

Digital Ecosystems as Levers for Agroecological Redesign

Innovation Adoption, Technological Autonomy, and New Producer–Consumer Relationships in Bio-Districts

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Introduction

The transition towards more sustainable agricultural systems requires rethinking not only production techniques, but the entire food network, including local shops, food hubs, shared logistics and other territorial actors. This work explores how integrated digital ecosystems can support such transformation. Bio-Districts provide privileged settings, as they bring together heterogeneous actors around shared territorial visions and operate as multi-actor governance arrangements (Poconi et al., 2021), fostering agroecological transition at territorial level (Passaro & Randelli, 2022, Migliorini & Lieblein, 2016).

Objectives

RESEARCH QUESTION

Under what conditions can integrated digital ecosystems reduce structural barriers to the adoption of innovation while redefining the relationships between producers and consumers toward co-created agroecological value within the Bio-Districts?

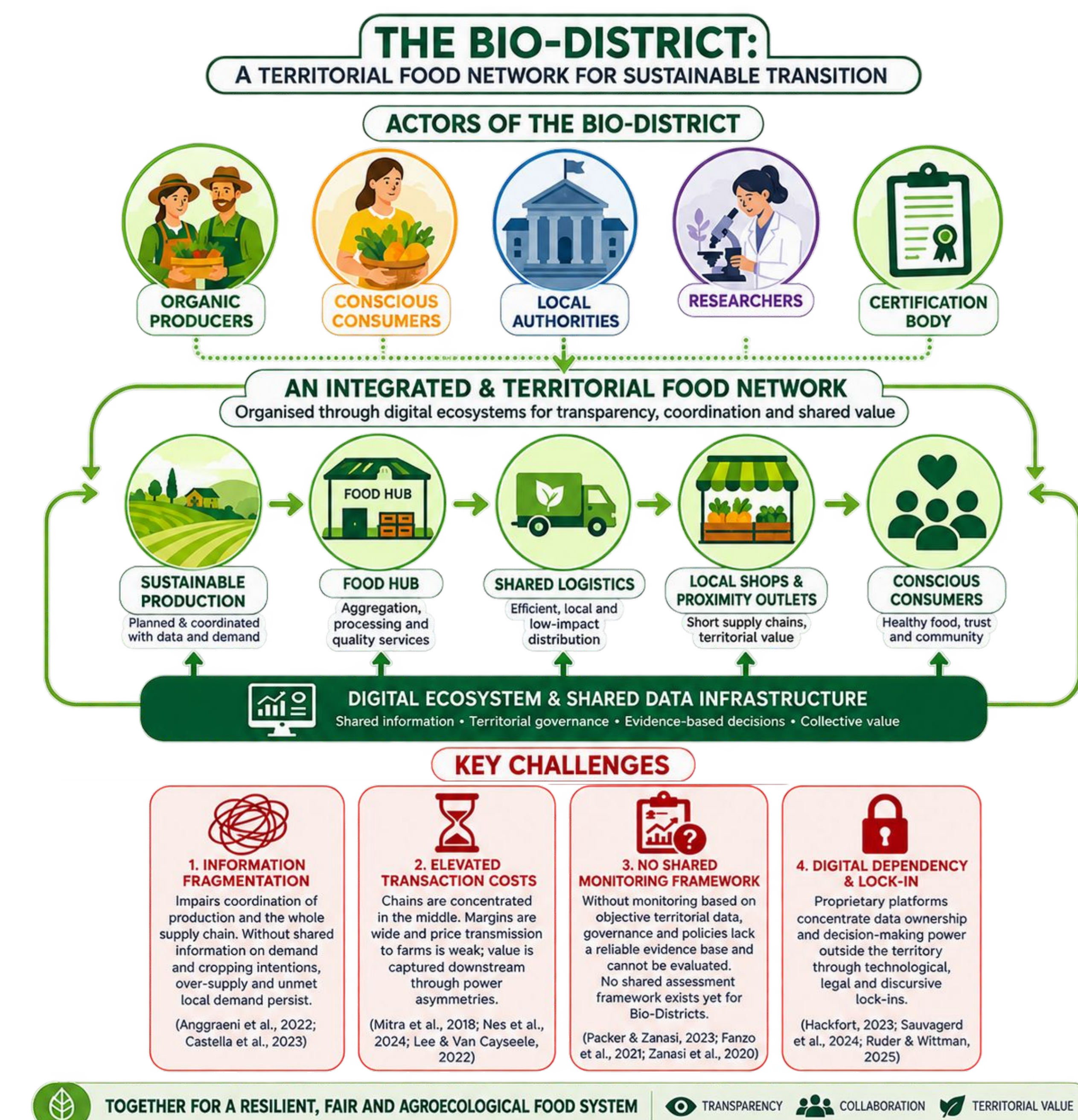
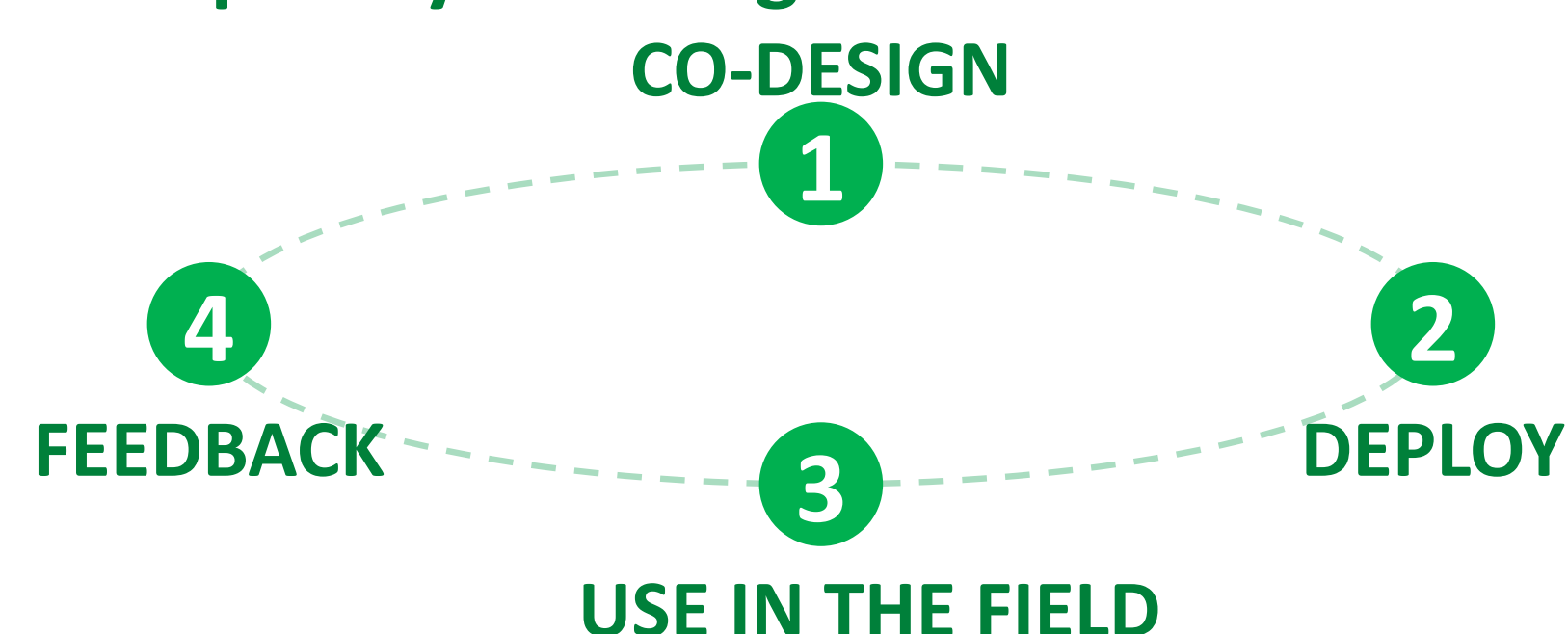
THESIS

Designing digital infrastructures is not merely a technical concern, but a **strategic governance issue** linked to the long-term resilience and self-determination of territories (Sturla et al., 2024, Migliorini et al., 2018).

Materials and Methods

AXIS 01 — KNOWLEDGE A hub of collective technical knowledge (Rastorgueva et al., 2025)	AXIS 02 — RELATIONSHIPS Direct producer–consumer channels (Stefanovic et al., 2023)	AXIS 03 — TRANSPARENCY Legible ethical and environmental commitments (Lai et al., 2025)
→ Reduced information asymmetries and lower coordination and logistic costs	→ Strengthened relational trust and co-creation of economic and social value	→ Market differentiation and participatory territorial governance

Participatory co-design in a territorial living lab



Technology sustainability

the six principles of digital inclusion adopted by the project (Dittmer et al., 2024)

01 Engage diverse farmers	04 Use technology appropriately
02 Enhance access	05 Use farmers' data responsibly
03 Co-create practices with the farmer	06 Develop tools responsibly

Results

The first tangible outcome of this work is **doliFarm**, an open-source digital ecosystem for agroecological farms, cooperatives and territorial networks. Its architecture was derived inductively from fieldwork requirements. Opensource-software licensing provides governance, enabling inspection, modification and territorial redeployment.



doliFarm.com/github

Future work

Future work will define outcome indicators through co-design with Bio-District actors, then collect baseline and pilot data after doliFarm adoption. The formative design will assess five effect domains (economic, environmental, social, relational, territorial) and scalability to guide digital ecosystem development and document agroecological transition.



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Bibliography