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Inner Areas Regeneration and the Circular Economy Model

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Inner Areas Regeneration and the Circular Economy Model

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Urban and territorial Functional Creative Diversity.
Innovating models fostering territorial and urban systems resilience capacities

Diversità Creativa Funzionale urbana e territoriale.
Innovare i modelli per rafforzare le capacità di resilienza dei sistemi urbani e territoriali

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ABSTRACT AND KEYWORDS

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Urban and territorial Functional Creative Diversity
The pandemic has shown the fragility and inadequacy of the urban and territorial systems in responding to the needs and urgencies of a society in transition. Functional creative diversity (and redundancy) emerges as a crucial property for the resilience of the socio-ecological systems governing the interaction processes between places, people, and nature, constituting a fertile ground for experimentation.
The paper presents theoretical considerations and operational proposals rooted in the workshop's outcomes on 'Functional Creative Diversity. Innovating urban and territorial models', promoted and organized in 2022 by the REsilienceLab. The paper focuses on two emerging and recurring needs: the experiences of social, food, and resilience hubs as experimentations fostering creative diversity in the process of innovation and re-organizing facilities and services for and of the community and the reconfiguration of alliances generative of synergies between urban and territorial peripheries.

Keywords: resilience, creative diversity, complex systems, functional adequacy, functional redundancy

Diversità Creativa Funzionale urbana e territoriale
La pandemia ha mostrato la fragilità e l'inadeguatezza dei sistemi urbani e territoriali nel rispondere alle esigenze e alle urgenze di una società in transizione. La diversità creativa funzionale (e la ridondanza) emerge come una proprietà cruciale per la resilienza dei sistemi socio-ecologici che governano i processi di interazione tra luoghi, persone e natura, costituendo un terreno fertile per la sperimentazione.
Il documento presenta considerazioni teoriche e proposte operative radicate nei risultati del workshop "Functional Creative Diversity. Innovare i modelli urbani e territoriali", promosso e organizzato nel 2022 dal REsilienceLab. Il documento si concentra su due esigenze emergenti e ricorrenti: le esperienze di hub sociali, alimentari e di resilienza come sperimentazioni che favoriscono la diversità creativa nel processo di innovazione e riorganizzazione di strutture e servizi per e della comunità e la riconfigurazione di alleanze generative di sinergie tra periferie urbane e territoriali.

Parole chiave: resilienza, diversità creativa, sistemi complessi, appropriatezza funzionale, ridondanza funzionale

1. Creative Diversity for our common futures

The pandemic has dramatically shown the fragilities of our complex urban and territorial systems reminding us how the quality and the functionality of the environment, social and economic organization, and behaviours of everyday life are connected. The multiple phenomena of pressures on socio-ecological systems result from the dynamic and complex interactions between humans and nature.

During the pandemic, the REsilienceLAB network started a co-production process involving association members, experts, and third-sector actors, activating new connections between consolidated lines of research and action on territorial and urban resilience. The Creative Diversity path is part of the "[Dis]Seminare Resilienza" project developed by REsilienceLAB and supported by the Banca del Monte di Lombardia Foundation.

The path of Creative Diversity connects different concepts and approaches to transfer the theoretical stimuli in terms of strategies to face the key challenges characterizing the territories by acting on their public component fostering resilience capacities.

Different disciplines have used and use the term resilience by developing related definitions and functional to the research focus of each disciplinary field. In ecology and psychology, the approach to resilience solicits coping and learning to live with uncertainty (Adger, 2000): changes and crises are part of the evolutionary processes of complex systems. One of the key strategies to maintain and increase resilience mechanisms is perceiving dynamic conditions and grasping changes with adaptive responses oriented towards opportunities for growth and evolution.

In psychology, resilience defines the ability to cope with stressful or traumatic events and positively reorganize one's life in the face of difficulties. Therefore, aspects and properties of the individual's resilience are the ability to find "strength" to react positively and learn from experiences, even the traumatic ones (Fletcher & Sarkar, 2013; Herrman et al., 2011).

Ecological resilience is the property of ecosystems to react to stress phenomena, activating response and adaptation strategies to restore the functioning mechanisms. Resilient systems react by renewing themselves but maintaining the functionality and recognizability of the systems themselves in the face of stress (Gunderson, 2000).

In physics and engineering, resilience is the specific property of materials that describes the materials' capacity to bounce back to the initial condition after a deformation (Colucci, 2012b, 2012a).

Multiple properties contribute to the resilience of an ecosystem (Colucci, 2012a, 2022) creative diversity and redundancy, emergent properties, flexibility and modularity, functional mechanisms and renewal cycles, feedback cycles, and memory.

Some properties and concepts are shared by all disciplinary definitions and approaches, such as flexibility and elasticity. Both materials and systems (individuals and complex systems) are more resilient if more elastic and flexible (for example, they can react to "stresses" by storing and then returning energy). Other concepts are shared by the ecological, psychological, and social approaches, such as redundancy, creative diversity, learning/memory processes, feedback functionalities, and systemic organization (Elmqvist et al., 2003; Folke et al., 2004; Gunderson, 2000).

1.2 Creative Diversity

To maintain and increase resilience capacities, the socio-ecological systems acknowledge the dynamic conditions and address changes with adaptive responses oriented toward opportunities for growth and evolution (Colucci, 2022, 2023). Under this frame, Creative Diversity emerges as propriety navigating the tensions about resilience applied to complex territorial systems, fostering alliances and synergies among disciplinary fields and policy sectors. Redundancy and Creative Diversity could be recognized as the source for replacing functions lost due to a disruptive event and provide the "stock" for activating adaptive responses concerning a multiplicity of temporal and spatial dimensions (Folke et al., 2004).

In ecology, an ecosystem has three types of diversity: biological, genetic, and functional. Each species is a single component of biodiversity itself, stored in the species' lineage (genetic diversity) and expressed through its behaviour (functional diversity). Functional equivalence (or functional redundancy) is the ecological phenomenon in which multiple species representing various taxonomic groups may share similar, if not identical, roles in ecosystem function. Redundancy and Creative Diversity are insurance strategies for maintaining ecosystems' recognizability/functionality or the preferred regime threshold.

The REsilienceLAB association promoted a co-production path to address synergies and connections among resilience practices/resilience in action and the creative diversity soliciting the contribution and mutual exchanges of and among the different disciplinary approaches characterizing the association (ecology, landscape ecology, environmental planning/urban design, psychology and sociology, informatics and environmental engineering, economy). From the debate, the need to transfer the theoretical stimuli operationally, maintaining complexity as a fundamental aspect in approaching multifaceted challenges that characterize our territories and urban systems emerged. Boosting creative diversity and redundancy of the public components of our cities makes it possible to improve the preparedness to cope with unexpected shocks activating effective responses of recovery, allowing to socio-ecosystems to adapt to changes (positive and negative), and learn from past or ongoing crises and fostering the imaginative capacity of more sustainable and inclusive development models.

Based on the resilience practices discussed, the promising emerging action assets boosting the creative diversity of territorial and urban common/public components were clustered in four principal domains:

− space for nature (space for ecological diversity and evolution and functional diversity of green spaces for one planetary health and communities' wellness);
− space for social diversity (boosting the creativity of all and the functional creative diversity in public life);
− spaces for functional diversity (boosting creative economic diversity and urban functions);
− organizational and creative diversity of processes and knowledge (the creative diversity to manage complex processes and knowledge diversity).

2. Functional Creative Diversity for our common futures

Framing the issue of urban regeneration within the framework of resilience represents a point of view that is more effective today than ever before. In this

framework, the territory is understood as a real living being «whose genes, personality and beauty are the result of co-evolutionary processes between human settlement and the environment, sedimented throughout history» (Magnaghi, 2020, p. 20).

Within the production process of human living space, Functional Creative Diversity (and Functional Redundancy) can be understood as a feature that governs the interaction between places, people, and nature.

The property of Functional Creative Diversity highlights connections between complexity and the creative and generative capacity of spatial and urban systems, which are critical to addressing social and ecological challenges. The literature has demonstrated the correlations among multidimensional indices (i.e., multi-trait indices), the different complex properties of ecosystems in response to disturbances, and, therefore, how there is an increase in variety and in the ability to activate functional responses to a perturbation in the presence of ecological systems that have multiple species performing similar functions (Nyström et al., 2000).

Especially in the urban contexts, several administrations are experimenting with functional innovation acting on the reorganization of community services to respond to the challenges of the Green New Deal (Council of Europe, 2019), and to address emergencies multiplied by environmental, economic, and social imbalances. The theme is approached starting from the objectives of equity, accessibility, decarbonization and active participation in which the property of Functional Creative Diversity is declined through the concept of multiple use and innovation of both functional models of services and management of services with the aim, on the one hand of optimizing underutilized resources, and on the other, of enhancing and diversifying services to the community.

During the REsilienceLAB workshops, several experiences and innovative models were shared and discussed. The paper retraced, using case studies, two typical concepts emerged as strategic to foster the creative diversity of urban-territorial systems: the networks redundancy and the multifunctional nodes. There is a need to innovate territorial systems with a multi-scalar approach to redundancy and diversification. The paper presents and discusses the case of a redundant and place-based slow mobility network as an innovative and promising approach for renovating territorial models able to circularize the latent resources of territories, generating alliances between peripheries and poles.

The innovation of functional nodes is explored by comparing and discussing the recent experimentations of social/food/resilience hubs. These hubs could be recognized as experimentation in diversifying and innovating the urban and territorial node community services developed in responding to the pressures and challenges of the Anthropocene. Social, food, and resilience hubs have recently been the object of experimentation both in metropolitan areas and in rarefied territorial systems, trying to give multiple answers to social, economic, and organizational questions and needs for the strengthening of systemic resilience capacities.

3. Functional Creative Diversity for generating alternatives in our urban and territorial peripheries

Within the broader scientific and policy framework of mitigating territorial inequalities between areas at different development speeds, inland areas, small

peripheral municipalities, and the so-called marginalized areas are the ones that have suffered interconnected phenomena of depopulation, population aging, decrease in essential services, weakening of educational offerings, degradation of natural and cultural heritage, and hydro-geological disruption (European Commission, 2021; Marchigiani et al., 2020; Oppido et al., 2021). Marginalized areas have always received less scientific and political attention compared to central urban areas where technological innovation, infrastructural hubs, tertiary and productive activities, and socio-cultural catalysts are polarized (Cerreta et al., 2021).

The nature of the processes and causes that have led to the marginalization of these areas, the criteria for identifying a marginalized territory, and the policies to be constructed to support their equitable and balanced development represent the issues currently most debated on this issue (Oppido et al., 2020).

Several European documents (European Commission, 1999, 2011) and research in science suggest a systems approach to the territory, looking at the new alliances between urban and territorial suburbs and exploring their functional links (Dematteis, 2021; Magnaghi, 2020; Oppido et al., 2020; Zonneveld & Stead, 2007). A study, titled "Rural-Urban Partnerships: an integrated approach to economic development," conducted by the Organization for Economic Cooperation and Development in 2013 (OECD, 2013) as part of the RURBAN project, highlights how these areas have environmental, social, cultural, and economic characteristics that make them complementary and tend to be interdependent.

«Rural areas have many resources that are essential for urban areas: they provide food and water, renewable energy (biomass, wind, hydropower) and ecosystem services (air quality, preservation of biodiversity). They also provide agricultural or forest ('greenfield') land for new commercial or industrial projects and land for urban expansion. Furthermore, rural areas can provide a high quality of living, cultural resources, and landscapes for recreation and tourism. Finally, they offer space for waste disposal and decomposition.

Urban areas, for their part, concentrate resources that are relevant for developing rural areas. For instance, they provide large markets that benefit local production, job opportunities, advanced education and skills, and commercial and public services (such as specialized healthcare). Additionally, they attract capital flows and concentrate financial institutions, but also pool administrative capacities and political power, which help local representatives to manage complex activities» (European Parliament Research Service, 2016).

The perspective of balancing metropolitan and peripheral areas may thus find different answers to the more widespread issue of tourism enhancement as a solution to counter the phenomena of depopulation, aging population, and degradation of cultural and environmental heritage. The data, quantitative and qualitative, on the diversification of capital that these areas possess must orient local communities and policy makers toward recognizing the complex functions they perform - and can potentially perform - as part of the larger territorial system (Oppido et al., 2021).

The co-production debate on the Creative Diversity promoted by REsilienceLAB investigated this property's contribution to transforming the inequality issue into a strategic asset for territorial visioning. Functional Creative Diversity and Functional Redundancy were approached and explored in response to settlement systems and communities' environmental, ethical, social, cultural, and economic needs (Caterina, 1989).

The debate developed by the REsilienceLAB identified some principles of

innovation to deal with the challenges' complexity:

- overcome «binomial representations» of the Italian and European territory, in a systemic vision and «reciprocity between places of urban concentration and places that depopulate» (De Rossi, 2018);
- overcome the use of homologated functional categories (such as the taxonomy of Hospitals, Schools, etc.), often borrowed from metropolitan areas (De Rossi, 2018);
- promote processes of renewal of urban, social, environmental, economic, and cultural models, appropriate to contexts, capable of circularizing the latent resources of territories.

3.1. The case study of the rural subway in Alta Irpinia

The project of the *"Metropolitana rurale in Alta Irpinia"* (rural subway in Alta Irpinia) represents experimentation of redundant multifunctional and muti-benefit territorial network boosting the creative system diversity. Through a performance and place-based approach (Barca, 2015), the project aims to respond to the lack of infrastructure for the mobility, one of the essential needs of marginal contexts. The project introduces an alternative and appropriate local mobility network rooted in the physical, environmental, social, and economic characteristics of the places developing a network able to systematize local resources, often underutilized, the territorial values in a circular perspective and facing multiple needs.

The project's territory is part of Alta Irpinia, one of the four pilot areas selected by the Campania Region to implement the National Strategy for Internal Areas SNAI (2014-2020). It includes more than 25 municipalities classified as peripheral and ultra-peripheral based on distance from the primary service nodes (Agenzia per la Coesione Territoriale, 2017).

Alta Irpinia is in the heart of the Campanian Apennines, characterized by a predominantly agricultural and wooded landscape, with a strong and common historical and cultural identity. The territory expresses vocation for tourism and production, which represent a latent potential mainly due to the lack of basic services and infrastructure, and the presence of a predominantly elderly population. In fact, the territory is undergoing to a slow and progressive process of depopulation with a reduction in total population of about 25 percent, since the 1971 ISTAT survey.

Although neighboring, the municipalities of Alta Irpinia are historically characterized by a low population density and a high territorial extension, with inhabited centers that are distant from each other on average 15-20 km. In these municipalities, mobility occurs mainly by private car using local, provincial, and state roads. Historically managed with private solutions, local transport is performed by private companies using road (collective) vehicles with limited journeys, mainly aimed at satisfying the demand for mobility toward schools in the area.

A group of Irpinia professionals, so-called "returners"[1], has developed the "rural subway" project to increase local public transport and improve extra-local transport offers. The innovative public mobility model for internal areas is a system of electric rubber shuttles connecting the local municipalities and the interexchange mobility nodes, retracing ancient rural/municipal roads. The rural subway route is characterized by circuits between the neighboring municipalities (about five municipalities for each circuit) that are interconnected with the intermodal exchange centers, existing (A16 motorway - Avellino-Rocchetta tourist railway Sant'Antonio)

and planned (High Speed Railway Line – High Capacity Naples-Bari - Hirpinia Station).

The innovative mobility system is conceived to serve schools, public and private health facilities, pharmacies on duty, museum sites, but also the nodes of agricultural production and industrial areas (such as Calitri, Lacedonia, Melfi), the municipal and supra-municipal public administration offices (Mountain Community, GAL, ASL, Zonal Social Plan, SPRAR, etc.).

The project proposal provides different lines with specialized routes for service categories to activate a virtuous valorization system and foster the synergies among the local services and functional nodes (work, education, health, and culture) scattered in different municipalities and fragmented (Figure 1).

Figure 1. Project of Rural subway in Alta Irpinia
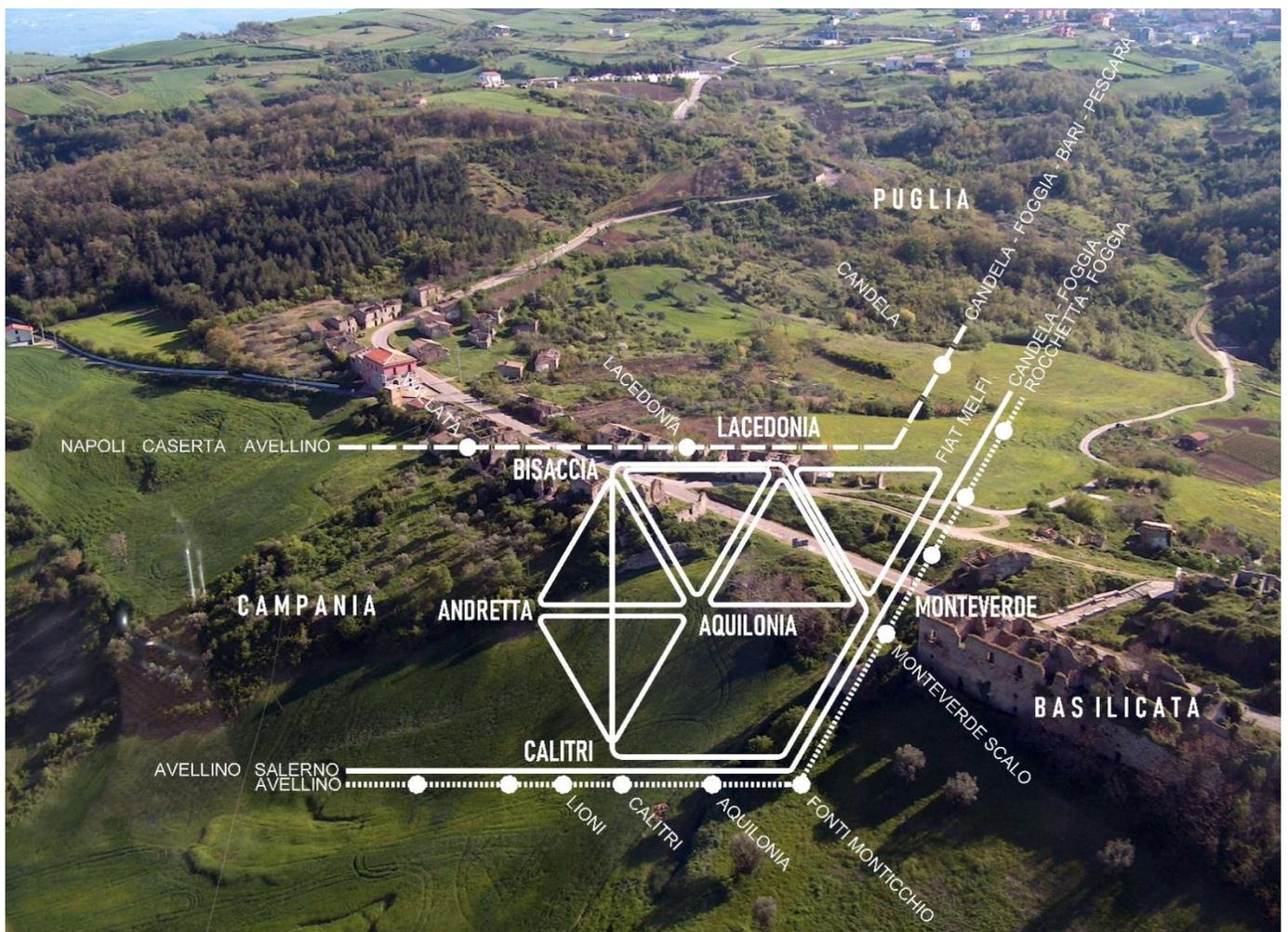
Source: ©+tstudio.

The local transport project is inspired by the city of proximity approach, innovating the theorized models for the dense urban contexts: «Functional proximity corresponds to a relational one, thanks to which people have more opportunities to meet, support each other, take care of each other and the environment, and collaborate to achieve goals together» (Manzini & Pais, 2021) p.1). The innovative slow mobility system, tailor-made for these small towns in Alta Irpinia, is designed

to be managed as a continuous service, with journeys every 15 minutes, which users can also access "by direct call", for an interconnection network between the municipalities in the area and the infrastructural networks.

The project also aims to enhance the area's touristic assets, providing bookable (from local cultural network services) and flexible mobility services connecting places otherwise accessible only privately. The rural mobility service supports and integrates sustainable accessibility during the most popular seasonal events, even on a national and international scale.

The project's feasibility, implementation, and management constitute a crucial opportunity for reorganizing a territorial network for local development. In particular, the mobility project connecting local places is an opportunity to renovate the existing inter-farm network that is degraded and underutilized, mainly used by agricultural vehicles and partly private. The new redundant mobility network/service connects the municipalities (directly and quickly) across unexpected landscapes. Based on unprecedented territorial and mixed partnership, the new accessible network generates multiple mobility services supporting diverse assets:

− conventional public transportation for public use;
− the connections of local economical nodes (agricultural);
− the touristic valorization of cultural nodes and rural landscapes.

The rural metro project was promoted by local communities and partly financed in 2022 as part of the broader project "Reinhabit the inner areas" proposed by the Campania Region and the Campana Residential Building Agency, with the scientific advice of the DiARC of the Federico II University of Naples, winner of the PINQuA National Innovative Program for the Quality of Living (D.I. n. 395 of 16/9/2020)[2].

The expected short-medium-term outcomes of the rural metro are:

− the advancement of the accessibility of places, guaranteeing the right to mobility of all users and supporting local products exchange;
− the accessibility to essential functional nodes (school, work, health) for inhabitants and to the promoted activities (cultural, sports, tourism, etc.) for inhabitants and non-residents (tourists, visitors);
− the recovery and maintenance of artifacts and infrastructures of the rural landscape (fences, fountains, drinking troughs, sheep tracks, etc.) abandoned and/or underused.

Furthermore, the system of nodes and networks generated by the rural metro provides also, in the medium-long term, the activation of processes such as:

− the strengthening of territorial cohesion between internal areas and external/ urban nodes through the development of transport hubs;
− the strengthening of local social cohesion through the reconstruction of extended social networks among local communities and the promotion of the recognition and identity of these communities in the socio-political decisions arenas;
− the enhancement of rural landscapes, the promotion of new routes to explore ordinary mobility, and the encouragement of "slow or gentle" mobility services on pedestrian networks and greenways.

The innovative mobility model for the municipalities of Alta Irpinia will be able to support the new demand from a diversified, open, and dynamic user base, which is growing in the internal Italian areas where old and new inhabitants coexist and interact in search of alternative life behaviours and interests while responding to the shortage in terms of welfare, innovation, and the new economy (Fabbricatti et al.,

2022).

4. Innovative functional diversity: social, food and resilience hubs

The reflection on Resilience Hubs was launched as part of the workshop on Creative Diversity for our common futures on 11 December 2020 promoted by the REsilienceLAB with the idea of investigating possible models and characteristics so that they can become nodes of the renewed public city, generators of creative diversity and complex nodes of strengthening local resilience.

The reflection developed by the REsilienceLAB identified some principles of innovation, complexity and coherence with the path on creative diversity:

– hubs are approached as multiple "places" (spatial, immaterial, and virtual) capable of strengthening local resilience by acting on the three dimensions of resilience: recovery/restoration, adaptation and transformation (Davoudi et al., 2013). In fact, these nodes should strengthen the resilience of local communities in case of emergencies, host spaces and opportunities to experiment with urban and social innovations for adaptation to climate change and to different stress factors (innovate urban services and functions, experiment and implement collaborative green infrastructures, circular and supportive economies, etc.) and become the arena of empowerment for everyone to imagine scenarios and projects for a more sustainable public city;

– the hubs should activate multi-scale and intersectoral connections, allow for the local experimentation of projects and policies on a metropolitan, regional or community scale (for adaptation, energy communities, inclusion, NBS, etc.);

– the hubs could facilitate synergies between local, national and international resilience practices and between different themes and foci with the aim of building alliances and mutual hybridizations towards the generation of multiple benefits on the quality and resilience of local territorial and urban systems;

– the hubs should host the principals for support services in the emergency phases (health, climatic, economic and social emergencies in collaboration with third sector, institutional actors, etc.).

4.1 Resilience hub

Resilience Hub models and experimentation spread starting from the pandemic period and in response to the intensification (by frequency and severity) of extreme weather events and natural disasters. Taking up the first model developed by the Urban Sustainability Directors Network (USDN) (Baja, 2018), it is possible to assume that the Resilience Hubs are physical spaces at the service of the community created to support residents, coordinate communication and services and provide the distribution of resources before, during or after a disaster. The strengthening of local resilience is integrated with other local demands aimed at improving the quality of life, reducing climate-altering emissions and tackling adaptation to climate change in a more coordinated way[3].

The Resilience Hubs were launched as an "innovative model" for the preparation and management of emergencies aimed at strengthening local resilience. Substantially all the models developed integrate the preparation of the communities (self help) and crucial functions for the emergency phases management including nodes guaranteeing the access to primary resources for local communities.

The various guidelines and cases underline the relevance of the quality of public places and spaces surrounding the hubs to attract local communities and become meeting places. The hubs integrating diversified services for the community (information/communication, education/training and preparation /adaptation) play a crucial role also in the inhabitants' quality of life improvement.

The models and experiences are mainly located in urban or suburban areas and recovering/upgrading existing buildings: the location also demonstrated a relevant role to ensure maximum accessibility and recognition (e.g. community centres, recreational facilities, libraries, etc.).

From a functional point of view, two aspects are common: the relevance of the co-design/co-production process with local communities as an integral aspect of the Resilience Hub's goals (communities as resources in the design and management and empowerment process) and the dimension of the multi-temporality of the functional arrangement. Hubs operate in three modalities (Baja, 2018): normal mode, response mode during the event/phenomenon and recovery mode (post-event/response).

It is possible to identify some clusters of recurring functions/activities of the Resilience Hubs models:

− coordination functions and functional diversity of services: for urban health and well-being (e.g. Health services/basic Medical supplies, Mental health, Fitness facilities) related to food (growth of Fresh/local food, Horticulture/Cooking classes), of/for training (such as workshops or training for work inclusion: Community arts/culture, Job training, Trainings on finances) and coordination of social initiatives (older, adult and youth/child services and program);
− spaces and places to welcome people and functions in conditions of stress (e.g. Heating and/or cooling, Meal services, Showers and restrooms) or emergency (Support for reuniting families);
− infrastructure or access to primary resources (Wi-Fi access, Food/water distribution, Computers);
− emergency capacity building (Community emergency response training);
− experimentation of climate policies such as Energy Communities;
− enhancement of organizational diversity for the dissemination of administrative functions (Administrative Desk Information) and preparation and management of emergencies (info/coordination of activities and services available during disaster) and coordination of social and health programmes.

4.2 Community Hub and food hub

Community Hubs can be defined as multipurpose institutions that offer a variety of services (for example, Education, Social and Health) in combination with cultural, recreational activities to enhance community well-being. Community Hubs were launched with the aim of creating/strengthening social networks to reduce social vulnerabilities and give effective answers to local questions (McShane & Coffey, 2022).

With the increasing frequency of extreme events related to climate change, community hubs have integrated and adapted services and functions to increase local resilience, such as shelters/emergency accommodation, information centres, community kitchens and response services and recovery. During the COVID-19 pandemic, many community hubs have reorganized services to respond to the

primary needs of the community (for example Food baskets, Meals and Hygiene items). Community Hubs have been shown to improve the well-being of local communities by providing more effective/flexible and close responses to local needs by improving access to services, connectivity, and social cohesion in the community (McShane & Coffey, 2022). The results of the Community Hubs related to social cohesion constitute an important inspiration for the Resilience Hubs.

Food Hubs experimentations show diversified models, some are nodes closely related to the food supply chains, others, like those considered, are the Food Hubs promoted with the food policies (Urban Food Policy). Without going into the dimension of food policies and the role of Food Hubs in different urban and metropolitan contexts, it is important to underline how food hubs (at least in the Italian context, and in Milan in particular) are successful experiences in supporting the diversification of food distribution networks initiatives (GAS centres/nodes, distribution of local products directly from producers), in connecting and supporting urban agriculture experiments (social, community) and collaborative green management becoming places for sharing sustainable food culture and cultures (collective, local cuisines, circular economies and food health) and nodes for the implementation of Urban Food Policy. The Urban Food Hubs hosted multi-benefit initiatives (institutional, of the third sector and mixed) for the distribution of food, the reuse and reduction of food waste. In relation to the peculiarities of the local context, they also have very different functions, but generally they are rooted in synergies and alliances between local, metropolitan/regional and global actors with different natures and roles distributed along the supply chain of food systems.

The pandemic COVID-19 crisis revealed the fragility of centralized food distribution networks and showed the importance of diversification (direct sales, farm shops, local shops) (O'Hara & Toussaint, 2021). The actors, such as associations, community networks, local production networks, that gravitated around the Urban Food Hubs quickly activated emergency responses for food distribution, organizing home delivery services and promoting alliances with emergency management networks. The pandemic has reinvigorated the debate on the fragility and vulnerability of food systems and the need for their diversification by strengthening the role of local food systems The experiences of Food Hubs provided responses to multi-sectorial urgencies emerging in the metropolitan peripheries: fostering local food initiatives generated tangible advancements in social cohesion and inclusion, supported local and micro/social economic initiatives, and collective green stewardships enhancing the local urban regreening.

Many of the characteristics of the Resilience Hub hypothesized by the REsilienceLAB at the start of the in-depth study are confirmed as key ingredients of the models and comparative experiences.

It emerges how it is more urgent (useful) to imagine and activate multiple experiments of innovative functional "nodes" capable of strengthening local and urban creative diversity by overcoming the question of naming and differentiating between "Resilience/Community/Food" Hubs and focusing on the promising ingredients of experiments and experiences (Figure 2).

**Figure 2. Graphical scheme summarising the model of
"Resilience/Community/Food" Hubs proposed by REsilienceLAB**
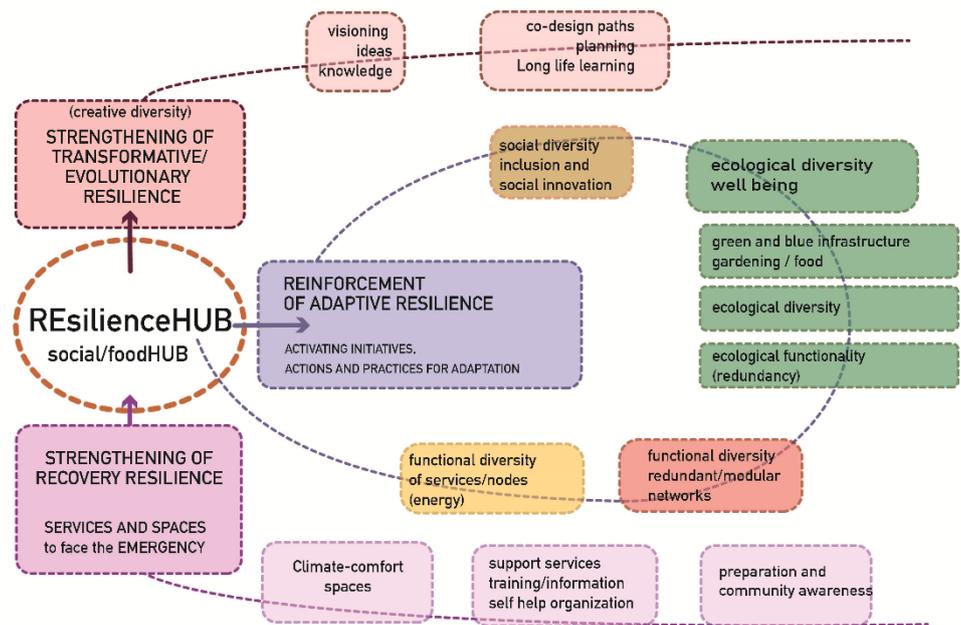
Source: Elaborated by the author Angela Colucci.

5. Boosting resilience: contribution of creative diversity property

The concept of creative diversity and functional redundancy as a driver and challenge for territories represents a promising experimentation and research field, mainly when the poor response capacity of our living environments has emerged, both unexpected and foreseeable events.

From the various approaches to the topic, explored/discussed during the co-production path organized by the REsilienceLab, shared urgencies emerged, such as the need for functional models appropriate to the contexts and which at the same time look at interactions on a large, systemic and territorial scale; the importance of the spatial dimension, of being rooted in places also for building awareness and local skills; the priority in building and urban reuse strategies of functions with generative, regenerative and symbiotic capacities.

The paper presents and discusses two innovative experimentations boosting the functional creative diversity rooted in two concepts: the diversification and redundancy of the networks, and the multifunctionality and innovation of functional nodes. Fostering the innovation and the diversification of both the "networks" and the "functional nodes" emerges as crucial urgency to boost the redundancy and the creative diversity of our territorial and urban system.

The case study of the rural subway in Alta Irpinia is an example in which the approach of creative diversity, through the development of innovative models and place-based solutions, represents a driver for triggering innovation processes and enhancing balanced territorial development between urban/dense and marginal areas. The presented case proposes introducing innovative mobility, a redundant, multi-functional, and adaptive network to foster the creative diversity of the territorial context. The model is rooted in the local latent resources systemization to envisage social, economic, and landscape reactivation.

The case study interprets the theme of proximity as a prerequisite for interactions on a large, systemic, and territorial scale based on local communities' empowerment toward improving resilience capacities.

The comparison and dialogues concerning the innovative social/food/resilience hubs experimentation permitted identifying some shared principles highlighting how the Hubs must be configured as a physical, immaterial, and virtual node/place to strengthen local resilience. The Hubs models represent promising experimentation of functional diversification and innovation. The Hubs emerged as physical places to host dialogue-project processes, giving them continuity and stability over time, to imagine and where to implement interventions to improve the public city and where to activate experiments transition (energy communities, creative workshops, training activities and co-production of knowledge). They are also nodes from which to activate responses in urgent emergency conditions (climate comfort zones, emergency rooms, and shelters, preparation activities, supply of sanitary materials, etc.). The Hubs work on the three dimensions of resilience: recovery, adaptation, and transformation, where many proposals and strategies can be implemented to increase the Creative Diversity of our urban systems.

The hubs have so far had predominantly urban experiments. A crucial and urgent aspect is also to imagine the Hubs as generating nodes of diversity and redundancy even on a territorial scale, connecting suburbs and rebuilding social and territorial connections as integrated components of innovative diversified networks.

Notes

1. The project was developed by +tstudio, Aquilonia (AV).
2. The working group of the "Rehabit the Inner Areas"' project consists of: A.M. Pirone general design coordinator; C. Andreotti (ACER/ Avellino), V. De Leonardis, M. Senatore (ACER/ Salerno) supporting the regional RUP; V. Tenore (+tstudio) architectural designer, with V. Tenore, F. Sibilia, E. Mastrangelo, A. Di Prenda, M. Scalisi; the DiARC of the University of Naples Federico II scientific consultant of the project, with F. De Rossi, M. Russo (resp. sc.), E. Formato, A. Sgobbo (sc. coord.), A. Picone (project coord.), F. Ascione, G. Berruti, K. Fabbricatti, G. Laino, C. Mattiucci, E. Muccio, G. Poli (project team).
3. The Resilience Hub models taken into consideration derive mainly from reports, guidelines and campaigns launched by international organizations such as (without claiming to be exhaustive): Resilience Hub of the Urban Sustainability Directors Network (https://www.usdn.org/resilience-hubs.html); the guidelines developed by the UN Office for Disaster Risk Reduction (UNDRR) as part of the Making Cities Resilient 2030 (MCR2030) campaign (https://mcr2030.undrr.org/resilience-hub); the platform developed by UN-Habitat / Urban economic resilience (https://urbanresiliencehub.org/); the model of the UN Climate Change Conference (COP27) https://cop-resilience-hub.org/); to these are added some local experiments and/or networks of associations such as "The NorCal Resilience Network" (https://norcalresilience.org/resilient-hub-initiative/), that of the Frontline Civilians (http://frontlinecivilian. com/), or the Mercy Corps (https://www.mercycorps.org/research-resources/resilience-hubs).

Author Contributions

Although the authors jointly contributed to the conception and design of the work, the final drafting of the paragraph "1. Creative Diversity for our common futures" is attributed to Angela Colucci; of the paragraph "2. Functional Creative Diversity for our common futures'' to both of the authors; of the paragraph "3. Functional Creative Diversity for generating alternatives in our urban and territorial peripheries'' to Katia Fabbricatti; of the paragraph "4. Innovative functional diversity: social, food and resilience hubs'' to Angela Colucci; of

the paragraph "5. Boosting resilience: contribution of creative diversity property" to both of the authors.

Conflicts of Interest
The authors declare no conflict of interest.

Originality
The authors declare that this manuscript re-elaborates and supplements the contents of the following paper: Fabbricatti K., Colucci A. (2022), "Diversità creativa e ridondanza funzionale. Innovare i modelli urbani e territoriali", in Moccia F.D., Sepe M. (a cura di), XIII Giornata Internazionale di Studi INU - 13°Inu International Study Day "Oltre il futuro: emergenze, rischi, sfide, transizioni, opportunità - Beyond the future: emergencies, risks, challenges, transitions, and opportunities" (Napoli, 16 December 2022), *Urbanistica Informazioni*, n. 306s.i., INU Edizioni, Roma, pages 819-822.

The authors also declare that the manuscript is not currently being considered for publication elsewhere, in the present of any other language. The manuscript has been read and approved by all named authors and there are no other persons who satisfied the criteria for authorship but are not listed. The authors also declare to have obtained the permission to reproduce in this manuscript any text, illustrations, charts, tables, photographs, or other material from previously published sources (journals, books, websites, etc).

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