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Heritage, margins, innovation: the FORWARD LLab for a circular transition in Alta Irpinia

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Abstract.
In fragile territories, ecological, social, and digital transitions risk becoming decontextualized processes when implemented through standardized models. This article proposes embracing local assets as operational infrastructures for the project, interpreting the margins as places of experimentation for situated innovation trajectories. Drawing on the FoRWARD project, the Living Lab experience in Alta Irpinia is conceived as a tool for building demand for innovation, capable of surfacing the latent needs and potential of micro-enterprises and communities. The project's main outcome is the establishment of a local Academy as a training and production infrastructure for a circular transition rooted in local contexts.

Keywords: Living Lab; Circular design; Local heritage; Inner areas; Territorial academy.

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Introduction: transitions, local heritage and innovation in fragile territories

The ecological, digital, and social transitions promoted by European and national policies are increasingly impacting fragile territories, where the presence of underutilized local assets coexists with dynamics of depopulation, productive fragmentation, and limited access to innovation processes. In such contexts, the adoption of standardized models risks failing to address latent needs, skills, and potential, nor recognizing the role of local assets as active resources for guiding transformation processes (Rodríguez-Pose, 2018; De Rossi, 2018; Teti, 2022).

In contemporary debate, heritage is increasingly understood as a cultural and collective process, defined by social practices, shared imaginations, and everyday uses, as well as a dynamic stratification of ever-changing values (Harvey, 2001; Council of Europe, 2005; ICOMOS, 2011; Harrison et al., 2023). From this perspective, local heritages are configured as relational fields whose value is constructed through practices of use, social negotiations, and design processes. Their regeneration is not limited to conservation interventions or specific reuse operations, but requires mechanisms capable of integrating conservation and innovation, translating territorial resources—environmental, productive, and cultural—into development trajectories consistent with local identities.

Internal areas and small peripheral municipalities, characterized by small production chains, proximal social networks, and underutilized environmental resources, are configured as privileged contexts for experimenting with models of situated innovation, in which planning and public policies contribute to the definition of development trajectories consistent with local vocations (Barca, 2009; De Rossi, 2018; Carrosio, 2019) . Historically marginalized with respect to the hubs of technological and infrastructural innovation, these territories concentrate environmental resources, widespread building heritage, artisanal knowledge, intergenerational relationships, and community networks that configure a latent territorial infrastructure. In such contexts, interpreting transitions as eco-socio-technical processes, based on the dynamic interaction between technologies, production systems, social practices and environmental resources (Geels, 2002; Loorbach, 2010), allows us to understand innovation as a systemic transformation in which environmental, economic and relational dimensions co-evolve through design devices rooted in local systems.

Building situated innovation trajectories therefore requires tools capable of operating in real-world conditions and complex territorial systems, integrating technological and social dimensions within negotiation and collaborative processes. Within this framework, user-driven innovation ecosystems, grounded in open innovation practices and systematic co-creation processes with users in real-world contexts, represent strategic tools for operating in complex territorial systems. Within this perspective, Living Labs are collaborative environments centered on local actors, capable of integrating research and innovation within communities and real-life situations. They foster interaction between heterogeneous actors—research, businesses, institutions, communities—in innovation-oriented co-creation processes, in which the use dimension and active user participation contribute to defining development trajectories (Bergvall-Kåreborn & Ståhlbröst, 2009; Leminen et al., 2012; ENoLL, 2013). A significant portion of the experiments focuses primarily on the solution validation phase; the potential of Living Labs as tools for building demand for innovation in fragile territories is less explored (OECD, 2020). In this regard, design assumes a strategic role as a mediating practice between technological and social dimensions, capable of translating latent needs, local knowledge, and local heritage into design trajectories, products, services, and enabling infrastructures for territorial regeneration (Manzini, 2015; Morelli, 2017; Perriccioli, 2016).

From this perspective, heritage is not a stable entity or a collection of assets to be preserved in isolation, but a constantly evolving field of relationships, whose value is constructed through practices of use, social negotiations, and design processes. It is through these processes—negotiated, collaborative, and multidimensional—that heritage regenerates itself, producing new meanings and new forms of collective relevance within the territories in which it operates (Cerreta, 2010; Fusco Girard, 2014; Harrison et al., 2023). Considering local heritage as operational

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infrastructures therefore implies a design posture capable of integrating conservation and innovation within regenerative processes aimed at producing new forms of habitability in fragile territories .
The article considers the margins as places of experimentation where transitions can generate new production and cultural paradigms, provided that the demand for innovation is built on the practices, identity values, and untapped potential of local areas. From this perspective, local assets—tangible and intangible—serve as operational infrastructure for the activation of regenerative trajectories capable of strengthening local supply chains, skills, and community networks.
Furniture Waste for Circular Design (MICS – NextGenEU, PE11, Spoke 4)[1] research project fits into this framework. It experiments with innovation models located in fragile territories, integrating technological research on materials and production processes with collaborative practices rooted in local communities. The methodological framework combines quantitative and laboratory-based experimental activities, aimed at developing technological and design solutions, with a qualitative approach based on the FoRWARD Living Lab, intended as a collaborative ecosystem for building demand for innovation.
Alta Irpinia has been identified as a pilot context, where we can test how the integration of technological experimentation and co-creation processes can uncover latent needs and potential, guiding regenerative trajectories consistent with the region's vocations. The underlying hypothesis is that marginal innovation cannot simply be transferred, but must be built in relation to local assets and local socio-productive dynamics, through design approaches capable of connecting technological and eco-social dimensions.

The FoRWARD project for a circular transition between technological innovation and territorial heritage
FoRWARD – *Furniture Waste for Circular Design* (MICS – NextGenEU, PE11, Spoke 4) is a research project aimed at experimenting with circular transition models in production contexts characterized by fragmented supply chains and limited access to innovation processes. The project considers the wood sector as a privileged testing ground for integrating technological innovation and design culture, contributing to the regeneration of local supply chains in fragile territories.
Part of European policies for the circular economy and the sustainability of Made in Italy (Ghisellini, 2013; European Commission, 2020), FoRWARD interprets local assets as operational infrastructures for activating trajectories of change consistent with local vocations. From this perspective, the research proposes a model that intertwines technological experimentation, design, and territorial activation, situating innovation within systemic processes that involve productive, environmental, and relational dimensions.
FoRWARD's methodological framework is based on the integration of two complementary research paths: technological and design experimentation conducted in a laboratory setting, and territorial experimentation aimed at building demand for innovation in real-world contexts. This integration responds to the need to move beyond linear models of technology transfer, adopting an eco-socio-technical perspective (Fig. 1) in which solutions emerge from the dynamic interaction between research, production systems, social practices, and local heritage (Schuurman, 2015; Leminen & Westerlund, 2015).
Operationally , the research combines quantitative tools — focused on analyzing material flows, life cycles, and the environmental performance of production processes — with qualitative tools, aimed at exploring the needs, skills , and practices of micro and small businesses and local communities. Within this framework, the FoRWARD Living Lab is used as an operational tool for building collaborative environments for on-site experimentation, in which diverse stakeholders engage in iterative processes of listening, discussion, and co-design.
Designed as an academic-led (provider-driven) ecosystem, the FoRWARD Living Lab fosters interaction between businesses, institutions, and local communities in a collective learning process aimed at defining situated innovation trajectories consistent with local specificities. Adopting this

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approach allows for the emergence of a demand for innovation that is progressively built through experimentation, negotiation between stakeholders, and the translation of latent needs into shared project scenarios (Fig. 2).

Alta Irpinia as a system of local heritage and a context for experimentation

As part of the FoRWARD project, Alta Irpinia has been selected as a pilot area to explore how territorial assets can guide innovation processes in fragile territories. An internal area of the province of Avellino, comprising 25 municipalities, with a surface area of 1,118 km² and a resident population of 53,462 in 2021 (64,386 in 2011), Alta Irpinia has been identified as a pilot area for the National Strategy for Internal Areas (SNAI 2014-2020; SNAI 2021-2027). The municipalities that comprise it are classified as peripheral and ultra-peripheral with respect to the main service hubs, a condition that impacts access to infrastructure, services, and innovation networks (Oppido et al. 2023; Barca et al., 2014; Department for Cohesion Policies, 2014; 2021). In the SNAI territorial governance structure, the area refers to the City of Alta Irpinia, established in 2015 as a single representative body for the 25 municipalities; Aquilonia is its institutional headquarters and lead municipality (Fig. 3).

In this complex territorial system, the FoRWARD project selects and activates the environmental, productive, and cultural resources connected to the wood resource cycle, including artisanal, supply chain, and design knowledge and skills, adopting the local forestry and productive heritage as levers for building circular transition trajectories rooted in the context.

Forestry covers approximately 38% of the area (approximately 50,000 hectares), equivalent to approximately 10% of the regional forestry, and is currently underutilized both in terms of production (firewood, timber, non-timber products) and its environmental, educational, recreational, and socio-cultural potential. In relation to this resource, the Alta Irpinia Forestry Agency was established in 2020 within the SNAI (National Forestry Agency), with the aim of promoting integrated governance of forestry and enhancing the supply chains linked to the wood resource cycle and ecosystem services (Campania Region, 2018; ISPRA, 2021).

In terms of production, the Alta Irpinia area boasts a business network consisting primarily of micro and small businesses, characterized by high fragmentation and limited capacity for independent access to innovation processes, driven by the depopulation of the villages. Alongside this widespread structure, there are a number of excellent businesses and traditional productions that still show signs of vitality, including artisanal woodworking, wrought iron, ceramics, and embroidery. These activities constitute a local production heritage that, despite structural challenges, preserves technical expertise and local knowledge essential for the development of higher value-added supply chains.

With reference to the wood sector, in the province of Avellino there were 160 active local units in 2021 (ISTAT), with an average size of 3.06 employees, a decrease from the 209 active units in 2011 (ISTAT). In the Alta Irpinia area, surveys conducted by the Departments of Architecture and the Department of Social Sciences of the University of Naples Federico II report the presence of approximately 60 companies active in the wood sector, with variable employment numbers .[2] These data confirm the presence of a widespread production system, characterized by consolidated skills but poorly structured in supply chain networks and cooperation systems.

This widespread production system represents a local heritage characterized by deep-rooted skills and consolidated local relationships, but also by structural weaknesses linked to fragmentation, the difficulty of generational turnover, and limited integration along the supply chain. Within this framework, the Living Lab experiment serves as a mediation tool capable of activating alliances and collaborative networks, guiding a (re)definition of supply chains within a community and circular logic.

Alongside its material heritage, the area expresses changing social and cultural dynamics, linked to *bottom-up planning* , phenomena of return and new inhabitants, as well as the presence of the Reception and Integration System (SAI), active in 12 out of 25 municipalities[3]. These dimensions

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constitute the dense field of latent resources within which the FoRWARD Living Lab grafts its experimentation devices, recognising the role of local communities in building the demand for innovation and in reactivating local heritage.

The FoRWARD Living Lab for building demand for innovation

In the FoRWARD project, the Living Lab is conceived as a device for building collaborative environments for in-situ experimentation, aimed at identifying and structuring the demand for innovation in fragile territories. Consistent with the research approach, the Living Lab is not intended as a technology transfer platform, but as a collective learning ecosystem in which research, businesses, institutions, and local communities interact iteratively to co-define circular transition trajectories rooted in local heritage (Rigillo et al., 2024).

provider-driven) research and innovation ecosystem , oriented towards integrating *technology push* and *application pull dynamics* in a hybrid experimentation environment (Leminen et al., 2012; ENoLL, 2016). This structure enables structured interaction between research laboratories, solution developers, local governments, and user communities, enhancing the creative contribution of each actor within a systemic innovation framework. The university's role is defined as a management and mediation function between technological, productive, and social needs (Fig. 4).

On this basis, the FoRWARD Living Lab was structured as a process divided into phases, conceived as iterative cycles of listening, experimentation and adaptation (Fig. 5).

Phase 1 – Sharing objectives and building the testing ground

The initial phase involved the shared definition of the scope of intervention (Focus Area 1 in Alta Irpinia, with operational headquarters in Aquilonia) and objectives among research partners, local institutions, and regional stakeholders. In this phase, the Living Lab was explicitly adopted not as a device aimed at transferring predefined solutions, but as an environment geared toward the shared construction of a framework of critical issues and opportunities, starting with local production and environmental assets.

Phase 2 – Building a shared knowledge base

The second phase involved building a shared knowledge base of the production and territorial context, through mapping the wood industry's stakeholders, georeferencing companies, and analyzing existing and potential networks. At the same time, a map of stakeholders complementary to those in the wood industry was developed. This has the dual purpose of broadening the knowledge base and, in the subsequent listening phases, uncovering a framework for discussion and sharing , converging interests, complementary skills, and potential alliances between diverse stakeholders (businesses, local authorities, researchers, education providers, and communities), thus laying the foundation for building collaborative networks at the regional level.

This mapping was conceived as an incremental and open tool, to be integrated with qualitative listening tools (exploratory interviews, questionnaires, round tables) and public opportunities for feedback and discussion. The goal was to build a common ground of knowledge between research and local stakeholders, making visible tacit knowledge, production practices, and structural constraints that affect access to innovation.

Phase 3 – Co-design of innovation processes and trajectories

On this basis, the Living Lab initiated a co-design phase aimed at exploring potential innovation trajectories consistent with local resources and feasibility conditions. Thematic workshops and roundtables, held with the various clusters of identified stakeholders (Fig. 6), guided a (re)definition of the issues surrounding the wood supply chain within a community-driven framework, orienting new operational alliances and collaborative networks between micro, small, and medium-sized

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businesses, resource management stakeholders, designers, and local institutions, along with a cluster of related stakeholders (related businesses, industry associations, schools, and local reception and integration systems – SAI). The supply chain is thus reinterpreted as a relational system in which territorial proximity enables process and product innovation in a circular manner.
At this stage, the need to shift the focus from technological solutions to the organizational, relational, design, and production issues that hinder or enable innovation processes and, in some cases, affect the very survival of micro-enterprises, has become more evident.

Phase 4 – Co-creation, experimentation and prototyping
The co-creation phase involved the launch of on-site experimentation activities, through workshops with businesses and training sessions with schools and university students, aimed at exploratory testing of circularity practices along the wood supply chain. In this phase, prototyping developed with local businesses and artisans was used as a collective learning tool, useful for highlighting operational criticalities, skill gaps, and opportunities for integrating artisanal knowledge and emerging technologies.
The discussion with artisans highlighted the presence of already established circular practices, based on consolidated reuse and recycling processes, along with an interest in *upcycling practices* with greater added value. This interest is currently limited by the lack of professionals capable of translating production needs into design and operational specifications, as well as by the difficulty of accessing technical skills for the use of innovative machinery and processes. This gap has guided the Living Lab toward building mediation mechanisms between design, production, and the supply chain, highlighting the role of design as a practice capable of translating user needs, production constraints, and technological opportunities into shared operational scenarios.

Phase 5 – Testing, adapting and building the demand for innovation
The set of activities conducted in the previous phases allowed us to structure the demand for innovation as an outcome of the process, rather than an initial prerequisite. Specifically, three main demand trajectories emerged, summarizing differentiated yet interconnected needs:

- creative and design demand, relating to the need for mediation between client, designer and company;
- technological-manufacturing demand, connected to the development of operational skills for the adoption of innovative technologies and machinery;
- demand for supply chain governance, aimed at strengthening local sourcing and activating short supply chains in a circular economy logic.

The structuring of the demand for innovation guided the definition of a project outcome consistent with the emerging needs: the proposal of a territorial Academy as a training and production infrastructure rooted in local assets.

Towards a Territorial Academy in Alta Irpinia
The establishment of an ITS Academy – Alta Irpinia "Wood, Living, and Sustainable Regeneration" is one of the key project outcomes of the project initiated by the FoRWARD Living Lab. The Academy was born as an operational translation of the demand for innovation built through a process of listening and co-design with businesses, communities, and institutions, configuring itself as a localized response to the needs that emerged. The Academy represents a concrete evolution of the research and co-design experiences developed, which have addressed several structural critical issues in the local context: the risk of disappearing woodworking craftsmanship and local expertise, the weakness of sustainable management systems for forest resources and the wood supply chain, the difficulty of retaining young graduates in the area and generating new job and business opportunities.

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In continuity with FoRWARD, the Academy adopts the wood sector as a privileged area of experimentation for the integration of design, advanced technologies and sustainable regeneration practices for living in inland areas.
The Academy is conceived as a training and production infrastructure capable of combining artisanal tradition and local material culture with emerging skills related to digital design, advanced manufacturing, and the bioeconomy, guiding the training of technical professionals capable of acting as mediators between design, production, and the local supply chain. The training program is designed to respond, through hybrid professional profiles, to the three innovation demand trajectories that emerged in the Living Lab (creative/design, technological-manufacturing, supply chain governance), helping to strengthen local skills, short supply chains, and new forms of local entrepreneurship.
From this perspective, the Academy's project engages with several national and international benchmarks that represent consolidated practices of integrating education, experimentation, and the local environment. In particular, approaches that integrate applied research and digital fabrication on biomaterials, training models based on immersive learning and direct experimentation between design, material, and construction, as well as practices that combine material culture, creative production, and sustainable landscape enhancement, are of particular importance. These experiences are not models to be replicated, but methodological and operational references useful for guiding the definition of an educational infrastructure capable of integrating situated learning, applied research, and rootedness in the productive and cultural resources of Alta Irpinia, while also promoting the Academy's positioning within broader networks of innovation and knowledge transfer (Fig. 7).
The Academy's location in Aquilonia (AV) is part of a framework of already ongoing urban and territorial regeneration policies and projects, aimed at revitalizing abandoned building stocks and building integrated spaces for training, employment, and sustainable living within an innovative model of territorial welfare.[4] In continuity with these experiences, the Academy is part of an experiment in new forms of living in inland areas, integrating residential, educational, and productive dimensions and embracing the quality of living as an enabling device for activating circular processes for the regeneration of local assets. This approach allows it to respond to diversified user needs and contribute to the construction of new demands for local development (Fabbricatti et al., 2022).
In this context, the Academy is intended as a training hub within a broader territorial infrastructure for innovation, capable of connecting environmental resources, local production systems, and extra-local knowledge networks. The Academy's inclusion in a growing mobility system constitutes a further enabling factor for student accessibility, faculty mobility, and the connection of the training and production system with regional and national research, design, and manufacturing hubs[5].
The Academy is therefore conceived as a device for the regeneration of local heritage, a socio - technical infrastructure capable of providing continuity to the innovation processes activated by the Living Lab, contributing to the construction of new local development trajectories, the strengthening of production chains and the creation of opportunities for younger generations in inland territories.

Conclusions

This paper demonstrates how interpreting local assets as operational infrastructure for projects allows for rethinking transitions in fragile territories, moving beyond standardized approaches and activating regenerative processes rooted in local vocations and specificities. The experience of the FoRWARD Living Lab in Alta Irpinia highlights how building demand for innovation—through the integration of local knowledge, production practices, and socio-ecological dynamics—can uncover the latent needs and untapped potential of micro-enterprises and communities, translating them into shared project trajectories and continuity mechanisms such as the Territorial Academy.
The uniqueness of the approach lies in its approach to project design as a mediation device between technological innovation and the social and cultural dimensions of local heritage, configuring the

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Living Lab as an environment for collective learning and the construction of operational alliances and collaborative networks among diverse stakeholders. From this perspective, the Academy represents an outcome capable of consolidating processes of situated innovation over time, integrating training, employment, and the new forms of living currently being tested in Alta Irpinia as levers for reactivating local heritage.

This approach, however, requires avoiding an idealized reading of heritage and communities, recognizing that participatory processes and territorial innovation mechanisms entail power asymmetries, lengthy negotiation times, and the risk of overloading fragile contexts with excessive project expectations. Building demand for innovation therefore requires ongoing mediation and critical reflection on the role of design in territorial regeneration processes.

The research's limitations include the limited scale of the experiment and the complexity of the participatory processes, which require lengthy timeframes and strong mediation skills between stakeholders and governance levels. Future developments include the possibility of adapting the Living Lab model to other marginalized contexts, enhancing the project's role as an infrastructure connecting territorial heritage, local production systems, and regeneration policies, as well as consolidating the Academy as a territorial device capable of generating continuity between training, innovation, and local development.

NOTES

[1] The research is part of the FoRWARD – Furniture Waste for Circular Design project, funded by MICS – Made in Italy Circolare e Sostenibile within NextGenerationEU, Extended Partnership 11 (PE_00000004), promoted by the Universities of Naples Federico II, Palermo and Florence.

[2] The calculations are based on data from the Company Register (InfoCamere), with reference to the activities classified under ATECO code 16.

[3] For the data referred to, please refer to the documentation of the Reception and Integration System (SAI), in particular the annual reports relating to 2021 and 2022, published in 2022 and 2024 respectively.

[4] The Municipality of Aquilonia's PINQuA program envisions the revitalization of the village of Carbonara with studio-homes and shared spaces for students, artisans, makers, and young professionals.

[5] The Alta Irpinia Rural Metro, currently under construction, will connect the network's municipalities to the Lacedonia hub and the Hirpinia station on the Naples-Bari high-speed/high-capacity line.

REFERENCES

Barca, F. (2009). An agenda for a reformed Cohesion Policy. European Commission, Brussels.

Barca, F., Casavola, P., Lucatelli, S. (2014). A strategy for inner areas in Italy. Agency for Territorial Cohesion, Rome.

Bergvall-Kåreborn, B., Ståhlbröst, A. (2009). Living Lab: an open and citizen-centric approach for innovation. International Journal of Innovation and Regional Development, 1(4), 356–370.

Carrosio, G. (2019). The Margins at the Center: Italy's Inner Regions Between Fragility and Innovation. Donzelli Editore, Rome

Castillo, C.P., et al. (2024). Are remote rural areas in Europe remarkable? Challenges and opportunities, in Journal of Rural Studies / Elsevier, Volume 105, January 2024

Cerreta, M. (2010). Thinking Through Complex Values. In: Cerreta, M., Concilio, G., Monno, V. (eds) Making Strategies in Spatial Planning. Urban and Landscape Perspectives, vol 9. Springer, Dordrecht. https://doi.org/10.1007/978-90-481-3106-8_21

Cognetti, F. (2018). Enabling spaces. What bridges between institutions and citizens for collaborative

Just accepted article

governance practices?, Tracce urbane, 3, 52-63.
Council of Europe (2005). Framework Convention on the Value of Cultural Heritage for Society (CETS No. 199). Faro, 27 October 2005.
De Rossi, A. (2018). Re-inhabiting Italy. Inland Areas Between Abandonment and Reconquest. Donzelli, Rome.
Department for Cohesion Policies (2021). National Strategy for Internal Areas 2021–2027. Office of the President of the Council of Ministers, Rome.
European Commission (2020). A New Circular Economy Action Plan. For a Cleaner and More Competitive Europe. COM(2020) 98 final.
European Commission (2021). A long-term vision for the EU's rural areas – towards stronger, connected, resilient and prosperous rural areas by 2040. Brussels: European Commission.
European Network of Living Labs (ENoLL) (2013). Living Labs Definition and Principles. European Network of Living Labs, Brussels.
European Network of Living Labs (ENoLL) (2016). Introducing ENoLL and Living Labs. European Network of Living Labs, Brussels.
Fabbricatti, K., Picone, A., Tenore, V., Ascione, F., Berruti, G., Formato, E., Mattiucci, C., & Sgobbo, A. (2022). Quality of living for internal areas: between specialized offerings, local welfare, and the production of new economies. Techne, 24, 187-197.
Fusco Girard, L. (2014). The role of cultural urban landscape towards a new urban economics: New structural assets for increasing economic productivity through hybrid processes. Housing Policies and Urban Economics, 1 , 3–27.
Geels, F. W. (2002). Technological transitions as evolutionary reconfiguration processes: A multi-level perspective and a case study. Research Policy, 31 (8–9), 1257–1274.
Ghisellini, P., Cialani, C., & Ulgiati, S. (2016). A review on circular economy: the expected transition to a balanced interplay of environmental and economic systems. Journal of Cleaner Production, 114, 11-32.
Harrison, R., Dias, N., & Kristiansen, K. (Eds.). (2023). Critical heritage studies and the futures of Europe . UCL Press. https://uclpress.co.uk/book/critical-heritage-studies-and-the-futures-of-europe/
Harvey, D. C. (2001). Heritage pasts and heritage presents: temporality, meaning and the scope of heritage studies. International Journal of Heritage Studies, 7(4), 319–338.
ICOMOS (2011). The Valletta Principles for the Safeguarding and Management of Historic Cities, Towns and Urban Areas. International Council on Monuments and Sites, Paris.
ISPRA (2021). Report on the State of Forests in Italy. ISPRA, Rome.
Leminen, S., Westerlund, M. (2015). Stakeholder roles in living labs. Technology Innovation Management Review, 5(12), 33–39.
Leminen, S., Westerlund, M., Nyström, A.-G. (2012). Living labs as open innovation networks. Technology Innovation Management Review, 2(9), 6–11.
Loorbach, D. (2010). Transition management for sustainable development: A prescriptive, complexity-based governance framework. Governance, 23 (1), 161–183.
Manzini, E. (2015). Design, When Everybody Designs. MIT Press, Cambridge (MA).
Morelli, N. (2017). Design and Territories. Design as Infrastructuring for Local Development. In Zurlo, F., Cautela, C. (eds.), Design for the Territory. Approaches, Methods, Experiences. FrancoAngeli, Milan.

Unit accepted article

Moulaert, F., MacCallum, D., Mehmood, A., Hamdouch, A. (2013). The International Handbook on Social Innovation . Edward Elgar.
OECD (2020). Innovative Citizen Participation and New Democratic Institutions: Catching the Deliberative Wave. OECD Publishing, Paris.
Oppido, S., Ragozino, S., & Esposito De Vita, G. (2023). Peripheral, Marginal, or Non-Core Areas? Setting the Context to Deal with Territorial Inequalities through a Systematic Literature Review. Sustainability, 15(13), 10401. https://doi.org/10.3390/su151310401
Perriccioli, M. (2016) (ed.). Technical Thinking and Design Culture. Franco Angeli, Milan, 135
Campania Region (2018). Regional Forestry Plan. Campania Region, Naples.
Rigillo, M., Galluccio, G., Fabbricatti, K., Block, M., Ermolli, SR, Perriccioli, M. (2024). Digital and Circular Innovation for Made in Italy Wood Supply Chain: The FoRWARD Research Project. In: Calabrò, F., Madureira, L., Morabito, FC, Piñeira Mantiñán, MJ (eds) Networks, Markets & People. NMP 2024. Lecture Notes in Networks and Systems, vol 1189. Springer, Cham. https://doi.org/10.1007/978-3-031-74723-6_12
Rodríguez-Pose, A. (2018), The Revenge of the Places That Don't Matter (and What to Do about It), Cambridge Journal of Regions Economy and Society, 11, no. 1, pp. 189-209. https://doi.org/https://doi.org/10.1093/cjres/rsx024.
Schuurman, D., Leminen, S., Westerlund, M., & Koivisto, A. (2016). Living labs: from hype to reality. Technology Innovation Management Review, 6(1), 5–10.
Teti, V. (2022). The Remainder. Einaudi, Turin.

Images

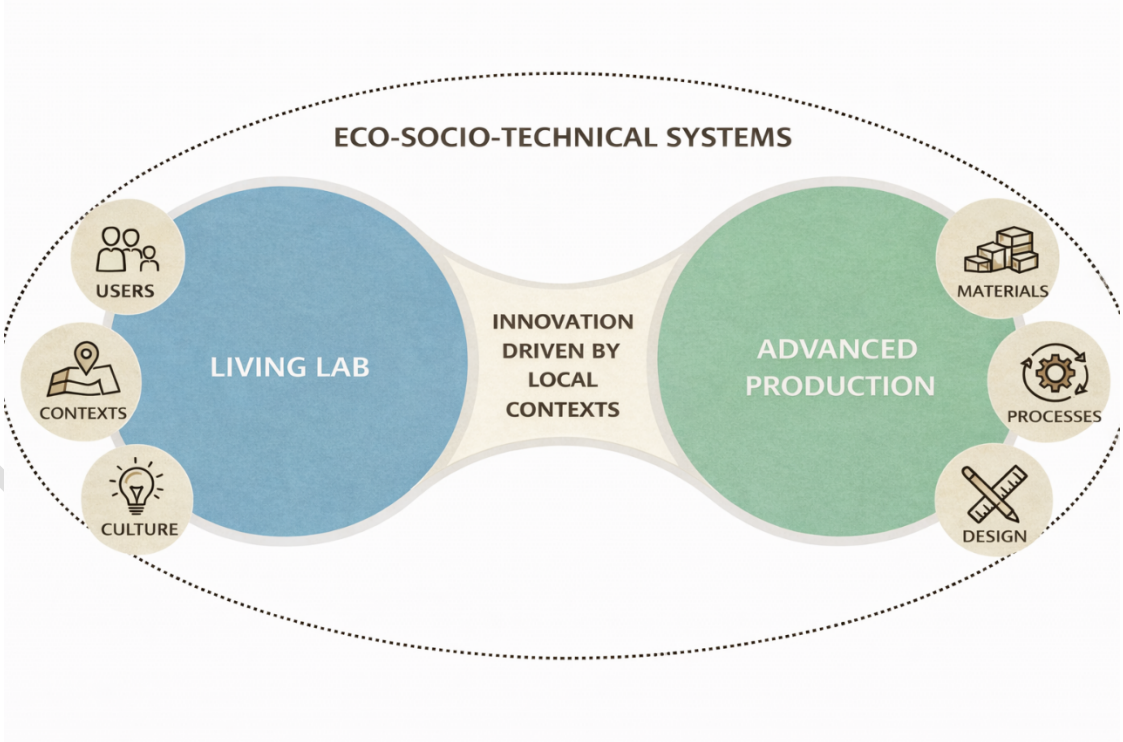


Fig. 01 – The eco-socio-technical system highlights how innovation emerges from the integration of local contexts, social dimensions, and productive capacities.

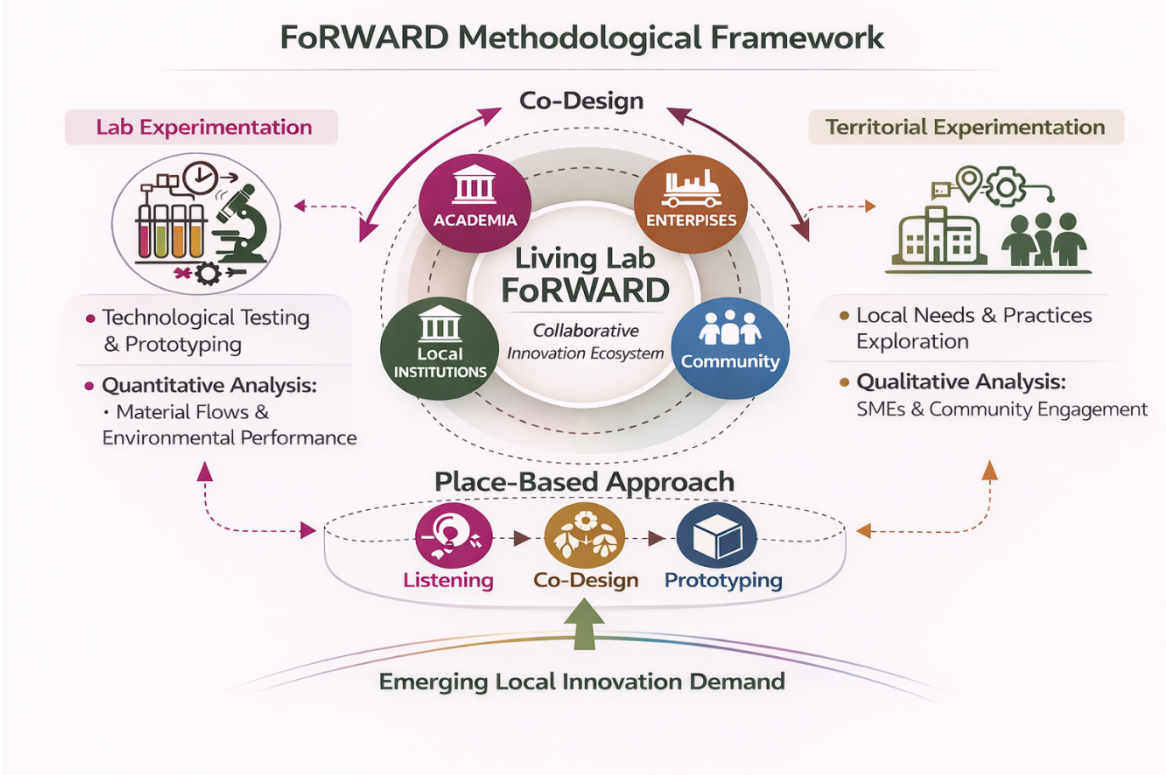


Fig. 02 - The FoRWARD framework combines Living Lab, co-design, and a place-based approach in a collaborative ecosystem between academia, businesses, institutions, and communities.

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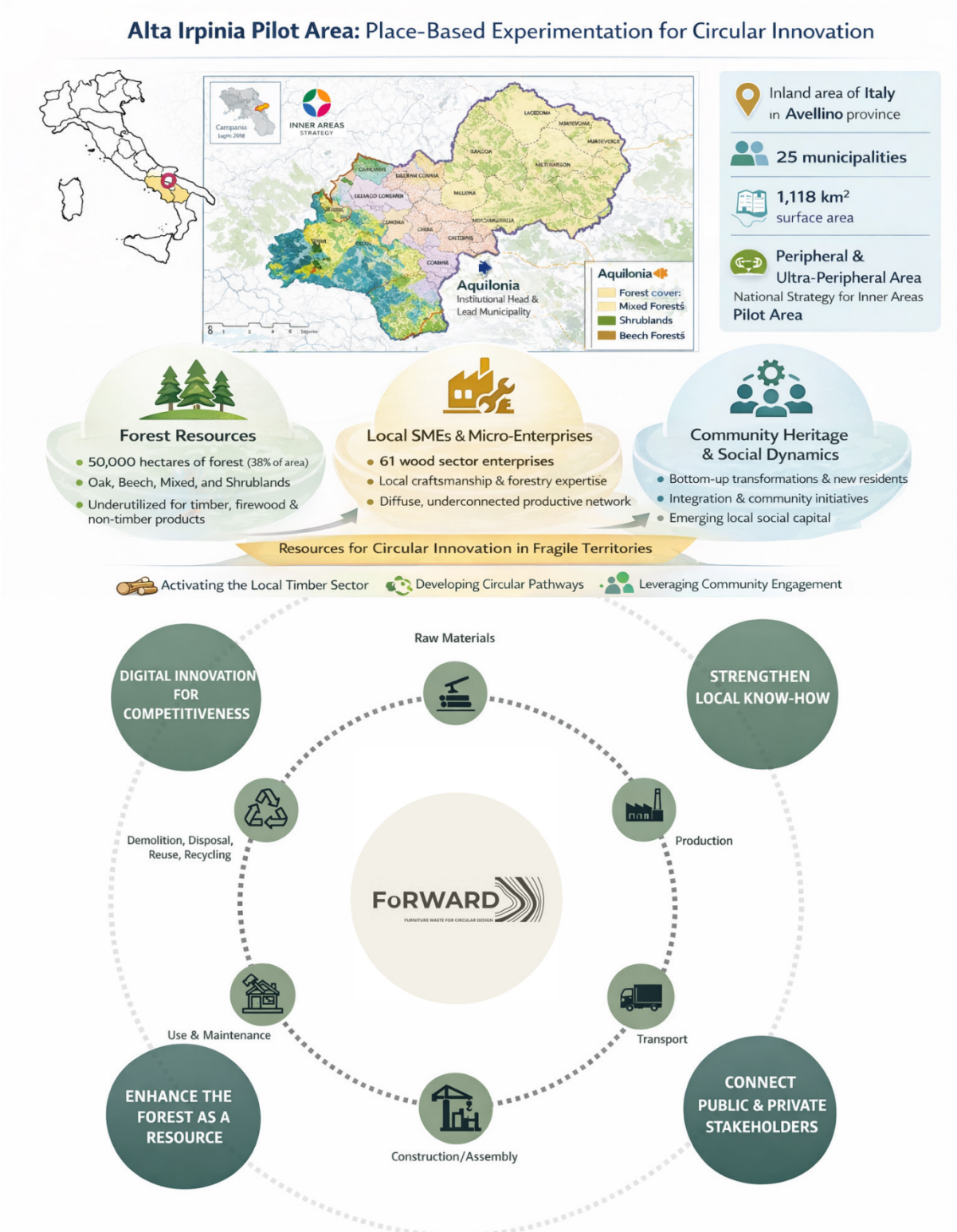


Fig. 03 – The model uses the SNAI as a conceptual and operational framework for interpreting the local production system throughout the life cycle of resources.

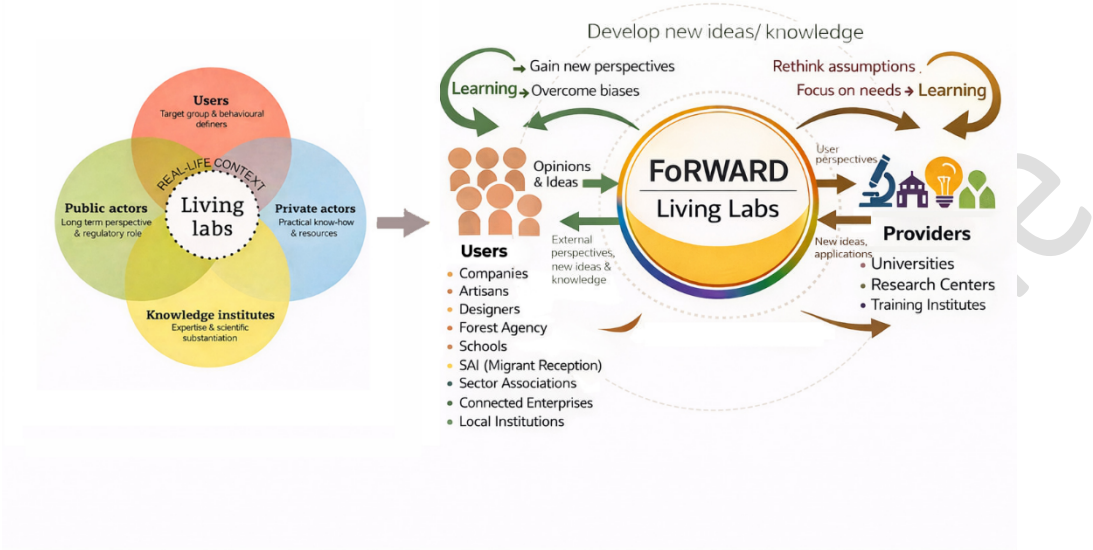


Fig. 04 – The FoRWARD Living Lab showcases the interaction between users, public and private stakeholders, and knowledge institutions in a real-world co-creation context.

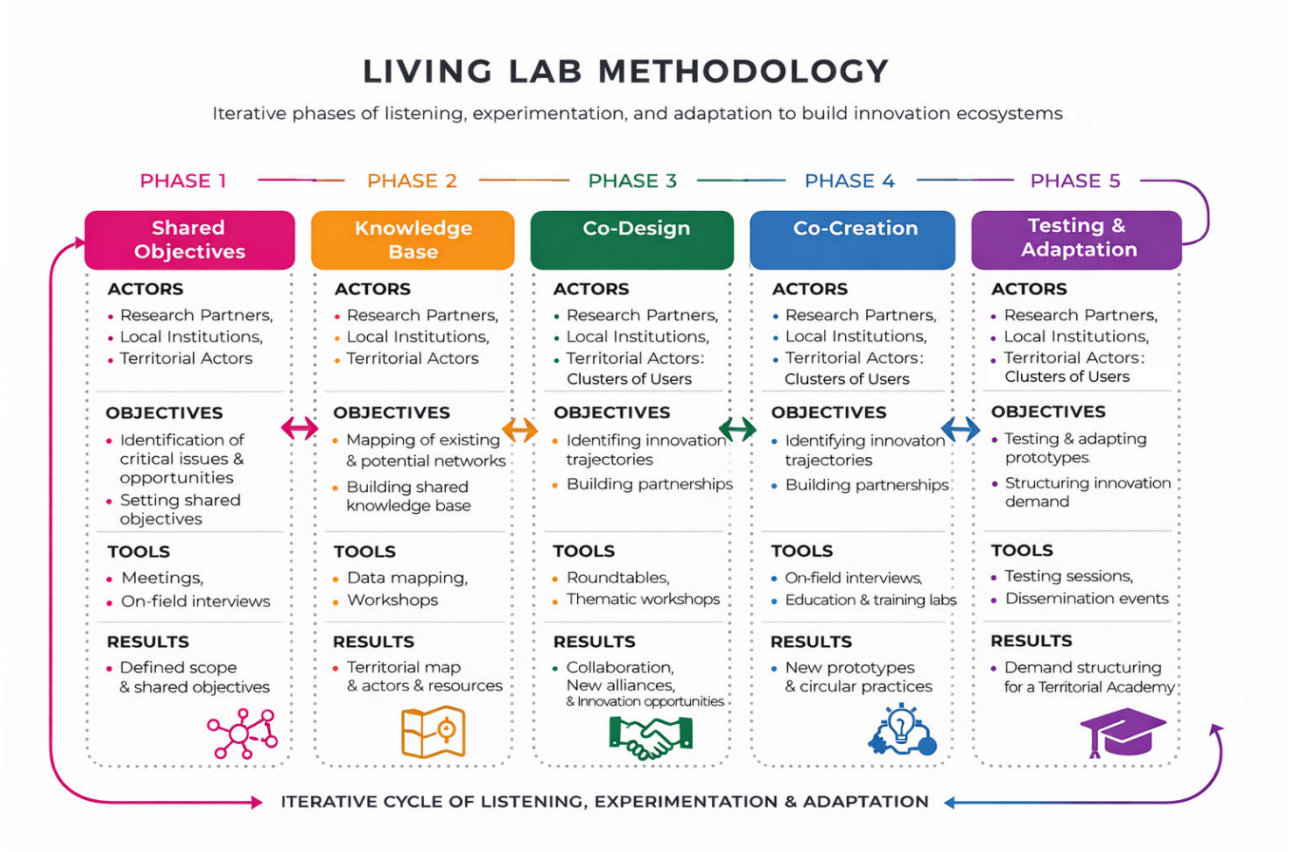


Fig. 05 – The Living Lab unfolds in five iterative phases of listening, experimentation, and adaptation.

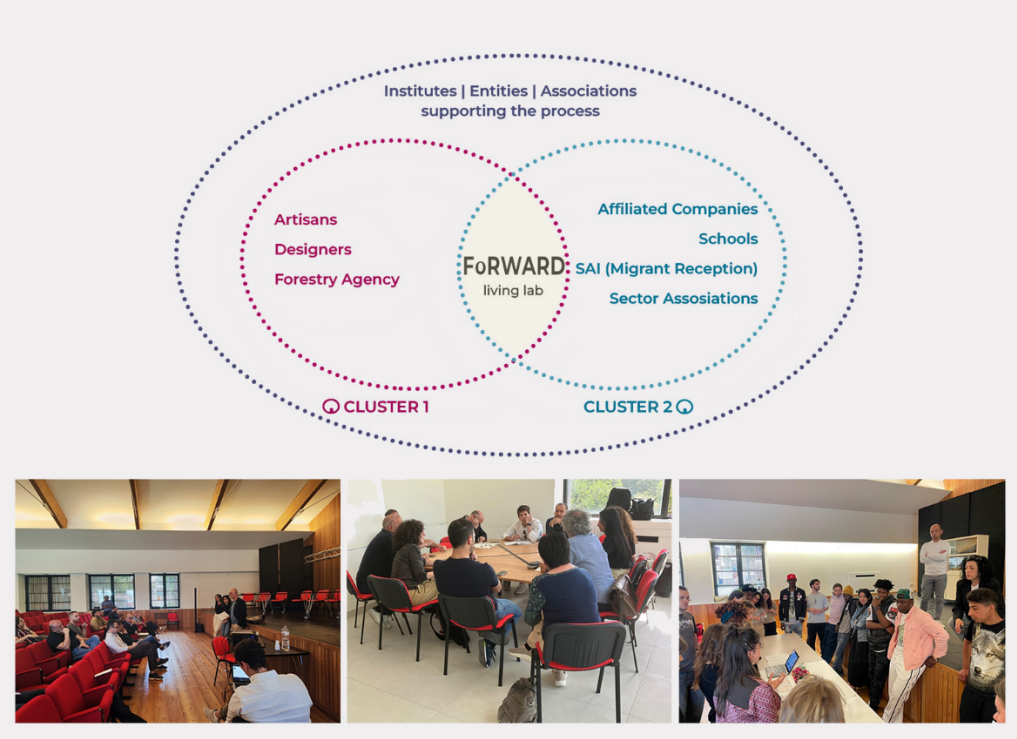
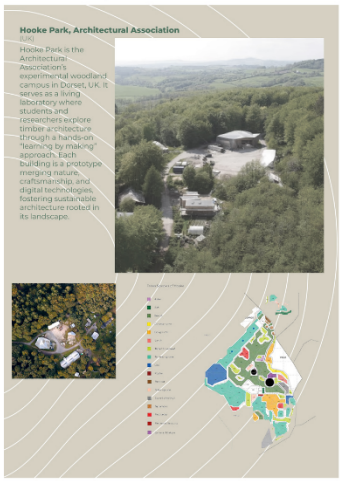


Fig. 06 – Clusters distinguish production actors and training and institutional entities, supported by support bodies.

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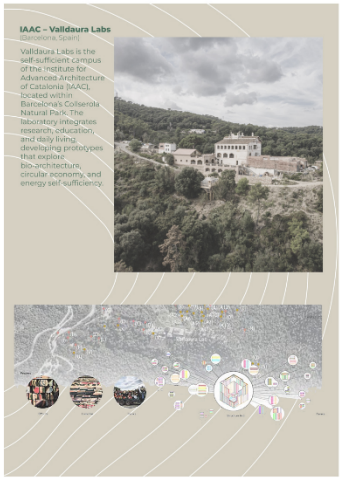
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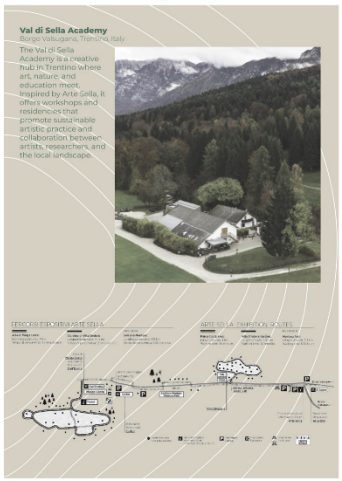






Fig. 07 – Comparative analytical sheets link training models, organizational structures, infrastructure, tools, and territorial impacts.

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