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New Metropolitan Perspectives

Knowledge Dynamics and Innovation-driven
Policies Towards Urban and Regional
Transition Volume 2

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Preface

This volume contains the proceedings for the Fourth International “*NEW METROPOLITAN PERSPECTIVES. Knowledge Dynamics and Innovation-driven Policies Towards Urban and Regional Transition*”, scheduled from 26 to 28 May 2020, in Reggio Calabria, Italy.

The Symposium was jointly promoted by LaborEst (Evaluation and Economic Appraisal Lab) and CLUDs (Commercial Local Urban Districts Lab), laboratories of the PAU Department, *Mediterranea* University of Reggio Calabria, Italy, in partnership with a qualified international network of academic institution and scientific societies.

The fourth edition of “*NEW METROPOLITAN PERSPECTIVES*”, like the previous ones, aimed to deepen those factors which contribute to increase cities and territories’ attractiveness, with both theoretical studies and tangible applications.

When the call for papers of New Metropolitan Perspectives was launched in September 2019, no one could imagine that in a few months we would find ourselves suddenly catapulted into a totally unknown future. And the papers sent in January 2020, of course, could not in any way reflect the dynamics caused by the spread of COVID-19, the outlines of which will all be discovered and deepened in the coming years: it is still too early to fully understand the extent of these changes.

Today, we are still dealing with what appears to be a cataclysm of planetary proportions; it will take time to “historicise” events and interpret their profound meaning and long-term impact, through the multi-level observation—through the interpretation of macro-data and the in-depth investigation of the different realities involved—that the scientific community will be able to develop when the health emergency is over. At that point, the scenarios can begin to be configured with scientific rigour, which are beginning to be intuitively delineated in constant events. It will be possible to appreciate the permanent (real and perceived) effects on the daily life of communities, on the organisation of work and logistics chains and in the system of social relations.

At present, we can only hypothesise scenarios, more or less well founded.

The common thread that linked the different themes from the Symposium in its original conception was technology, in particular the effects produced on the settlement systems by the relationship between man and technology, in two different aspects: the progressive replacement of man with machines in practically all production processes and the spread of ICT.

The pandemic and the policies and practices put in place to contain the infection have brought this issue to the fore with arrogance. The replacement of physical interactions with “virtual” contacts has used consolidated technologies but has accentuated their pervasiveness, generating impacts of a different nature. The next few months will tell us how much of this acceleration will persist in our daily lives and how much it will be a transitory phenomenon.

Permanent changes are conceivable, for example, in the organisation of work, with the adoption of smart working as an ordinary way of carrying out the various tasks, also in areas where until a few months ago it seemed a distant future, such as in teaching.

And these changes will probably also affect other areas, just think of the use of culture, in a broad sense, as the many virtual opening initiatives of museums and sites of cultural interest have shown us in this period.

As well as central issues for democratic systems will be those related to the use of big data and their impact on individual freedoms: the ongoing debate on tracking movements and personal preferences is extremely topical.

However, the data that seems to emerge with greater force from the phase we are experiencing is the progressive loss of relevance of the location factor: the pandemic has made even more evident the fall of many barriers to the global dimension of relationships and exchanges. This change brings with it, as a consequence, a change also on the plane of centre–periphery dualism: what is centre and what is periphery, when the two terms no longer refer to accessibility to physical places but, for example, accessibility to goods and services and, ultimately, to knowledge? And how do you measure accessibility if you can no longer measure in metres or hours?

The other phenomenon on which it will be increasingly necessary to reflect in future is the speed of changes. As already underlined on the occasion of the past edition of the Symposium, while society evolves with accelerations impressed by endogenous and exogenous factors (such as the pandemic COVID-19), the physical dimension of space adapts with extended times.

At the dawn of the studies on the impacts of ICT on the city, the “wired city” studied by the research group of Corrado Beguinot was divided into a system of three cities: stone, relationships and experience. To harmonise the development times of the physical city with the “liquid” city of human relations is, after thirty years, still a priority.

So how will our cities and, more generally, the settlement systems on a planetary level record these changes? Will the trend towards population concentration persist in hyper-equipped and congested metropolitan areas or will we see reflux? New perspectives open up towards what are now considered peripheral areas (such as the inner areas so dear to our Master Edoardo Mollica), in which perhaps some

organisational processes are more easily managed and there are still values that could be appreciated by future generations?

The ethics of research, in the disciplinary sectors that the Symposium crosses, invites us to feed, with scientific rigour, policies and practices that make the territory more resilient and able to react effectively to events such as the pandemic that we are suffering in recent months: we hope to know the outcomes of these courses in the next editions of the New Metropolitan Perspectives Symposium.

For this edition, meanwhile, approximately 230 papers published allowed us to develop 6 macro-topics, about “*Knowledge Dynamics and Innovation-driven Policies Towards Urban and Regional Transition*” as follows:

- 1 - Inner and marginalised areas’ local development to re-balance territorial inequalities
- 2 - Knowledge and innovation ecosystem for urban regeneration and resilience
- 3 - Metropolitan cities and territorial dynamics. Rules, governance, economy, society
- 4 - Green buildings, post-carbon city and ecosystem services
- 5 - Infrastructures and spatial information systems
- 6 - Cultural heritage: conservation, enhancement and management

And a special section, *Rhegion United Nations 2020–2030*, chaired by our colleague Stefano Aragona.

We are pleased that the International Symposium NMP, thanks to its interdisciplinary character, stimulated growing interests and approvals from the scientific community, at the national and international levels.

We would like to take this opportunity, together with Carmelina Bevilacqua and the CLUDs Lab team, to thank all who have contributed to the success of the Third International Symposium “NEW METROPOLITAN PERSPECTIVES. *Knowledge Dynamics and Innovation-driven Policies Towards Urban and Regional Transition*”: authors, keynote speakers, session chairs, referees, the scientific committee and the scientific partners, participants, student volunteers and those ones that with different roles have contributed to the dissemination and the success of the Symposium; a special thank goes to the “Associazione ASTRI”, particularly to Giuseppina Cassalia and Angela Viglianisi, together with Immacolata Lorè, Tiziana Meduri and Alessandro Rugolo, for technical and organisational support activities: without them, the Symposium could not have place; obviously, we would like to thank the academic representatives of the Mediterranea University of Reggio Calabria too: Rector Prof. Marcello Zimbone; responsible of internationalisation Prof. Francesco Morabito; and Chief of PAU Department Prof. Tommaso Manfredi.

Thank you very much for your support.

Last but not least, we would like to thank Springer for the support in the conference proceedings publication.

Francesco Calabrò
Lucia Della Spina

Cities and Regions Towards Transition

The fourth edition of the New Metropolitan Perspective Symposium took place in a period of global uncertainty that is calling into question the essence of the economic prosperity pursued in the last decades. It is recognised that what is urgently required is a policy shift from a primary push towards ever-increasing productivity and competitiveness goals to one that pursues a “renewed” concept of competitiveness—socially just and environmentally responsible—employing a reformed pan-economic approach. The continuing and progressive changes due to the systemic impact of shocks and stresses at the global level need a convergence of efforts by all countries. This is critical to balance the need to maintain economic prosperity generated by globalisation and to mitigate global crisis like climate change and the ongoing COVID-19 pandemic. The scenario that is emerging these days is similar to a post-war reconstruction economy, alongside climate change and the risks associated with it, the emergency of the pandemic has seriously questioned social stability at the urban level and the confluence of institutions in multi-level governance processes. Concurrently, the main question to be addressed can no longer be confined to how cities and regions can compete in a global context, but rather how they can survive in a world that must face the effects of continuous shocks by ensuring socially acceptable living conditions for everyone.

At European level, this need has been stimulating the debate for the revision of policies designed to build a better Europe for its citizens and a “restructuring process” of EU institutions in the light of anti-European, populist and sovereign political movements. These movements together with far-reaching global crises and shocks are threatening the future of EU and the Cohesion Policy grounded on the virtuous principle to reduce disparities by promoting social, economic and territorial cohesion. In response, the European Commission has recently introduced the European Green Deal, a set of policy initiatives to strive for a green transition based on solidarity and fairness. This marks a novel growth strategy that is comprehensive, ambitious and bold, integrating climate, environmental and social protection goals with economic ones. Such a transformative pathway helps set the stage for policy actions in the upcoming post-2020 programming period of the Cohesion

Policy. Arguably, these days the perspective of the EU mission will be redesigned, through new priorities and new tools launched for Shaping the Conference on the Future of Europe.

In this context, the debate on how to prepare EU territories and cities to address challenges of regional and global implications cannot be more relevant. The current development approaches need to be adjusted to formulate a new development pattern. Such a pattern is characterised by a more flexible approach in allocating investment, a more integrated approach to reach the goal of transition development and a more tailored, place-sensitive approach to regional development. It should facilitate a sustainable transition process towards transforming regional and urban socio-economic and technological systems. This process will be driven with an evolutionary approach in which knowledge and innovation dynamics can break path dependency and promote an effective regional diversification. This pattern should be underpinned by an integrated, multi-scalar and multidimensional approach aimed to enhance the resilience capacity of territories to respond to the various crises and shocks they are exposed to.

To substantiate these arguments, the Symposium was also part of the TREnD (Transition with Resilience for Evolutionary Economic Development) research project funded by the European Union's Horizon 2020 Research and Innovation Programme under the Marie Skłodowska Curie Actions – RISE 2018. Considering the above-mentioned unparalleled yet controversial complexity while responding to the European call for the green transition, TREnD proposes a new approach in the design process of place-sensitive, innovation-oriented development policies that can facilitate the regional and urban transition to sustainability while reinforcing resilience to shocks induced by transition economies (e.g. post-carbon economy). TREnD's approach is focused on how to strengthen the regional capabilities to trigger, implement and manage transition strategies towards driving "resilience-building" processes. The scope is to combine Transition with Resilience for Evolutionary Development in different territorial contexts towards a reforming process of Cohesion Policy for the next programming period 2021–2027. The TREnD, therefore, seeks to: 1) identify and examine the factors enabling or hindering the transition strategies at a governance standpoint; 2) assess the territorial characteristics critical to enable a resilience-building process; and 3) unveil the unexploited potentials for "reshaping trajectories" disclosed through the windows of local opportunities due to the external shocks cities and regions are continuously exposed to.

TREnD highlights regional diversification seen more as a process of co-creation of solutions and concepts to solve development problems through the enhancement of the resilience capacity of regions, which can be achieved by implementing tailored place-based innovation policies with a transitional approach. Stemming from the current debates on regional diversification together with the emerging role of the city in pursuing local innovation ecosystem, the aim is to explore new development policy configuration within the evolutionary framework to help different territories effectively respond to continuous shocks. It is expected to gain a sound understanding of the triggering mechanisms conducive to frame a more

inclusive S3 process for the post-2020 Cohesion Policy. This new framework, thanks to resilience-based process and transition management, will help define tailored S3 processes more sensitive to different regional contexts and needs. In so doing, it will reinforce innovation diffusion, facilitate diversification and tighten the linkages between advanced and peripheral areas (at regional and sub-regional levels) through more inclusive approaches.

Considering this vision, the Symposium tried to offer possible solutions to sustainable development as defined by the UN Agenda 2030, focusing on the complex and dynamic relationships between human society and technological development, and the latter's socio-economic, political, institutional and environmental impacts on territorial and urban systems. Indeed, investigating the nexus between the ever-changing societal needs and rapid technological development represents a valuable opportunity to achieve this ambitious goal. The desired shift towards a more sustainable knowledge-based economy and society since the beginning of the 2000s, especially in developed countries, is impeded by several challenges. In Europe, the Smart Specialisation Strategy (S3) represents the strong push to boost economic development through knowledge, research and innovation. The current academic and policymakers' debate is questioning its capacity to break down path dependencies and facilitate economic diversification. The difficulties in implementing and doubts about the effectiveness of this ambitious innovation-oriented policy—especially at regional level—suggest the need to revise the post-2020 Cohesion Policy and the approach beyond Regional Smart Specialisation Strategy (RIS3). Among the rising concerns, the controversial effect of innovation concentration on peripheral areas due to the new geography of knowledge is coming to the fore. The surging discontent shows how policymakers are struggling with continuous mutating scenarios characterised by more complex territorial dynamics. The pillar on which the current policy action seems to rest is represented by the potentials underlying knowledge complexity and innovation in reversing negative trends. However, recent studies have pointed out how such complexity is giving rise to inequalities in both core and lagging regions, making peripheral areas a common issue to tackle. More efforts are needed to address different aspects of inequalities connected with the new geography of knowledge. Therefore, a more inclusive and integrated approach is desirable to advance technological innovation while addressing social issues of health, environment, education and social exclusion.

Accordingly, the Symposium stimulated multidisciplinary discussions on the key elements of the debate on a shift in policy design and implementation, including transition management, resilience, diversification and quality of governance to leverage the potentials of peripheral areas and reshape the trajectory of economic growth for more equitable development. It aims to identify a new and balanced developed pattern, casting light on the multi-scalar and multidimensional analysis of different perspectives, strategies, tools, objectives and impacts of local economic development and innovation processes. Such a pattern needs to be framed within the United Nations 2030 Agenda (TS25) and to reach the Sustainable Development Goals (SDGs).

The sessions have been organised around key elements affecting vertically (multi-level) and horizontally (cross-sectoral and multidisciplinary) the social, economic, institutional, organisational and physical/environmental dimensions of local economic development. The themes of sessions followed the key elements of the debate on a shift in policy design and implementation to drive transition-oriented structural change of regions. This echoes the EU's desirable smart transition that requires an economically prosperous and socially inclusive transition process to promote regional convergence. Sessions TS04T1, TS04T2, TS04T3 and TS04T4 altogether build up the overall theoretical framework of a sustainable transitional development, offering insight into knowledge complexity, transition management, resilience, diversification and quality of governance to leverage the potentials of peripheral areas and reshape the trajectory of economic growth for more equitable development.

To achieve a smart transition, it is critical to reinforce the resilience of regions at different territorial scales, especially those expected to be more affected, to respond to the shocks that green and digital transitions are likely to trigger. In this regard, the Symposium undertook a multifaceted and multidimensional conceptualisation of resilience, for which sessions TS01, TS25 and TS26 investigated territorial system resilience, urban resilience and sustainability. Session TS07 looked into smart and resilient infrastructures, and sessions TS09 and TS23 investigated urban and built environment with sustainability and resilience. Sessions TS02, TS06, TS10 and TS21 pay close attention to territorial and urban regeneration. Urban and territorial regeneration is considered as a useful tool to facilitate territorial and urban resilience-building processes by promoting positive physical transformations and thereby increasing cities' preparedness and response capacity to crises and shocks. Sustainable urban and territorial regeneration needs to define new economic and territorial strategies within a period of financial constraints. Therefore, session TS21 casts light on the issue of circular regeneration, while session TS03 conducts a critical review of territorial dynamics and urban growth models.

The value-adding of local assets from the urban–rural perspective offers a chance to define alternative development patterns. In this respect, cultural heritage, as potential local assets, needs to be properly leveraged to drive sustainable local development. The Symposium, therefore, highlighted innovative approaches to heritage management. Session TS19 casted light on the enhancement of cultural heritage in fragile areas; session TS20 presents new management strategies for the value-adding of heritage in inner areas; session TS22 relates heritage management to climate change, exploring integrated conservation strategies based on traditional and innovative technologies able to help mitigate the negative effects of climate change. The Symposium equally gives insight into the urban transition towards a post-carbon society, a key element useful for the discussions on the new objectives of the post-2020 Cohesion Policy and new strategies and tools. Accordingly, session TS23 investigated an ecosystem services approach to the evaluation of settlement transformations; session TS12 was focused on green building related to post-carbon transition, and session TS30 furthers session TS12 and proposed eco-design-based strategies and approaches.

As in the past editions, this year's Symposium has received generous support from and will see the participation of a high-quality international network of higher academic institutions and scientific societies. Therefore, it will undoubtedly serve as an important occasion for exchanging and disseminating research findings and stimulating a fruitful debate on global challenges among academics and policy-makers. All in all, the Symposium and the contributions to its different sessions contributed to deepening the discussions on a transition-oriented approach—on which the TREnD project is grounded—while offering insights into how to fill the existing gaps.

Carmelina Bevilacqua

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The Abandoned Railway Heritage: From Problem to Opportunity for the Regeneration of Minor Historic Centres

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Abstract. The phenomena of socio-economic polarization, metropolization and intensive exploiting of territorial resources have progressively weakened the relationship between historic centres and territorial context, fostering unsustainable forms of mobility and land use transformations that require new strategies for territorial rebalancing and regeneration.

In particular, on the one hand, minor historic centres are nowadays involved in phenomena of abandonment, ageing of the population, declining of local economies that suggest a relaunch of activities and facilities in the framework of sustainability, denying speculative and pollutant touristic development. On the other hand, the heritage of these *inner areas*, constituted by landmarks of Italian historic masterpieces, need a preservation and valorisation of their identity forms and cultural values within a territorial point of view.

In this context, the increasing number of secondary lines characterized by underutilization, result of liberalization processes and unfair mobility policies, have produced enormous social costs in terms of social exclusion, depopulation and weakening economies of widespread historic settlements.

The paper focuses on the role of dismissed minor railway networks, at the same time, for enhancement and relaunch of this minor historic centres and territory, with particular reference to railways lines of landscape interest and historic trains, in a broader concept of the notion of cultural heritage. In fact, the abandonment of this mobility networks is recognized as a challenging opportunity for the regeneration of lines, stations, bridges, roadman's houses, and the innovation of tourist services towards resilience paths, supporting the reflection with an emblematic best practice from the Abruzzo and Molise Regions.

Keywords: Resilience · Cultural heritage · Fragile territories

The paragraph 1 is attributable to C. Amato, the paragraph 2 to G. Bevilacqua, the paragraphs 3, 4.1 and 5 to C. Ravagnan and the paragraph 4.2 is attributable to C. Amato and G. Bevilacqua.

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1 Territorial Imbalances, Fragility and Inner Areas. The Italian References in the European Context

The recurring cyclical nature of the economic crises, the instability of the economic markets, the processes of late industrialization and deindustrialization, climate change and deterioration of ecosystems, have deeply transformed the traditional perspectives of urban development and socio-economic dynamics. Since the second post-war period there has been a strong industrialization of Italian territory, which already produced at the end of the 1980s a territory characterized by a system structured around attraction poles of primary services, causing the actual polarization, congestion, inefficiency and social conflicts. Around these poles of a metropolized territory [1], a fragmented urban sprawl is linked to the main centres within economic and commuting dynamics, contaminating rural areas with incompatible and hybrid uses. These processes affect the structure of the territory, which presents the pathological features of an enormous proliferation of settlements characterized by widespread fabrics and flows of private multidirectional mobility [2].

The progressive expansion of these settlements around the attraction poles and the corresponding territorial imbalance are fostered by the phenomena of abandonment of the so-called inner areas, defined by the former Italian Public Investment Evaluation Unit as «areas far from the centres that offer essential services such as education, health, mobility, connectivity, and characterized by depopulation and degradation processes». These areas represent today 61% of the national territory where less than 20% of the Italian population resides (ISTAT 2016), a significantly reduced percentage compared to early decades of the 20th century. These differences are not only attributable to the classic north/south gap, but are linked to many factors inherent the unequal development between city and countryside, between mountain and plain, between coast and hinterland [3]. This network of former territorial centrepieces, after the end of the Second World War was affected by significant phenomena of abandonment. It has progressively declined through the weakening the interactions that for centuries had fed the whole system; transhumance, supply chains, ancient paths, pilgrimages, represented the networks of territorial relationships that had kept local economies alive for centuries and that urban polarization and globalization dynamics have almost deleted. Today the minor historic centres of the inner areas, except in rare cases, present common pathologies, linked to the inability to respond to the needs of contemporary housing and living [4], due to the marginality of these centres in the framework of production flows, services networks and territorial connections.

In the last decades, the lack of financial resources in small municipalities, restricted by national and regional policies, absorbed by chronic “emergencies”, has turned these minor urban realities into ghost areas. Rarely, exogenous dynamics have promoted large tourist real estate investments, which had nevertheless little impact on the revitalization of the local economy. It seems therefore necessary to work with the local materials and networks to overturn the erroneous approach that does not consider the *inner areas* as a resource or an opportunity, but as a problem or a residue concerning peripheral lands, and to react to the progressive marginality, conceiving these places as place of social and productive experimentation, potential protagonists of a cultural and

economic renaissance. In response to these dynamics, the National Reform Plan adopted a National Strategy for Inner Areas (SNAI). 69 pilot areas were selected, 1.061 Municipalities involved, representing 24.9% of the *inner areas*, for a total of 2.026.299 inhabitants (15.3% of the population residing in the *inner areas*, 3.4% of the national population). The aim was to counteract the demographic decline, assessing the conditions of marginality of these scopes and implementing actions to adapt essential services (i.e. health, education and mobility), promoting local development projects. This strategy had the merit of highlighting the issue of *inner areas* and fostering research paths relating to the phenomena of fragility, triggering a national reflection and placing Italy as the leader of a European debate on “inner peripheries” [5]. At the same time, it stimulated the implementation of partnership actions at all institutional levels and the networking of socio-economical resources, of strategies and initiatives that contributed to enriching the sustainability and resilience goals of the EU Programming 2021–2027.

2 The Cultural Dimension of Territorial and Railway Heritage. State of the Art and Legislative Inputs

Within the complex framework of the ongoing policies and strategies, wide-ranging interventions appear necessary to reconnect the scattered and heterogeneous pieces of disciplinary knowledge in a more coherent and complex overview. The main driver of a strategy of resilience to overcome the crisis is certainly the sustainable enhancement of the territorial heritage of these areas, as the set of long-lasting structures produced by the coevolution between the natural environment and human settlements, whose value is recognized for present and future generations [3]. Territory as a cultural landscape, as an expression and outcome of the complexity of nature and culture and therefore as a product of history, a specific sign of local identity, whose components thus become the invariants of places and communities, matrix for a historicized and contextualized evolution [6]. This expansion of meaning does not concern only the formal, civil and symbolic aspects but also the age of belonging of the resources and their location in the contemporary territories, thus representing an expansion of temporal, spatial and meaning interest. The traditional field of analysis of the physical city has in fact extended from the «historic centre» to the complex of «existing city», to involve the entire «historic territory», looking for the «widespread and often fragmented network of human tracks» [7]. The passage that led to sanctioning the conceptual extension from “historic centre” to “historic territory” (Carta di Gubbio, 1960, 1990), confirmed by the European Landscape Convention (ELC), has been further innovated with the concept of “historic urban landscape” that UNESCO introduced with the “Vienna Memorandum” in 2005 and which at the end of 2011 was consolidated into a special “Recommendation”. Its field of application concerns the recognition of the quality of an urban landscape whose strength is in the widespread, capillary and lively presence of a heritage that is not only extended to protected historic areas and buildings, but it refers to the physical, geographical and historic context in which it fits, determining a synoptic and organic vision of the heritage that opposes the idea of discontinuous and isolated heritage [8]. In the polycentric territorial system, the small historic centres

perfectly embody those landscapes of everyday life mentioned by the ELC as territories capable of projecting and «making perceptible values of properly identifiable matrix for the local communities» to be preserved, avoiding homologating interventions that «safeguard stones but not the people and traditional functions» [9].

In this sense, among the territorial landmarks for the rebirth of the most fragile areas, abandoned historic infrastructures play a fundamental role, able to connect and to divide, to bring together or to isolate places, to originate flows, to support activities and economies and therefore, new forms of sociality. In particular, the railway system of our peninsula today constitutes a dense network of “broken wires”, once seen almost as an intrusion into naturalness, now merged into the landscape and structured as important features; in the past a means of economic, social, human connection, which, far from the urban systems of big cities, has continued to make these villages live within a high-quality micro economy. Therefore, the railway lines have assumed a cultural value recognized in an increasingly widespread manner not only “bottom up”, by the communities organized in local associations or stakeholders or by local administrations, but also “top down”, by national laws (such as Law 128/2017) and international organisations, such as UNESCO. Urban-territorial and landscape planning also attribute an increasing role to dismissed railway infrastructures, as frames to mend relationships and create interactions between places and territories. Their linear and capillary character, on the one hand, and their historical-cultural value, on the other, determine, in fact, enormous potential in terms of physical, functional and social restitching of contexts and identity enhancement, starting from their “technical, social and economic history” [10] and from the roots of their past, towards a process of heritage-led regeneration.

3 Resilience Paths. Research Goals and Methodology

The economic dynamics and railway policies of the 1990s triggered the divestment of many secondary railway lines, a progressive abandonment (6.000 km on the Italian territory) of the “dry branches” (*rami secchi*) which took away fragments of territory, local economy and life, in this vicious circle toward decline. In this framework, the relaunch or reuse of abandoned railways is recognized as a main research and experimentation field for inner areas that can combine economic-productive re-boost with sustainable mobility, reconciling conservation of cultural heritage and innovation of touristic activities, loisir and knowledge, itinerant story of the memory of places and dynamic perception of natural and historical landmarks. In this research and experimentation path, disused railway networks are configured as “regeneration matrices” able to counter the progressive weakening of “fragile territories” and the abandonment of minor historic centres, experimenting “resilience paths” through social, economic and environmental changes [11].

The goal of the research is to define guidelines for the regeneration of inner areas, focusing on relaunch and reuse of divested railway lines. The ongoing activity is aimed at deepening best practices that have realized resilient integrated process of revitalization linked to the secondary railway lines in fragile areas characterized by natural landmarks, historic minor centres and widespread heritage. The outcomes of the

practices can show how the reactivation of the line can foster economic activities, social inclusion and overcome the degradation of brownfields and cultural heritage.

In particular, the research methodology pays attention to policies and strategies that overcome the long-standing separation between mobility planning and territorial planning, promoting osmotic approaches between territory, landscape, environment and community that are reflected in new “integrated design categories”. Furthermore, the research is aimed at outlining the main role of partnership-based tools and agreements characterized by joint initiatives that involve public authorities, railway foundations and citizens associations. In coherence with the research methodology, the case study proposed in the following paragraph intends to illustrate the main role of interventions in railways in inner areas, underlining some significant insights through:

- the analysis of railways divestment phenomena as significant part of the processes of abandonment and deprivation of *inner areas* that involve minor historic centres in population and socio-economic decline;
- the recognition of new complex *design categories* – such as *touristic railways* – in the framework of territorial policies that promotes an osmotic approach between mobility planning and territorial projects, emphasizing historic and natural elements in successful enhancement projects of minor historic centres;
- the deepening of *partnership-based tools and regeneration projects* that involve new public and private stakeholders in multilevel financing and activities management toward a *territorial and strategic planning based on mobility issues*.

4 The Law 128/2017 and the Transiberiana d'Italia Railway Line. A Way of Sustainability and Inclusion

4.1 The Law 128/2017 for the Enhancement of Touristic Lines

After the institution of the Italian *FS Foundation* in 2013 and the promotion of the Program called “Binari senza Tempo”¹, the Law 128/2017 *Establishment of tourist railways in areas of particular naturalistic or archaeological value* took a step forward for an integrated approach to minor railway lines between mobility, territorial planning and landscape issues. The law recognizes problems and opportunities linked to secondary railway lines and establishes the *Italian system of touristic railways*, promoting partnership management forms in favour of lines aimed at enhancing the divested railway heritage - trains, lines, stations, bridges, viaducts, tunnels and underpasses - in contexts of landscape value that affect many *inner areas*. The law enhances ongoing projects or fosters new tourist services (Cf. Table 1).

¹ BST is an initiative launched by the FS Foundation, set up within the FSI Group for the preservation and enhancement of the historic railway heritage. It guarantees a management by RFI, with the aim of recovering spectacular abandoned lines in order to build a “dynamic museum”.

Table 1. Law 128/2017 Touristic Railways

Route	Title	Activation/Divestment/Reactivation	Natural & historic heritage	Programs & operators
Sulmona-Isernia (Abruzzo-Molise)	Transiberiana d'Italia	1892/2011/2014	Historic centres (HC) Majella Park	Binari senza tempo (BST), Ass. Le Rotaie, Fondazione FS
Avellino-Rocchetta (Campania, Molise, Puglia)	Irpinia Express	1934/1986/2016	HC, Conza Lake	BST, Fondazione FS, Reg. Campania, Ass. In_Loco_Motivi
Fano – Urbino (Marche)	Ferrovia Valle Metauro	1898/1987/service suspended	HC, Metauro River, sea coast	Ass. Ferrovia Valle Metauro (FVM)
Cosenza-S. Giovanni F. (Calabria)	Ferrovia Silana	1922/1997/2016	HC, Sila Park	FC, Reg. Calabria
Sacile –Gemona (Friuli)	Ferr. Pedemontana del Friuli	1914/2012/2018	HC, Prealpi, Cornino Reserve	BST, RFI – Fondazione FS
Palazzolo-Paratico S. (Lombardia)	Sebino Express Treno Blu	1876/1966/1994	HC, Oglio Park, Lake of Iseo	BST, FTI-Ferrovie turistiche italiane
Ceva-Ormea (Piemonte)	Ferrovia del Tanaro	1883/2012/2016	HC, Tanaro River	BST Fondazione FS
Mandas-Arbatax (Sardegna)	Trenino verde	1893/1997/1997	HC, Gennargentu-Orosei Park	ARST (Regione Sardegna)
Isili-Sorgono (Sardegna)	Trenino verde	1889/1997/1997	HC, Gennargentu-Orosei Park	ARST (Regione Sardegna)
Sassari-Palau (Sardegna)	Trenino verde (part)	1931/1997/1997	HC, Liscia Lake, Sea cost	ARST (Regione Sardegna)
Macomer-Bosa (Sardegna)	Trenino verde	1888/1981/1995	HC, Temo River, Bosa Gulf	ARST (Regione Sardegna)
Alcantara-Randazzo (Sicilia)	/	1959/1985/service suspended	HC, Etna Park, Sea Cost	FS
Castelvetrano-P. Empedocle (Sicilia)	Ferrovia dei Templi	1910/1976/2014	HC, Sea coast, archeologic sites	Fondazione FS
Asciano-Monte Antico (Toscana)	Ferrovia della Val d'Orcia	1865/1994/2014	Val d'Orcia HC, Amiata Park	Ferrovie della Val d'Orcia
Civitavecchia-Orte (Lazio)	/	1894/1961/service suspended	HC, Sea coast	FS

The main importance of this research and experimentation field is confirmed in 2020 by the Ministry of Cultural Heritage (MIBACT), which has established in 2020 the *Year of the Touristic Railway*, and introduced new public funding for night train services in the MIBACT Draft Law of February 2020.

4.2 The Transiberiana d'Italia Railway Line

Among the lines promoted by the Law 128/2017, Sulmona-Castel di Sagro-Isernia railway line called the “Transiberiana d'Italia” (in Abruzzo and Molise regions) represents one of the fundamental best practices for regeneration of minor centres in *inner areas*, a “wire” that links today a unique cultural heritage through a protected natural area, overcoming a divestment phase of the line (Cf Fig. 1). In consistency with the research methodology, it is possible to underline the specificity of the territory and the role of the railway line in the resilience path:

- the area crossed by the line is recognized as an *Inner area* in the SNAI² and in particular, the plateaus of Abruzzo hosts the second highest station in Italy – Rivisondoli-Pescocostanzo – at an altitude of 1.268 m along a track that reaches the sides of the mountain and supplies several minor historic centres (Pettorano sul Gizio, Monte Giove, Pescocostanzo, Palena, Roccaraso).

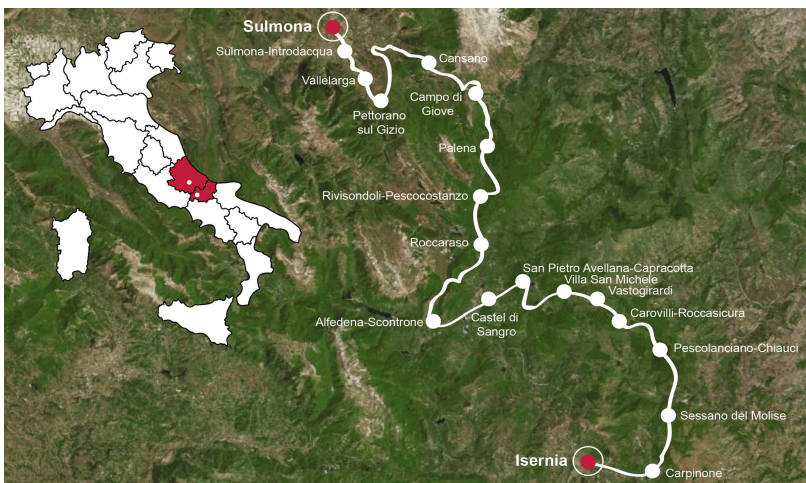


Fig. 1. The *Transiberiana d'Italia* railway line.

The history of this line is similar to that of other abandoned secondary lines. The line was built between 1892 and 1897 with the aim of connecting transversally the Adriatic coast with the Tyrrhenian Sea, in a network related with other minor lines. In the early twentieth century, the importance of the line grew, connecting other isolated places, making minor centres continue to live due to a local microeconomy; this situation persisted until the 1980s, when the social and economic dynamics in this area triggered a sudden depopulation of the centres crossed by the line, with a consequent loss of competitiveness and entrepreneurial dynamism. In 2010 the operation on the section from Castel di Sangro to Carpinone was suspended due to urgent maintenance

² 33 Municipalities, 20.929 Inhabitants, Demographic Variation: -7,83% (ISTAT Census 2011–2017).

needs of the rolling stock, and the few passengers made Abruzzo region no longer willing to continue the service, permanently suspended in 2011. However, the line remained formally open for the infrastructure manager (RFI), thus allowing the eventual passage of agency trains and occasional tourist services;

- the features of the line comply with the characteristic of the “Railway line of natural interest”. In particular, the line offers a “glimpse from the train” on the Majella National Park, along the 76 km line that goes from Sulmona to Roccaraso. The line opens the view and the access to minor historic centres (Cf Fig. 2), whose access is very difficult for their localization, for the land morphology and the climatic conditions. Little-known centres where the tourist line is revitalizing artistic and cultural activities, such as small museums, festivals and architectural tours, as well as artisan traditions still practiced today; a path that reconnects material and immaterial heritage made with new values of sustainability and resilience. The travels of historic convoys within this program also triggered the rehabilitation and reuse of the former RFI stations and of the tollbooths in the municipalities of Cansano, Campo di Giove and Palena, already acquired by the Majella National Park in 2002. In particular, the passenger buildings of Cansano and Palena have been transformed into orientation centres for visiting the Park and temporary places to eat and sell local products during tourist trips; the former *caffetteria* of Cansano has been used as a bike rental point; the former Palena freight yard building was turned in the garage for ecological means of transport. However, many artefacts along the line are still in a state of decay;



Fig. 2. The historic centre of Pettorano sul Gizio from the *Transiberiana d'Italia* railway line.

- the reactivation of the line is therefore not a simple tourist route, but a tool for the territorial enhancement, a driver for local-based economies supported by policies, programs, projects and forms of public-private partnership. In particular, in 2014, the non-profit local association *Le Rotaie*, established in 2006 in Isernia with the aim of promoting railway culture, participated in the “Binari senza tempo” program, but found a really success with the Law 128/2017: the line was counted among the “lines dismissed or in the ongoing divestment process located in areas of particular

naturalistic or archaeological value”. The new law gave a significant boost to the line which in 2019 counted 84 circulations for tourism journeys, for a total of 31.500 travellers (+49% compared to 2018), revitalizing as well the accommodation and cultural activities in the area, with the contribution of *Le Rotaie* Association, the collaboration with FS, the Park Authority and the Municipalities. The importance in quantitative terms of the flows also opened a debate on the reopening of the line for a commuter service capable of consolidating a sustainable regeneration of the smaller centres. Due to this success, the institutional debate in Molise have also introduced the idea of a *Strategic regional plan* for the re-boost of Isernia and Campobasso stations as tourist *hubs* (Cf Fig. 3).



Fig. 3. The landscape from the *Transiberiana d'Italia* railway line.

5 Perspectives. Towards a Heritage-Led Regeneration

The historical-morphological and landscape perspective for the regeneration of fragile contexts underlines the importance of the role of historic infrastructures in the revitalization of small centres of *inner areas* (Cf Fig. 4). In this direction, the strategic and multisectoral dimension of the interventions on the network infrastructures highlights key topics:

- the testing of integrated approaches – involving different disciplines – to the study of the depopulation and decline of historical territory, recognizing the railway infrastructures as a fundamental part of the territorial palimpsest, a long standing structure for socio-economic activities, a matrix for the connection of the discontinuous and widespread system of minor centres and architectural heritage in *inner areas*;
- the reflection on cultural, economic and social value of mobility infrastructures, and in particular the secondary lines, for the relaunch of minor centres considering

sustainable tourism as a successful component for regeneration strategies through the fostering of material and immaterial resilient networks;

- the experimentation of multilevel institutional partnerships able to put in synergy local and national resources toward Strategic Plans for a sustainable re-boost of *inner areas* based on accessibility, combining the modernization of the territory (SNAI, municipal funds), and the conservation of heritage (FESR, Foundations and Associations).

Moving from the success of the case study of Abruzzo and Molise Regions, the study opens new fields of research and experimentation for the lines that are still dismissed (such as Fano-Urbino, Civitacchia-Orte and Alcantara-Randazzo) in order to provide useful references toward strategic planning and integrated projects of regeneration for minor historic centres.



Fig. 4. The historic train in the station of Rivisondoli-Pescocostanzo.

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