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AGRITOURISM AS A CATALYST FOR BUILDING CROSS-BORDER CIRCULAR INNOVATION ECOSYSTEMS AND DIASPORA CAPITAL IN THE MOLDOVAN–UKRAINIAN CORRIDOR

The inherent fragility of Moldova and Ukraine within the global economic landscape is fundamentally conditioned by their peripheral structural positioning. This vulnerability stems not merely from their stage of economic development, but from their marginal integration into global value chains, caught between the gravity of EU accession and the systemic impact of Russia's war of aggression, while remaining reliant on low-value commodity exports. This article reconceptualizes agritourism, moving beyond traditional paradigms of supplemental farm income. Instead, it situates agritourism within the mainstream of functional and intersectoral upgrading across EU agri-food value chains, operationalized through the Deep and Comprehensive Free Trade Agreement (DCFTA) and the Hexa-Helix Circularity Framework (HCF). By repositioning diaspora and transnational networks as a foundational bridging helix, this model serves as the primary conduit through which tacit market knowledge, global value chain relationships, and EU regulatory familiarity are transferred to domestic agri-food clusters.

Synthesizing Sustainable Smart Specialisation (S4), Doughnut Economics, and Barbieri's typologies of agritourism across the 9R circularity tiers, this paper proposes an Adaptive Action Research framework to assess trans-boundary macroeconomic resilience across the tefan Vod (Moldova) and Odesa (Ukraine) pilot regions. The research tests three hypotheses: (1) that functional upgrading, propelled by diaspora-facilitated linkages, occurs more rapidly than growth driven by traditional foreign direct investment; (2) that creative agritourism rooted in DCFTA Geographical Indications (GI) achieves export competitiveness through higher unit values; and (3) that a distributed diaspora network model offers superior resilience against geopolitical disruptions compared to centralized national industrial policy.

Keywords: Agritourism, Global Value Chains, Geopolitical Economy, Quintuple Innovation Helix, Smart Specialisation, Diaspora, GVC Upgrading, Hybrid Warfare Resilience.

Fig. 1. Tabl. 1. Lit. 17.

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АГРОТУРИЗМ ЯК КАТАЛІЗАТОР ДЛЯ ПОБУДОВИ ТРАНСКОРДОННИХ ЦИРКУЛЯРНИХ ІННОВАЦІЙНИХ ЕКОСИСТЕМ ТА ДІАСПОРНОГО КАПІТАЛУ В МОЛДАВСЬКО-УКРАЇНСЬКОМУ СПІВРОБІТНИЦТВІ

Стратегічна співпраця Молдови та України в рамках світового економічного ландшафту фундаментально зумовлена спільними кордонами та традиційними економічними та культурними зв'язками. Сучасна геополітична вразливість обох країн впливає не лише з географічного положення та соціально – економічного розвитку, але й інтеграції в глобальні ланцюги створення вартості, оскільки вони опинилися між серйозною дилеммою вступу до ЄС та системним впливом агресивної війни РФ, водночас залишаючись залежними від експорту низькоцінних товарів. У статті зроблено спробу переосмислення агротуризму, виходячи за рамки традиційних парадигм додаткового

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доходу від фермерства. Натомість ми розглядаємо агротуризм у рамках функціональної та міжгалузевої модернізації агропродовольчих ланцюгів створення вартості ЄС, що реалізується через Угоду про глибоку та всеохоплюючу вільну торгівлю (DCFTA) та Рамкову схему циркулярності Неха-Helix (HCF).

Перепозиціонуючи діаспору та транснаціональні мережі як фундаментальну спіраль-місток, ця модель служить основним каналом, через який неявні ринкові знання, зв'язки глобальних ланцюгів створення вартості та знання нормативних актів ЄС передаються до національних агропродовольчих кластерів.

Синтезуючи теорію Сталої Розумної Спеціалізації (S4), та типології агротуризму Барб'єрі на рівнях циркулярності 9R, у статті запропоновано рамки адаптивного дослідження дій для оцінки транскордонної макроекономічної стійкості в пілотних регіонах Штефан-Воде (Молдова) та Одеса (Україна). Дослідження перевіряє три гіпотези: (1) що функціональна модернізація, що стимулюється зв'язками, що сприяють діаспорі, відбувається швидше, ніж зростання, зумовлене традиційними прямими іноземними інвестиціями; (2) що креативний агротуризм, що базується на географічних зазначеннях (ГЗ) у рамках ГВЗВТ, досягає конкурентоспроможності експорту завдяки вищим одиничним цінностям; та (3) що розподілена модель мережі діаспори пропонує кращу стійкість до геополітичних потрясінь порівняно з централізованою національною промисловою політикою.

Ключові слова: агротуризм, глобальні ланцюги створення вартості, геополітична економіка, п'ятикратна інноваційна спіраль, розумна спеціалізація, діаспора, модернізація глобальних ціннісних ланцюгів, стійкість до гібридної війни.

Problem Statement. The prevailing international division of labor perpetuates underdevelopment on the periphery of the global economy. For Moldova and Ukraine, these peripheral integration models manifest as structural limitations, including declining terms of trade and persistent rural stagnation. Conventional development frameworks have historically treated agritourism as an occasional, small-scale pursuit. However, persistent geopolitical risks, infrastructure degradation, and systemic hybrid threats require discarding "business as usual" steady-state forecasts. Recreational tourist mobility has declined sharply in Ukraine and risks to fade away entirely, thus exposing local territorial capital to permanent depletion. From the regional science perspective there is an urgent need to shift towards networks of solidarity exchange based on circular relationships. Ensuring the operational continuity and security of the Ștefan Vodă –Odesa economic corridor is of paramount strategic importance for the long-term regional stability of both nations and their collective integration into the European Single Market. This model conceptualizes agritourism as an adaptive business engine ready to attract international grants, sustain local processing capabilities and foster resilience amid Europeanization rather than as pastime practice. Research draws on theories of sustainable territorial development and territorial systems of innovation. An Adaptive Action Research approach was deemed suitable for capturing trends in unstable environments affected by exogenous economic shocks. Calibration of biophysical and social boundaries for rural communities was performed through embedding Doughnut Economics approach by [Raworth, 2017] To model portfolio diversification strategies [Barbieri, 2023] matrix allows for streamlining horizontal transactions between SME actors in line with the Sustainable Smart Specialisation (S4) framework defined by European Green Deal.

Literature Review. Transition realities lately have been urging regional development researchers to explore multi-helix innovation frameworks and green rebuilding

trajectories. [Carayannis and Campbell 2009] introduced the multi-helix framework, suggesting that respecting ecological limits and incorporating civic engagement are fundamental to nurturing knowledge-driven regional progress. In practice, Barbieri [Barbieri 2023] built functional blueprints for agrotourism-related activities evidencing how crop portfolio diversification has supported farmers' resilience to external price fluctuations. For advancing circular economies nationally or regionally, the foundational models proposed by [Kirchherr et al. 2017] and the 9R circularity framework by [Potting et al. 2017] provide effective guidance for optimizing local supply chains. In practice, the mechanisms of diaspora leveraging have received empirical attention; [Antoci et al. 2014] demonstrated that migrant network activation provides access to financial & commercial channels that remain inaccessible for developing countries seeking EU market entry.

However, the interconnectedness between international trade theory and regional development practice is still missing one link. Agritourism has been studied in isolation, often framed as either a means to enhance local consumption and travel or as a casual business opportunity. Not enough literature has been put forward about agrotourism as a strategic lever to help re-position Moldova in its relevant value chains. Moreover, circular economy literature does not account for grey-area institutional or physical access. Authors have not yet explored how a small, relatively closed jurisdiction can act as a supporter for the partner next door. This paper seeks to address that oversight by examining how a border-adjacent, adaptable region like *tefan Vod rayon*, Moldova, can cooperate with its neighboring region, Odesa Oblast, Ukraine, to expand for value-chain equity, compliance assets, and economic dynamism, even when physical tourism faces significant disruptions.

Aim. The goal of this article is to conceptually model and spatially situate a Cross-Border Agritourism framework fit to act as an automatic stabilizer for the Republic of Moldova and Ukraine. Given the prevailing geopolitical turbulence and hybrid warfare, this research intends to demonstrate the value of cross-border, circular agritourism clusters in protecting exposed territorial capital and curbing rural demographic decline, irrespective of regular physical visitor numbers. Anchored by the protective intermediary structure of the Deep and Comprehensive Free Trade Agreement (DCFTA) and propelled by an adjusted Hexa-Helix Innovation model, rural tourism is reframed from a localized survival effort into a strategically resilient tradable capability. To this end the article endeavors to accomplish three objectives. 1) Detail how semi-connected regionalisms between buffered baseline economies and regions currently experiencing the shocks of war transform inherent compactness into a structural advantage. 2) Explore the integration of the Diaspora as a Hexa-Helix for Circular Innovation in Eastern Partnership (EaP) countries. 3) Conceptually model an institutional shelter at the intersection of [Barbieri, 2023]'s agritourism typology with the 9R Cascading Circular Economy Model, resulting in a viable "shock absorber" via the transmutation of physical experience capital into virtual or localized industrial metabolism.

Outline. Revitalizing marginalized rural communities requires transcending old innovation archetypes and including civil society and the natural world in the Triple Helix to provide a solid ecological foundation [Carayannis and Campbell 2009] while facilitating external knowledge integration into regional development [Etzkowitz and

Leyedesdorff 2000]. This dual framework is compounded by acknowledging that currently both countries have net emigration rates from geopolitical factors endemic to the region—we slice across with the transterritorial diaspora as a new axis, establishing a Hexa-Helix for Circular Innovation framework.

Measuring the human depletion [World Bank/NBS 2023] from these serious structural predicaments is now within reach. Across the right bank of Moldova, 30 years of mass economic emigration has seen anywhere from 40% – 50% of today's local population leave the country. Today there are only 2.4 million residents [NBS 2023]. At the same time, Ukraine experiences its own population implosion from historic shocks as between 20% – 25% of Ukraine's pre-war population have been pushed into outbound migration [UNHCR 2023]. Tens of thousands of people across the region are building transnational workforces overnight. There are unique implications and advantages at play in both origin and transit corridors as well.

The human capital depletion stemming from structural crises is quantifiable. In right-bank Moldova, three decades of mass economic emigration have resulted in the exodus of approximately 40% to 50% of the population [World Bank/NBS, 2023]. Concurrently, Ukraine is enduring a demographic contraction, with 20% to 25% of its pre-war populace forced into outbound migration [UNHCR, 2023].

When physical mobility is constrained, diaspora capital and operational expertise must be transmitted through digital mediums. This virtual exchange represents substantial economic volume; annual remittances to Moldova total \$2 billion USD, constituting roughly 12% of the national GDP [World Bank/NBS, 2023]. As [Antoci et al., 2014] suggest regarding social network activation, the Moldovan and Ukrainian diasporas generate unique value by leveraging access to external platforms and transnational "third spaces".

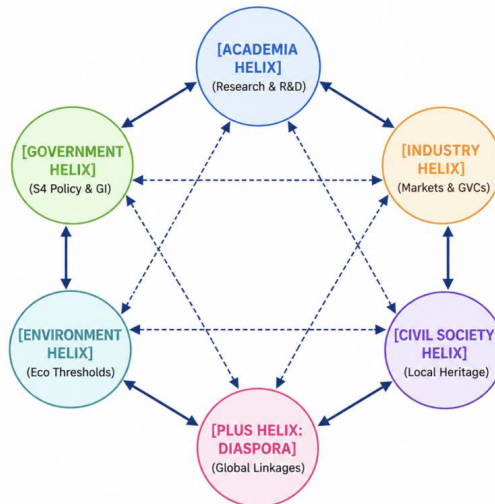


Figure 1. The Hexa-Helix Innovation Framework for Circular Innovation in the Eastern Partnership (EaP) Region, Adapted by the author from Carayannis 2009 and Moldova and Ukraine context

Table 1. Strategic Mapping of Agritourism Functions across the 9R Circularity Matrix for the Moldova–Ukraine Cross-Border Corridor, Elaborated by the author based on [Barbieri, 2023] and [Potting et al., 2017]

Circularity Level	9R Strategy	Barbieri's Agritourism Function	Operationalization in the Cross-Border Corridor (Ștefan Voda / Odesa)
High Circularity (Sustains value without physical resource flow)	R0: Refuse	Education & Heritage Preservation	Refusing the need for physical border-crossing transport by utilizing remote digital twins, interactive webinars, and virtual creative placemaking to teach traditional agronomy.
	R1: Rethink	Direct-to-Consumer Experiences	Rethinking the traditional hospitality model through virtual tourism platforms, diaspora-backed digital culinary masterclasses, and remote sponsorship of specific vineyard rows.
	R2: Reduce	Accommodation & Hospitality	Minimizing local resource footprints by introducing strict eco-benches, smart energy monitoring systems, and limiting physical tourist volumes to match local carrying capacities.
Medium Circularity (Extends lifetimes of physical assets)	R3: Reuse	Agri-Commercial Services	Establishing cross-border, peer-to-peer sharing systems for agricultural machinery, processing equipment, and storage spaces between adjacent regional enterprises.
	R4: Repair	Farm Equipment & Logic Infrastructure	Organizing cooperative maintenance workshops and regional spare-parts repositories to repair machinery, keeping existing physical capital functional under supply constraints.
	R5: Refurbish	Rural Accommodation Real Estate	Upgrading and restoring historic rural architecture, barns, and eco-lodges using local clay, wood, and traditional insulating materials rather than importing new construction assets.
	R6: Remanufacture	Processing and Value-Addition Workshops	Disassembling and rebuilding aging farm mechanics and solar components at centralized hub workshops in the baseline territory (Moldova).
	R7: Repurpose	Recreation & Leisure Space	Repurposing fallow border lands, unused storage structures, and processing facilities into biodiversity sanctuaries, open-air heritage trails, or digital coworking spaces.
Low Circularity (Recovers value from raw material fractions)	R8: Recycle	Agricultural Production (Agro-processing)	Processing post-hospitality food waste, organic bi-products, and sorting plastic packaging within regional materials recovery facilities to feed back into industrial loops.
	R9: Recover	Biomass & Waste Management	Diverting raw agricultural waste and vine clippings into shared cross-border anaerobic digesters to harvest biomethane and generate clean local electricity [EC 2022].

These networks can coordinate localized recovery initiatives with intentionality. Furthermore, the diaspora acts as a vital bridge for [Hexa-Helix for Circular Innovation in EaP countries] by collectively fundraising for EU structural programs, such as Horizon Europe [European Commission, 2021] or the Interreg Danube Region Programme [Interreg Danube, 2023], serving as critical intermediaries between origin and destination jurisdictions. By transmitting first-hand commercial intelligence and conducting targeted compliance audits, these networks ensure local enterprises are structurally prepared to absorb pre-accession funding [World Bank/NBS, 2023].

Ensuring the economic sustainability of Ukrainian agritourism infrastructure in the absence of a continuous stream of visitors requires mapping the agritourism archetypes defined by [Barbieri, 2023] to the specific levels of the [Potting et al., 2017] 9R circular hierarchy. Within this framework, the Stefan Voda region could expand its cooperation to act as a primary operational anchor throughout the composite circular framework illustrated in Table 1.

Functioning of this transnational corridor will upgrade linear export-led development to regional circular economy. A border no longer viewed as a barrier between jurisdictions but rather as an area for convergence that allows the Stefan Voda-Odesa regions to leverage territorial assets. Through industrial symbiosis, it offers protection from outside economic fluctuations by establishing a territory that expands transnational cooperation between Ukrainian and Moldovan agricultural businesses to enter the European Single Market with reduced risk of disruption.

Perspectives and Conclusions. If agritourism is to be reimaged, it must be approached as a tool to navigate current geopolitical realities. The Stefan Voda-Odesa corridor should be re-conceived as a redundant, circular supply chain that is shock-proof to volatility. A "strategy by design" moves away from fragile, linear exports toward regionalized networks. This transforms the border from a bureaucratic bottleneck into an integrated economic space via a "Green Corridor" bilateral agreement. By using the Hexa-Helix framework, we provide an empirical method for Moldova to demonstrate its capacity to manage complex, multi-stakeholder projects, establishing its credibility as a vital regional logistics hub. This agreement functions as an idiom to codify recycled material classifications, preventing customs delays, and is reinforced by on-the-ground joint biosecurity teams. By using mobile labs to process data points and transfer certified organic waste matter across the border instantaneously, the supply chain continues its momentum without sacrificing quality or diluting standards. Integrating these districts — and fostering economic engagement with the Transnistrian region as part of the reintegration process — is a realistic way for both nations to fast-track their European path.

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