Original Research Article

Mechanism deduction and pathway design for quality upgrading of rural tourism from the perspective of industrial ecosystem evolution: The case of Anshan City

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Abstract: Existing research on industrial integration implicitly assumes a linear "flow equals integration" hypothesis, neglecting threshold phase transition mechanisms and institutional logic conflicts, thus failing to resolve the "quantity increase, quality stagnation" paradox in rural tourism. This paper constructs a three-stage conduction model of "element recombination → structural coupling → functional leap" through the cross-lens of "industrial ecosystem evolution theory × value chain upgrading theory," advancing three core propositions: Cross-boundary element flow initiates integration but only triggers structural coupling upon crossing the maturity threshold (Proposition 1); after threshold crossing, triple institutional logic conflicts constitute the core mechanism blocking synergy (Proposition 2); functional leap constitutes a paradigm shift in value creation logic from material-type value creation through relational-type value co-creation to institutional-type value output (Proposition 3). Real-world blockages are mapped onto institutional response logic through chain integration, governance coordination, and digital leap pathways with assessable thresholds, forming a "theoretical blockage → institutional response → assessable closure" policy design framework.
Keywords: industrial integration; rural tourism; quality upgrading; industrial ecosystem; value chain leap; Anshan

1. Introduction

Rural tourism in Anshan exhibits a pronounced "quantity growth, quality stagnation" paradox: In 2023, leisure agriculture received approximately 9 million visits and generated 5.2 billion RMB in revenue. Yet 70% of tourism entities remain locked in a repetitive triad of "flower viewing–fruit picking–farmhouse dining," with average visitor stays of merely 1.2 hours, per-capital spending below 90 RMB, and a secondary processing rate of only 15% for geographical indication resources [3]. Seasonal congestion during harvest periods gives way to near-complete idleness during off-peak months, preventing the release of multiplier effects.

Three theoretical questions arise: (1) Is there a critical threshold between "element convergence" and "value leap" in industrial integration, and what are its theoretical content and triggering conditions? (2) After threshold crossing, what transmission mechanism drives structural coupling and functional upgrading, and how do institutional logic conflicts constitute synergy blockages? (3) Is the essence of value chain leap a physical extension of the chain or a paradigm shift in value creation logic, and what preconditions govern each stage? The study is situated in resource-endowed regions where integration remains at a low level.

2. Mechanism deduction

2.1. Element recombination: How cross-boundary flow initiates integration

Proposition 1: Cross-boundary factor flow initiates integration, but the direction and rate of flow are constrained by asset specificity and institutional friction; when flow scale and velocity remain below

critical levels, factors undergo only physical stacking rather than functional recombination.

Logical chain: Land conversion from single agricultural production to "production–ecology–experience" composite functions depends on property rights divisibility and transfer system flexibility. Cultural elements (Nanguo pear cultivation techniques, Manchu hot-spring culture) convert from community memory to tradable experiential products, contingent on the degree of symbolic comparability and intellectual property protection. Capital flow from low-return agriculture to high-return tourism is moderated by financing constraints and risk-sharing mechanisms—Anshan's operators are predominantly small enterprises and farmers lacking eligible collateral [7-8]. Data factors, as new integration media, reduce information asymmetry through demand profiling and supply matching but are constrained by digital infrastructure and data property institutions [4].

Theoretical dialogue: Gereffi's value chain governance theory reveals that lower asset specificity facilitates cross-border recombination [2]; North's institutional change theory clarifies that institutional friction constitutes transaction costs [3]. However, both implicitly assume "flow equals recombination"—empirical studies confirm the mediating role of factor flow but fail to explain why Anshan's factors remain locked in pseudo-integration despite convergence. The maturity threshold concept reveals that when flow scale and institutional alignment remain subcritical, factors undergo only physical stacking, bridging the explanatory gap.

2.2. Structural coupling: Systemic interconnection after threshold crossing

Proposition 2: When element recombination crosses the maturity threshold, triple coupling of government-enterprise-village interest contracts, symbiotic industry networks, and phallocentric governance structures emerges simultaneously, constituting the structural foundation for transition from pseudo-integration to genuine integration.

Logical chain: After threshold crossing, the system enters the structural coupling stage through the following micro-conduct chain: Transaction cost reduction (clearer property rights lower information search and contract enforcement costs) → expectation alignment (multi-agent actors form consistent expectations about integration benefits) → repeated game institutionalization (long-term interaction replaces one-shot transactions, reputation mechanisms become binding) → triple coupling crystallization (interest contracts, symbiotic networks, and governance structures become mutually reinforcing, forming self-organizing order). Specifically: (1) triadic interest contracts—Government exchanges infrastructure and policy concessions for tax revenue and political performance, enterprises exchange capital and technology for resource rights and market access, village collectives exchange land and cultural resources for dividends and employment; (2) symbiotic industry networks—Nanguo pear cultivation and blossom tourism, hot-spring wellness and farming experiences, and Clivia cultivation and cultural creative study tours form functionally complementary relationships; (3) polycentric governance—Government sets rules and baseline safeguards, markets allocate resources efficiently, communities oversee cultural heritage and benefit distribution [10].

Boundary condition: Threshold conditions include: Critical level of cross-border factor flow density; basic property rights protection and contract enforcement guarantees in the institutional environment; minimum organizational capacity across all three centers. When any condition is violated, the system stagnates in pseudo-integration.

2.3. Functional leap: Paradigm shift in value creation logic

Proposition 3: Deepening structural coupling drives value creation logic through a staged leap from material-type value creation through relational-type value co-creation to institutional-type value output; each leap constitutes an upgrading of value source from material attributes through relational attributes to institutional attributes, with independe.

3. Contextual blockage analysis: Theoretical stress testing of proposition boundary conditions

This section conducts theoretical stress testing of the boundary conditions deduced in Section 3. Each subsection opens with the explicit "Blockage X → Violates Condition Y → Arrests Stage Z" structure, creating a visible contrast between "ought-to-be mechanisms" (Section 3) and "actual blockages"

(Section 4).

3.1. Property rights ambiguity truncates element recombination: Blockage 1 → violates P1 boundary condition → arrests stage 1

Proposition 1's boundary condition requires definable property rights. Anshan's blockage: GI resources exhibit structural "use-right vacancy and benefit-right diversion"—a lack of exclusion mechanisms permits free-riding, diluting brand premium, with 85% of GI resources exiting the value chain as primary products[2]. Without exclusionary usage rights, processing enterprises lack incentives to enter; without processing value-added benefits, farmers lack quality incentives; without brand premium capture, operators lack integration incentives. The triple incentive deficit traps element recombination at "physical stacking," unable to cross the maturity threshold—The institutional root of Stage 1 stagnation.

3.2. Institutional logic conflict triggers synergy failure: Blockage 2 → violates P2 threshold condition → arrests stage 2

Proposition 2's threshold condition requires institutional alignment sufficient to reduce coordination costs below integration benefits. Anshan's blockage: Thornton et al. (2012) demonstrate that when multi-agent actors are embedded in different institutional logics, their objective functions become incommensurable [10]: Governmental bureaucratic logic pursues quantifiable short-term performance—Visitor numbers and investment scale dominate, while stay duration and per-capita spending remain marginalized [7]; capital market logic demands return rates and risk controllability—Enterprises favor short-recovery projects over deep processing and cultural exploration [7-8]; community logic priorities livelihood security—Farmers distrust deferred equity dividends and rationally exit cooperation. Triple logic conflicts prevent the maturity threshold from being crossed—The "transaction cost reduction → expectation alignment → repeated game → triple coupling crystallization" chain is blocked at its starting point, constituting the institutional root of Stage 2 stagnation.

3.3. Digital deficit blocks the leap channel: Blockage 3 → violates P3 precondition → arrests stage 3

Proposition 3's three-stage leap requires information infrastructure. Anshan's blockage: Three digital deficits converge: (1) scene homogeneity—"Flower viewing–picking" depends on natural bloom periods with near-zero supply during off-seasons; (2) supply–demand mismatch—The absence of unified reservation and diversion platforms leads to peak-season congestion and off-season idleness [3]; (3) data silos—Three GI resources remain unintegrated on a unified platform [4]. Digital deficits combined with scene homogeneity leave the three-stage preconditions unfulfilled, locking the value chain at the material-type creation stage—The technological root of Stage 3 stagnation.

4. Pathways and policy instrument design

4.1. Chain integration pathway: Breaking property rights truncation, activating element recombination

Theoretical blockage: GI property rights ambiguity traps element recombination at physical stacking (Blockage 1→Stage 1). Response logic: Exclusionary property rights definition reduces transaction costs; deep processing changes recombination quality; horizontal linkage raises allocation density. Design principles: (1) Property rights definition before element flow—Revision of GI management regulations establishing exclusionary authorization and brand maintenance responsibility; (2) vertical extension—Introducing deep processing to extend consumption from seasonal to year-round [2]; (3) horizontal linkage—Cross-GI itinerary products to raise factor allocation density. Assessable thresholds (proxy signals): Secondary processing rate ≥30%; average stay ≥3h; cross-GI itinerary visitor share ≥40%. Policy instruments: Supply-side—Deep processing technology incubation platforms, talent training; environment-side—GI regulation revision, secondary processing rate inclusion in rating standards; demand-side—Annual Anshan travel cards, international pear culture festivals.

4.2. Governance coordination pathway: Reconciling logic conflicts, restructuring stable contracts

Theoretical blockage: Triple logic objective function incomprehensibility prevents triadic contract equilibrium (Blockage 2→Stage 2). Response logic: Equity-based interest linkage binds three-party

objective functions to a shared value creation process; performance indicator restructuring redirects government incentives; multi-layered governance provides consultation and adjudication channels for logic conflicts. Design principles: (1) equity linkage replacing contract linkage—Village collective resources as equity, enterprise capital and technology as equity, government infrastructure concessions as equity; (2) performance indicator inversion—Efficiency indicators weighted no less than quantity indicators; (3) multi-layered governance—Government baseline standards, co-governance platform routine decisions, third-party arbitration of disputes. Assessable thresholds (proxy signals): Village collective dividend share ≥15%; efficiency indicator weight in government assessment ≥30%; dispute resolution response ≤30 days. Policy instruments: Supply-side—Model contract templates; environment-side—Revision of performance appraisal methods, addition of efficiency indicators; demand-side—Tax incentives for equity-linked enterprises, inclusion in demonstration village recognition.

4.3. Digital leap pathway: Unblocking spatiotemporal barriers, rebuilding the leap channel

Theoretical blockage: Digital deficit leaves three-stage preconditions unfulfilled (Blockage 3→Stage 3). Response logic: Digital infrastructure compensates for information asymmetry; immersive scenes extend spatiotemporal boundaries; data platforms support accounting tools and monitoring systems. Design principles: (1) platform first—Smart service platform integrating booking, navigation, payment, and evaluation; (2) scene extension—AR/VR experiences extending blossom season and enriching winter supply; (3) data loop—Data platforms providing demand profiles for operators and monitoring support for government. Assessable thresholds (proxy signals): Smart platform coverage of three GI resources 100%; digital scene non-bloom-season visitor share ≥ 25%; maturity monitoring indicator quarterly update 100%. Policy instruments: Supply-side—Digital construction special funds, agritourism data laboratories; environment-side—Data management regulations clarifying property rights and sharing rules; demand-side—Traffic support for smart platform participants, targeted digital marketing for the Shenyang metropolitan area.

5. Conclusions

First, a "maturity threshold" exists between element convergence and value leap—Combining CAS phase transition attributes with transaction cost threshold attributes, triggering phase transition only when both factor allocation density and institutional alignment reach critical levels. Second, after threshold crossing, triple coupling of interest contracts, symbiotic networks, and polycentric governance accomplishes structural interconnection, but institutional logic conflicts constitute the core mechanism blocking synergy. Third, value chain leap constitutes a paradigm shift from material-type value creation through relational-type value co-creation to institutional-type value output, with independent preconditions at each stage.The framework applies to resource-endowed regions where integration remains at a low level. Limitations include: Absence of cross-regional comparison; the maturity threshold awaits quantitative calibration.The mechanisms proposed herein are derived from logical deduction and policy text analysis rather than empirical testing; core propositions require subsequent empirical calibration.

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