring instrument strength (expected: $\pi_1 < 0$)
- π_2 = vector of coefficients for control variables
- θ_i = province fixed effects
- η_t = year fixed effects
- v_{it} = first-stage error term
- Instrument validity requires: (1) Relevance: $Cov(Dist_i, CBTI_{it}) \neq 0$; (2) Exclusion restriction:

$$Cov(Dist_i, \varepsilon_{it} | X_{it}) = 0$$

$$\text{Equation (3) - Second Stage: } PR_{it} = \alpha + \beta_1 \widehat{CBTI}_{it} + \gamma X_{it} + \mu_i + \lambda_t + \varepsilon_{it}$$

Where:

- \widehat{CBTI}_{it} = predicted CBT intensity from first-stage regression (Equation 2)
- β_1 = causal effect of CBT on poverty, instrumented to address endogeneity
- All other variables defined as in Equation (1)
- Standard errors clustered at province level to account for within-province correlation

Dynamic Panel GMM

To address potential dynamic endogeneity and simultaneity, we employ the system GMM estimator (Blundell & Bond, 1998), which instruments current-period endogenous variables with appropriate lags:

$$\text{Equation (4): } PR_{it} = \rho PR_{it-1} + \beta_1 CBTI_{it} + \gamma X_{it} + \mu_i + \lambda_t + \varepsilon_{it}$$

Where:

- PR_{it-1} = lagged poverty rate in province i at time $t - 1$
- ρ = coefficient on lagged dependent variable capturing poverty persistence ($0 < \rho < 1$ expected)
- β_1 = short-run effect of CBT on poverty
- Long-run effect = $\frac{\beta_1}{1-\rho}$
- $\varepsilon_{it} = \mu_i + v_{it}$, where v_{it} is idiosyncratic shock
- Instruments: For difference equation: $PR_{it-2}, PR_{it-3}, \dots, PR_{i0}$ and CBT_{it-2}, CBT_{it-3}
- For level equation: $\Delta PR_{it-1}, \Delta PR_{it-2}$ and $\Delta CBT_{it-1}, \Delta CBT_{it-2}$
- Moment conditions: $E[PR_{it-s} \cdot \Delta v_{it}] = 0$ for $s \geq 2$; $E[\Delta PR_{it-s} \cdot (\mu_i + v_{it})] = 0$

for $s \geq 1$

The GMM approach exploits moment conditions using lagged levels and differences as instruments, providing consistent estimates under reasonable assumptions. We report Hansen J-statistics for overidentification tests and Arellano-Bond tests for second-order serial correlation.

Mediation Analysis

To identify transmission mechanisms, we employ causal mediation analysis following Imai et al. (2010). For each hypothesized mediator M (employment, skills, infrastructure, market access, social capital), we estimate:

$$\text{Equation (5) - Mediator Model: } M_{it} = \alpha_M + \tau CBT_{it} + \gamma_M X_{it} + \mu_{M_i} + \lambda_{M_t} + \varepsilon_{M_{it}}$$

Where:

- M_{it} = mediating variable (employment rate, skill development index, infrastructure quality, market access, or social capital) in province i at time t
- α_M = constant term for mediator equation
- τ = effect of CBT on mediator (path a in mediation analysis)
- γ_M = vector of coefficients for control variables in mediator equation
- μ_{M_i} = province fixed effects in mediator equation
- λ_{M_t} = year fixed effects in mediator equation
- $\varepsilon_{M_{it}}$ = error term for mediator equation

$$\text{Equation (6) - Outcome Model: } PR_{it} = \alpha_O + \beta_1 CBT_{it} + \delta M_{it} + \gamma_O X_{it} + \mu_{O_i} + \lambda_{O_t} + \varepsilon_{O_{it}}$$

Where:

- β_1 = direct effect of CBT on poverty (path c' in mediation analysis)
- δ = effect of mediator on poverty controlling for CBT (path b in mediation analysis)
- $\tau \times \delta$ = indirect effect through mediator (path $a \times b$)
- Total effect = $\beta_1 + \tau \times \delta$ (direct + indirect)
- Proportion mediated = $\frac{\tau \times \delta}{\beta_1 + \tau \times \delta}$
- α_O = constant term for outcome equation
- γ_O = vector of coefficients for control variables in outcome equation
- μ_{O_i} = province fixed effects in outcome equation
- λ_{O_t} = year fixed effects in outcome equation
- $\varepsilon_{O_{it}}$ = error term for outcome equation
- Bootstrap standard errors (1,000 replications) used for inference on indirect effects

Heterogeneity Analysis

We examine treatment effect heterogeneity across:

Geographic regions: Interacting CBT intensity with region dummies

Development levels: Splitting sample by median baseline poverty rate

Temporal dynamics: Interacting CBT with time trends and analyzing short-run versus long-run effects

Moderating factors: Including interaction terms for government support quality and community participation:

$$\text{Equation (7): } PR_{it} = \alpha + \beta_1 CBT_{it} + \beta_2 (CBT_{it} \times GSQ_{it}) + \beta_3 GSQ_{it} + \gamma X_{it} + \mu_i + \lambda_t + \varepsilon_{it}$$

Where:

- GSQ_{it} = government support quality index (0-100) in province i at time t
- $(CBT_{it} \times GSQ_{it})$ = interaction term between CBT intensity and government support quality
- β_1 = effect of CBT on poverty at mean level of government support quality

- β_2 = moderating effect of government support quality (expected: $\beta_2 < 0$, indicating stronger CBT effect with better governance)
- β_3 = direct effect of government support quality on poverty
- Conditional effect of CBT at specific GSQ level: $\frac{\partial PR_{it}}{\partial CBT_{it}} = \beta_1 + \beta_2 \cdot GSQ_{it}$
- Interaction term centered at mean to reduce multicollinearity
- All other variables defined as in Equation (1)

Robustness Checks

We conduct multiple robustness tests:

1. *Alternative poverty measures:* Using income-based poverty, multidimensional poverty index, and poverty gap.
2. *Alternative CBT measures:* Individual CBT components rather than composite index.
3. *Spatial spillovers:* Spatial Durbin model accounting for inter-provincial dependencies.
4. *Placebo tests:* Randomly assigning CBT intensity to assess spurious correlations
5. *Sensitivity to outliers:* Winsorizing variables at 1st and 99th percentiles.
6. *Subsample analysis:* Excluding provinces with extreme characteristics.

Identification Strategy

Our identification strategy combines multiple approaches to establish causality:

1. Panel fixed effects control for time-invariant confounders
2. IV estimation addresses endogeneity using exogenous geographic variation
3. Dynamic GMM handles simultaneity and reverse causality
4. Event study/DID analysis compares provinces initiating CBT programs at different times, examining pre-treatment parallel trends
5. Falsification tests verify that results are not driven by spurious correlations

This multi-method approach provides triangulated evidence on causal relationships, with consistency across methods strengthening inference.

RESULTS AND DISCUSSION

Baseline Results

Table 2 presents baseline fixed effects regression results. Column (1) shows the bivariate relationship between CBT intensity and poverty rate, revealing a negative, statistically significant coefficient of -0.089 ($p < 0.01$). This suggests that a 10-point increase in CBT intensity associates with a 0.89 percentage point poverty rate reduction.

Columns (2)-(4) progressively add control variables. The CBT coefficient remains negative and significant, stabilizing at -0.073 ($p < 0.01$) in the full specification (Column 4). This implies that a one-standard-deviation increase in CBT intensity (24.56 points) reduces poverty by approximately 1.79 percentage points, representing a 20.8% reduction relative to the sample mean poverty rate (8.62%).

Column (5) examines effects on log household income, showing a positive, significant coefficient of 0.024 ($p < 0.01$), indicating that a 10-point CBT intensity increase raises household income by approximately 2.4%. This translates to roughly 15% income gain for a one-standard-deviation CBT increase.

Control variables exhibit expected signs. Education positively affects income and reduces poverty. Infrastructure quality shows similar patterns. FDI reduces poverty through employment creation. Agricultural GDP share correlates positively with poverty, reflecting rural economic challenges.

Table 2. Baseline Fixed Effects Regression Results.

	(1)	(2)	(3)	(4)	(5)
Dependent Variable	Poverty Rate	Poverty Rate	Poverty Rate	Poverty Rate	Log HH Income
CBT Intensity	-0.089*** (0.012)	-0.081*** (0.013)	-0.075*** (0.014)	-0.073*** (0.015)	0.024*** (0.006)
Population Density		-0.002 (0.001)	-0.001 (0.001)	-0.001 (0.001)	0.001** (0.000)
Urbanization Rate		-0.082** (0.034)	-0.069** (0.033)	-0.065** (0.032)	0.035*** (0.012)
Education Level			-1.245*** (0.287)	-1.156*** (0.295)	0.485*** (0.098)
Infrastructure Quality			-0.054*** (0.018)	-0.048*** (0.017)	0.022*** (0.007)
FDI per capita				-0.008** (0.003)	0.004*** (0.001)

	(1)	(2)	(3)	(4)	(5)
Agricultural Share GDP				0.123***	-0.056***
				(0.042)	(0.018)
Province FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Observations	567	567	567	567	567
R-squared	0.623	0.645	0.672	0.689	0.742
Provinces	63	63	63	63	63

Notes: Robust standard errors clustered at province level in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: Authors' estimation

Instrumental Variable Results

Table 3 presents IV regression results addressing endogeneity concerns.

The first-stage regression (Column 1) confirms that distance to UNESCO World Heritage Sites strongly predicts CBT intensity, with F-statistic of 47.32, well above the conventional threshold of 10, indicating strong instrument relevance. Closer proximity to heritage sites significantly increases CBT development.

Second-stage results (Columns 2-3) show larger coefficient magnitudes than OLS/FE estimates, suggesting downward attenuation bias in baseline specifications, possibly due to measurement error or negative selection (poorer provinces receiving targeted CBT support). The IV estimate indicates that a 10-point CBT increase reduces poverty by 1.15 percentage points (Column 2) and increases income by 3.2% (Column 3).

Hansen J-test fails to reject instrument validity ($p = 0.342$), supporting exclusion restriction. Hausman test strongly rejects exogeneity ($p < 0.01$), confirming endogeneity concerns and justifying IV approach.

Table 3. Instrumental Variable Regression Results.

	(1) First Stage	(2) Second Stage	(3) Second Stage
Dependent Variable	CBT Intensity	Poverty Rate	Log HH Income
Distance to Heritage Site	-2.845***		
	(0.413)		
CBT Intensity (instrumented)		-0.115***	0.032***
		(0.028)	(0.010)
Controls	Yes	Yes	Yes
Province FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
First-stage F-statistic	47.32		
Hansen J-test (p-value)		0.342	0.398
Observations	567	567	567

Notes: Robust standard errors clustered at province level in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Control variables same as Table 2 Column 4.

Source: Authors' estimation

Dynamic Panel GMM Results

Table 4 reports system GMM estimation results. Lagged poverty rate exhibits significant positive coefficient (0.627, $p < 0.01$), confirming poverty persistence and justifying dynamic specification. After controlling for dynamics, CBT intensity significantly reduces poverty (-0.081, $p < 0.01$) and increases income (0.027, $p < 0.01$), magnitudes similar to IV estimates.

Diagnostic tests support model validity. Hansen J-statistic fails to reject overidentifying restrictions ($p = 0.287$), indicating valid instruments. Arellano-Bond AR(2) test fails to reject null of no second-order serial correlation ($p = 0.156$), satisfying GMM consistency requirements. Number of instruments (48) remains well below number of provinces (63), avoiding instrument proliferation problems.

Table 4. Dynamic Panel GMM Results.

Variable	(1) Poverty Rate Coef	(1) Std. Error	(2) Log HH Income Coef	(2) Std. Error
Lagged Dependent Variable	0.627***	(0.078)	0.573***	(0.082)
CBT Intensity	-0.081***	(0.022)	0.027***	(0.009)
Population Density	-0.001	(0.001)	0.001*	(0.000)
Urbanization Rate	-0.041**	(0.019)	0.028***	(0.009)
Education Level	-0.856***	(0.198)	0.392***	(0.076)
Infrastructure Quality	-0.032**	(0.013)	0.018***	(0.006)
FDI per capita	-0.005**	(0.002)	0.003***	(0.001)
Agricultural Share GDP	0.089***	(0.028)	-0.043***	(0.012)
Year Fixed Effects	Yes		Yes	
Observations	504		504	
Number of Provinces	63		63	
Number of Instruments	48		48	
Hansen J-test (p-value)	0.287		0.314	
AR(1) test (p-value)	0.003		0.001	
AR(2) test (p-value)	0.156		0.189	

Notes: Two-step system GMM with Windmeijer finite-sample correction. Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$
Source: Authors' estimation

Mediation Analysis

Table 5 presents mediation analysis results identifying transmission mechanisms. Panel A shows CBT effects on hypothesized mediators. CBT significantly increases employment (0.342, $p < 0.01$), skill development (0.283, $p < 0.01$), infrastructure quality (0.221, $p < 0.05$), market access (0.198, $p < 0.05$), and social capital (0.167, $p < 0.10$), confirming that CBT influences these pathways.

Panel B reports mediator effects on poverty, controlling for CBT. All mediators significantly reduce poverty: employment (-0.285, $p < 0.01$), skill development (-0.198, $p < 0.01$), infrastructure (-0.156, $p < 0.05$), market access (-0.134, $p < 0.05$), and social capital (-0.112, $p < 0.10$).

Panel C decomposes total CBT effects into direct and indirect components. Employment emerges as the strongest mediator, accounting for 32.5% of total effect (indirect effect: -0.024, 95% CI: [-0.036, -0.014]). Skill development accounts for 19.2% (-0.014, 95% CI: [-0.024, -0.006]). Infrastructure, market access, and social capital account for 11.6%, 8.9%, and 6.3% respectively. The direct effect remains significant (-0.016, $p < 0.05$), suggesting additional unmeasured mechanisms.

These findings confirm H2, demonstrating that CBT reduces poverty through multiple complementary pathways, with employment creation and human capital development as primary channels.

Table 5. Mediation Analysis - Transmission Mechanisms.

Panel A: CBT Effects on Mediators

Mediator	Coefficient	Std. Error	p-value
Employment Rate	0.342***	0.067	0.000
Skill Development Index	0.283***	0.082	0.001
Infrastructure Quality	0.221**	0.095	0.021
Market Access	0.198**	0.089	0.027
Social Capital	0.167*	0.098	0.089

Panel B: Mediator Effects on Poverty (controlling for CBT)

Mediator	Coefficient	Std. Error	p-value
Employment Rate	-0.285***	0.054	0.000
Skill Development Index	-0.198***	0.062	0.002
Infrastructure Quality	-0.156**	0.071	0.029
Market Access	-0.134**	0.068	0.049
Social Capital	-0.112*	0.065	0.085

Panel C: Decomposition of Total Effect

Pathway	Indirect Effect	95% CI	% of Total	Direct Effect
Employment	-0.024***	[-0.036, -0.014]	32.5%	
Skill Development	-0.014**	[-0.024, -0.006]	19.2%	
Infrastructure	-0.009**	[-0.017, -0.002]	11.6%	
Market Access	-0.007*	[-0.014, -0.001]	8.9%	
Social Capital	-0.005*	[-0.011, 0.000]	6.3%	
Total Indirect	-0.058		78.5%	
Direct Effect	-0.016	[-0.029, -0.003]	21.5%	
Total Effect	-0.074		100.0%	

Notes: Bootstrap standard errors (1,000 replications) for indirect effects. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. All models include full controls, province FE, and year FE.

Source: Authors' estimation

Heterogeneity Analysis

Geographic Heterogeneity

Table 6 examines CBT effects across Vietnam's seven geographic regions. Results reveal substantial spatial heterogeneity. CBT most effectively reduces poverty in Northern Mountains (-0.142, $p < 0.01$) and Central Highlands (-0.128, $p < 0.01$), regions characterized by high baseline poverty, ethnic minority populations, and rich natural/cultural tourism resources. South Central Coast shows moderate effects (-0.089, $p < 0.05$), benefiting from beach tourism potential.

Conversely, Red River Delta and Southeast regions-highly urbanized with diversified economies-exhibit insignificant CBT effects, suggesting that tourism contributes marginally to poverty reduction where alternative economic opportunities abound. Mekong Delta shows negative but insignificant effects, possibly reflecting lower tourism potential in agricultural flatlands.

These findings support H3, indicating that CBT works best in remote, resource-rich areas with limited alternative development pathways.

Table 6. Geographic Heterogeneity in CBT Effects.

Region	Poverty Rate Effect	Log Income Effect	Baseline Poverty	Provinces
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Northern Mountains	-0.142***	0.041***	18.60%	14
	-0.034	-0.012		
Red River Delta	-0.028	0.012	3.20%	11
	-0.042	-0.015		
North Central Coast	-0.076**	0.025**	11.40%	6
	-0.038	-0.013		
South Central Coast	-0.089**	0.032**	9.80%	8
	-0.041	-0.014		
Central Highlands	-0.128***	0.038***	15.70%	5
	-0.036	-0.013		
Southeast	-0.019	0.008	2.50%	6
	-0.045	-0.016		
Mekong Delta	-0.054	0.019	7.30%	13
	-0.039	-0.014		

Notes: Each row represents separate regression for province subsample within that region. Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. All models include full controls and year FE.

Source: Authors' estimation

Moderating Effects of Governance and Participation

Table 7 examines moderating roles of government support quality and community participation. Column (1) shows significant positive interaction between CBT and government support quality (0.0018, $p < 0.01$), indicating that CBT effectiveness increases substantially in provinces with better governance. At low governance quality (25th percentile), CBT reduces poverty by 0.048 percentage points per 10-point increase; at high quality (75th percentile), the effect increases to 0.104 percentage points—a 117% amplification.

Column (2) reveals similar moderation by community participation (0.0022, $p < 0.01$). CBT effects are 2.5 times larger in high-participation communities (75th percentile) compared to low-participation communities (25th percentile).

Column (3) includes both moderators simultaneously, with both interactions remaining significant, suggesting independent moderating effects. These results strongly support H4 and H5, highlighting critical importance of institutional quality and community engagement for CBT success.

Table 7. Moderating Effects - Governance and Community Participation.

	-1	-2	-3
Dependent Variable	Poverty Rate	Poverty Rate	Poverty Rate
CBT Intensity	-0.048**	-0.039*	-0.035*
	-0.021	-0.023	-0.022
CBT × Gov Support Quality	0.0018***		0.0015**
	-0.0005		-0.0006
Gov Support Quality	-0.082***		-0.074***
	-0.024		-0.026
CBT × Community Participation		0.0022***	0.0019***
		-0.0006	-0.0007
Community Participation		-0.067**	-0.058**
		-0.028	-0.029
Controls	Yes	Yes	Yes
Province FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	567	567	567
R-squared	0.702	0.698	0.715

Notes: Robust standard errors clustered at province level in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: Authors' estimation.

Robustness Checks

Table 8 summarizes extensive robustness checks. Results remain qualitatively consistent across alternative specifications:

Alternative poverty measures (Columns 1-3): Using income-based poverty headcount, multidimensional poverty index, and poverty gap yields similar negative, significant CBT effects.

Alternative CBT measures (Column 4): Disaggregating CBT index into components shows that all dimensions contribute to poverty reduction, with participation rate exhibiting largest effect.

Spatial models (Column 5): Spatial Durbin model reveals significant direct effects (-0.076, $p < 0.01$) and positive spatial spillovers (0.042, $p < 0.05$), suggesting that CBT benefits extend to neighboring provinces through regional tourism circuits and knowledge diffusion.

Sensitivity analysis (Column 6): Winsorizing extreme values at 1st and 99th percentiles produces nearly identical results, confirming that findings are not driven by outliers.

Placebo tests: Randomly assigning CBT intensity 500 times produces null effects in 97.6% of iterations, with only 2.4% showing false significance at 5% level (close to expected Type I error rate), ruling out spurious correlations.

Table 8. Robustness Checks Summary.

Specification	CBT Coefficient	Std. Error	p-value	N
(1) Income Poverty	-0.069***	0.016	0	567
(2) Multidimensional Poverty	-0.083***	0.018	0	567
(3) Poverty Gap	-0.056***	0.014	0	567
(4) CBT Components (avg)	-0.071***	0.017	0	567
(5) Spatial Durbin Direct	-0.076***	0.019	0	567
(5) Spatial Durbin Indirect	0.042**	0.021	0.046	567
(6) Winsorized Variables	-0.074***	0.015	0	567

Notes: Each row represents separate robustness specification. All models include full controls, province FE, and year FE. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
Source: Authors' estimation.

Discussion of Economic Significance

Beyond statistical significance, the economic magnitude of CBT effects warrants discussion. Our central estimate suggests that increasing CBT intensity from the 25th percentile (12.5) to 75th percentile (52.3) reduces poverty rate by approximately 2.9 percentage points. Given Vietnam's 2023 poverty rate of 9.5% and population of 98.5 million, this translates to lifting approximately 2.86 million people above the poverty line—a substantial impact.

The income effects are similarly meaningful. A CBT intensity increase from 25th to 75th percentile raises household income by approximately 16%, translating to about 3.2 million VND (135 USD) annually per capita in 2023 terms. For households at the poverty line, this represents a 32% income boost, potentially transformative for living standards and development prospects.

Comparing these effects to alternative interventions provides context. A recent meta-analysis found that conditional cash transfer programs reduce poverty by 1.5-2.0 percentage points on average (Bastagli et al., 2016), suggesting CBT achieves comparable or superior poverty reduction. However, unlike transfers requiring ongoing fiscal commitments, CBT potentially generates self-sustaining income streams.

The heterogeneous treatment effects carry important policy implications. CBT appears most cost-effective in remote, high-poverty regions where alternative interventions face high implementation costs and limited private investment. This aligns with comparative advantage principles—leveraging natural and cultural assets unavailable in industrialized regions.

The strong moderating effects of governance and participation highlight that CBT is not a “one-size-fits-all” solution. Successful implementation requires substantial investments in institutional capacity, community organization, and participatory mechanisms. Provinces contemplating CBT programs should realistically assess governance capacity before launching large-scale initiatives.

CONCLUSION AND POLICY RECOMMENDATIONS

Summary of Findings

This study provides the first comprehensive, causal evidence on community-based tourism's poverty reduction effectiveness in Vietnam using province-level panel data from 2015-2023. Our multi-method identification strategy—combining fixed effects, instrumental variables, and dynamic panel GMM—establishes robust causal relationships. The key findings are:

1. *CBT significantly reduces poverty and increases income:* A one-standard-deviation increase in CBT intensity reduces poverty rates by 1.8-2.8 percentage points (20-33% relative to mean) and raises household income by 15-18%.

2. *Multiple transmission mechanisms operate:* CBT affects poverty through employment creation (32.5% of total effect), skill development (19.2%), infrastructure improvement (11.6%), market access (8.9%), and social capital accumulation (6.3%).

3. *Substantial geographic heterogeneity exists:* CBT works best in remote, resource-rich regions (Northern Mountains, Central Highlands) with high baseline poverty and limited alternative development pathways. Effects are negligible in urbanized, economically diversified regions.

4. *Governance and participation moderate effectiveness:* CBT impacts are 2-2.5 times larger in provinces with strong government support and high community participation, emphasizing critical importance of institutional quality and local engagement.

5. *Effects are economically meaningful and sustainable:* CBT's poverty reduction magnitude compares favorably to alternative interventions while potentially generating self-sustaining income streams rather than requiring ongoing fiscal transfers.

These findings confirm our five hypotheses and contribute significantly to development economics literature by providing rigorous causal evidence, identifying specific mechanisms, documenting heterogeneity, and analyzing moderating factors.

Policy Recommendations

Based on empirical findings, we propose the following evidence-based policy recommendations:

Strategic Targeting and Resource Allocation

Recommendation 1: Prioritize CBT investment in remote, high-poverty regions with strong tourism potential (Northern Mountains, Central Highlands, isolated coastal areas). These areas exhibit the strongest poverty reduction effects and face limited alternative development opportunities.

Recommendation 2: Adopt differentiated support strategies recognizing that CBT is not universally effective. Urban-adjacent and economically diversified provinces should receive lower priority for CBT investment, with resources directed toward alternative poverty reduction strategies better suited to local contexts.

Strengthening Institutional Capacity

Recommendation 3: Invest substantially in local government capacity for tourism planning, regulation enforcement, and conflict resolution. Our findings demonstrate that governance quality critically moderates CBT effectiveness. Specific actions include:

- Training programs for local officials on participatory planning and sustainable tourism management
- Clear regulatory frameworks balancing conservation, development, and benefit distribution
- Transparent monitoring systems tracking outcomes and ensuring accountability

Recommendation 4: Establish dedicated CBT support units within provincial tourism departments providing technical assistance, facilitating market linkages, and coordinating multi-stakeholder collaboration.

Maximizing Community Participation and Ownership

Recommendation 5: Mandate meaningful community participation in all CBT planning and decision-making stages. Effective mechanisms include:

- Community tourism cooperatives with democratic governance structures
- Participatory budgeting for tourism infrastructure investments
- Regular community consultations with transparent information sharing
- Clear benefit-sharing agreements ensuring equitable distribution

Recommendation 6: Provide targeted support for marginalized groups (women, ethnic minorities, landless households) ensuring inclusive participation and preventing elite capture. Special programs might include:

- Microfinance access for tourism enterprise startup
- Skills training in languages, hospitality, and business management
- Marketing support for handicrafts and local products

Infrastructure and Public Service Development

Recommendation 7: Coordinate tourism development with strategic infrastructure investments. Our mediation analysis reveals infrastructure as a significant transmission mechanism. Priority investments include:

- Road improvements ensuring tourist accessibility while preserving environmental integrity
- Clean water supply and sanitation systems
- Reliable electricity and internet connectivity
- Healthcare and education facilities serving both residents and visitors

Recommendation 8: Integrate CBT with broader rural development strategies addressing multiple poverty dimensions simultaneously rather than treating tourism as isolated intervention.

Market Development and Value Chain Integration

Recommendation 9: Facilitate market linkages connecting CBT communities with tour operators, accommodation providers, and value chains for local products. Specific mechanisms include:

- Online platforms promoting CBT destinations and facilitating bookings
- Partnerships with established tourism businesses incorporating community visits
- Quality standards and certification systems building consumer confidence

- Marketing campaigns highlighting authentic cultural experiences

Recommendation 10: Support value chain upgrading enabling communities to capture greater tourism value.

Interventions might include:

- Training in value-added production (processed foods, refined handicrafts)
- Collective marketing organizations achieving economies of scale
- Direct-to-consumer sales channels bypassing intermediaries

Knowledge Management and Learning Systems

Recommendation 11: Establish systematic monitoring and evaluation systems tracking CBT outcomes, documenting best practices, and facilitating knowledge transfer. This includes:

- Standardized indicators measuring economic, social, and environmental impacts
- Regular impact assessments using rigorous methodologies
- Knowledge platforms sharing successful models and lessons learned
- Peer learning networks connecting CBT communities

Recommendation 12: Support action research and experimentation allowing communities to adapt CBT models to local contexts through iterative learning processes.

Sustainability and Risk Management

Recommendation 13: Integrate environmental sustainability requirements into CBT policies preventing resource degradation threatening long-term viability. Mechanisms include:

- Visitor number limits based on carrying capacity assessments
- Environmental impact assessments for tourism infrastructure
- Revenue allocation for conservation and restoration activities
- Community-based natural resource management systems

Recommendation 14: Develop risk management strategies addressing tourism volatility. COVID-19 demonstrated tourism vulnerability to external shocks. Diversification strategies might include:

- Promoting domestic tourism alongside international markets
- Developing multiple income streams within communities
- Emergency support funds for tourism downturns
- Livelihood diversification programs

Study Limitations

Several limitations qualify our findings.

First, province-level analysis may mask within-province heterogeneity. Household-level data would enable more precise impact estimation and distributional analysis.

Second, while we employ multiple identification strategies, the possibility of unobserved confounding cannot be entirely eliminated in observational studies. Randomized controlled trials, though logistically challenging for CBT interventions, would provide gold-standard causal evidence.

Third, our mediator analysis identifies pathways but cannot fully capture complex, dynamic interactions among mechanisms. Qualitative research complementing quantitative analysis would deepen understanding of how CBT processes unfold.

Fourth, measuring some variables (particularly social capital and governance quality) requires subjective judgments potentially introducing measurement error. Refined measurement instruments would strengthen inference.

Fifth, our nine-year panel captures medium-term effects but cannot definitively assess long-term sustainability. Extended time series would clarify whether CBT generates persistent poverty reductions or temporary income boosts.

Sixth, generalizability beyond Vietnam requires caution given country-specific institutional, cultural, and geographic contexts. Cross-country comparative studies would illuminate boundary conditions on CBT effectiveness.

Future Research Directions

Our findings suggest several productive research directions.

First, household-level longitudinal studies examining CBT's distributional impacts would clarify who benefits most and whether inequality increases despite average income gains.

Second, qualitative research exploring community perspectives, power dynamics, and decision-making processes would complement econometric analysis.

Third, experimental or quasi-experimental designs providing cleaner causal identification would strengthen evidence base.

Fourth, comparative studies across Southeast Asian countries with similar development challenges but different institutional contexts would enhance understanding of generalizability.

Fifth, research examining CBT's environmental sustainability alongside economic impacts would assess triple-bottom-line outcomes.

Sixth, studies investigating optimal phasing and sequencing of CBT interventions would inform implementation strategies.

Finally, analysis of CBT's resilience to shocks (climate change, pandemics, economic crises) would illuminate long-term viability.

Concluding Remarks

Community-based tourism represents a promising but complex poverty reduction strategy requiring careful design, strong institutions, and genuine community participation. Our rigorous empirical analysis demonstrates that CBT can significantly reduce poverty in appropriate contexts, particularly remote regions with tourism potential and limited alternatives. However, CBT is not a panacea-effectiveness depends critically on governance quality, community engagement, and contextual factors.

As Vietnam and other developing nations pursue tourism-led development, evidence-based policymaking becomes essential. Our findings provide actionable guidance for targeting, design, and implementation of CBT programs. With appropriate investments in institutional capacity, infrastructure, and community empowerment, CBT can contribute meaningfully to sustainable, inclusive development aligned with global sustainability goals.

The COVID-19 pandemic highlighted tourism sector vulnerabilities, underscoring the importance of building resilient, diversified local economies. CBT's emphasis on local ownership, cultural preservation, and environmental sustainability positions it well for post-pandemic recovery strategies prioritizing long-term resilience over short-term growth. As the world rebuilds tourism systems, community-centered approaches offer pathways toward more equitable, sustainable futures.

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