

TeMA

Journal of
Land Use, Mobility and Environment

This special issue collects a selection of peer-review papers presented at the 8th International Conference INPUT 2014 titled "Smart City: planning for energy, transportation and sustainability of urban systems", held on 4-6 June in Naples, Italy. The issue includes recent developments on the theme of relationship between innovation and city management and planning.

Tema is the Journal of Land use, Mobility and Environment and offers papers with a unified approach to planning and mobility. TeMA Journal has also received the Sparc Europe Seal of Open Access Journals released by Scholarly Publishing and Academic Resources Coalition (SPARC Europe) and the Directory of Open Access Journals (DOAJ).

INPUT 2014

papers selected

Smart City

planning for energy, transportation
and sustainability of the urban system

SMART CITY

PLANNING FOR ENERGY, TRANSPORTATION AND SUSTAINABILITY OF THE URBAN SYSTEM

Special Issue, June 2014

Published by

Laboratory of Land Use Mobility and Environment
DICEA - Department of Civil, Architectural and Environmental Engineering
University of Naples "Federico II"

TeMA is realised by CAB - Center for Libraries at "Federico II" University of Naples using Open Journal System

Editor-in-chief: Rocco Papa
print ISSN 1970-9889 | on line ISSN 1970-9870
Licence: Cancelleria del Tribunale di Napoli, n° 6 of 29/01/2008

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TeMA

Journal of
Land Use, Mobility and
Environment

TeMA. Journal of Land Use, Mobility and Environment offers researches, applications and contributions with a unified approach to planning and mobility and publishes original inter-disciplinary papers on the interaction of transport, land use and environment. Domains include engineering, planning, modeling, behavior, economics, geography, regional science, sociology, architecture and design, network science, and complex systems.

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This special issue of TeMA collects the papers presented at the 8th International Conference INPUT 2014 which will take place in Naples from 4th to 6th June. The Conference focuses on one of the central topics within the urban studies debate and combines, in a new perspective, researches concerning the relationship between innovation and management of city changing.



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EIGHTH INTERNATIONAL CONFERENCE INPUT 2014

SMART CITY. PLANNING FOR ENERGY, TRANSPORTATION AND SUSTAINABILITY OF THE URBAN SYSTEM

This special issue of TeMA collects the papers presented at the Eighth International Conference INPUT, 2014, titled "Smart City. Planning for energy, transportation and sustainability of the urban system" that takes place in Naples from 4 to 6 of June 2014.

INPUT (Innovation in Urban Planning and Territorial) consists of an informal group/network of academic researchers Italians and foreigners working in several areas related to urban and territorial planning. Starting from the first conference, held in Venice in 1999, INPUT has represented an opportunity to reflect on the use of Information and Communication Technologies (ICTs) as key planning support tools. The theme of the eighth conference focuses on one of the most topical debate of urban studies that combines , in a new perspective, researches concerning the relationship between innovation (technological, methodological, of process etc..) and the management of the changes of the city. The Smart City is also currently the most investigated subject by TeMA that with this number is intended to provide a broad overview of the research activities currently in place in Italy and a number of European countries. Naples, with its tradition of studies in this particular research field, represents the best place to review progress on what is being done and try to identify some structural elements of a planning approach.

Furthermore the conference has represented the ideal space of mind comparison and ideas exchanging about a number of topics like: planning support systems, models to geo-design, qualitative cognitive models and formal ontologies, smart mobility and urban transport, Visualization and spatial perception in urban planning innovative processes for urban regeneration, smart city and smart citizen, the Smart Energy Master project, urban entropy and evaluation in urban planning, etc..

The conference INPUT Naples 2014 were sent 84 papers, through a computerized procedure using the website www.input2014.it . The papers were subjected to a series of monitoring and control operations. The first fundamental phase saw the submission of the papers to reviewers. To enable a blind procedure the papers have been checked in advance, in order to eliminate any reference to the authors. The review was carried out on a form set up by the local scientific committee. The review forms received were sent to the authors who have adapted the papers, in a more or less extensive way, on the base of the received comments. At this point (third stage), the new version of the paper was subjected to control for to standardize the content to the layout required for the publication within TeMA. In parallel, the Local Scientific Committee, along with the Editorial Board of the magazine, has provided to the technical operation on the site TeMA (insertion of data for the indexing and insertion of pdf version of the papers). In the light of the time's shortness and of the high number of contributions the Local Scientific Committee decided to publish the papers by applying some simplifies compared with the normal procedures used by TeMA. Specifically:

- Each paper was equipped with cover, TeMA Editorial Advisory Board, INPUT Scientific Committee, introductory page of INPUT 2014 and summary;
- Summary and sorting of the papers are in alphabetical order, based on the surname of the first author;
- Each paper is indexed with own DOI codex which can be found in the electronic version on TeMA website (www.tema.unina.it). The codex is not present on the pdf version of the papers.

SMART CITY PLANNING FOR ENERGY, TRANSPORTATION AND SUSTAINABILITY OF THE URBAN SYSTEM Special Issue, June 2014

Contents

- 1. The Plan in Addressing the Post Shock Conflicts 2009-2014.
A First Balance Sheet of the Reconstruction of L'Aquila** 1-13
Fabio Andreassi, Pierluigi Properzi
- 2. Assessment on the Expansion of Basic Sanitation Infrastructure.
In the Metropolitan Area of Belo Horizonte - 2000/2010** 15-26
Grazielle Anjos Carvalho
- 3. Temporary Dwelling of Social Housing in Turin.
New Responses to Housing Discomfort** 27-37
Giulia Baù, Luisa Ingaramo
- 4. Smart Communities. Social Innovation at the Service of the Smart Cities** 39-51
Massimiliano Bencardino, Ilaria Greco
- 5. Online Citizen Reporting on Urban Maintenance:
A Collection, Evaluation and Decision Support System** 53-63
Ivan Blečić, Dario Canu, Arnaldo Cecchini, Giuseppe Andrea Trunfio
- 6. Walkability Explorer. An Evaluation and Design Support Tool for Walkability** 65-76
Ivan Blečić, Arnaldo Cecchini, Tanja Congiu, Giovanna Fancello, Giuseppe Andrea Trunfio
- 7. Diachronic Analysis of Parking Usage: The Case Study of Brescia** 77-85
Riccardo Bonotti, Silvia Rossetti, Michela Tiboni, Maurizio Tira
- 8. Crowdsourcing. A Citizen Participation Challenge** 87-96
Júnia Borges, Camila Zyngier
- 9. Spatial Perception and Cognition Review.
Considering Geotechnologies as Urban Planning Strategy** 97-108
Júnia Borges, Camila Zyngier, Karen Lourenço, Jonatha Santos

- 10. Dilemmas in the Analysis of Technological Change. A Cognitive Approach to Understand Innovation and Change in the Water Sector** 109-127
Dino Borri, Laura Grassini
- 11. Learning and Sharing Technology in Informal Contexts. A Multiagent-Based Ontological Approach** 129-140
Dino Borri, Domenico Camarda, Laura Grassini, Mauro Patano
- 12. Smartness and Italian Cities. A Cluster Analysis** 141-152
Flavio Boscacci, Ila Maltese, Ilaria Mariotti
- 13. Beyond Defining the Smart City. Meeting Top-Down and Bottom-Up Approaches in the Middle** 153-164
Jonas Breuer, Nils Walravens, Pieter Ballon
- 14. Resilience Through Ecological Network** 165-173
Grazia Brunetta, Angioletta Voghera
- 15. ITS System to Manage Parking Supply: Considerations on Application to the “Ring” in the City of Brescia** 175-186
Susanna Bulferetti, Francesca Ferrari, Stefano Riccardi
- 16. Formal Ontologies and Uncertainty. In Geographical Knowledge** 187-198
Matteo Caglioni, Giovanni Fusco
- 17. Geodesign From Theory to Practice: In the Search for Geodesign Principles in Italian Planning Regulations** 199-210
Michele Campagna, Elisabetta Anna Di Cesare
- 18. Geodesign from Theory to Practice: From Metaplanning to 2nd Generation of Planning Support Systems** 211-221
Michele Campagna
- 19. The Energy Networks Landscape. Impacts on Rural Land in the Molise Region** 223-234
Donatella Cialdea, Alessandra Maccarone
- 20. Marginality Phenomena and New Uses on the Agricultural Land. Diachronic and Spatial Analyses of the Molise Coastal Area** 235-245
Donatella Cialdea, Luigi Mastronardi
- 21. Spatial Analysis of Urban Squares. ‘Siccome Umbellico al corpo dell’uomo’** 247-258
Valerio Cutini

- 22. Co-Creative, Re-Generative Smart Cities.
Smart Cities and Planning in a Living Lab Perspective 2** **259-270**
Luciano De Bonis, Grazia Concilio, Eugenio Leanza, Jesse Marsh, Ferdinando Trapani
- 23. The Model of Voronoi's Polygons and Density:
Diagnosis of Spatial Distribution of Education Services of EJA
in Divinópolis, Minas Gerais, Brazil** **271-283**
Diogo De Castro Guadalupe, Ana Clara Mourão Moura
- 24. Rural Architectural Intensification: A Multidisciplinary Planning Tool** **285-295**
Roberto De Lotto, Tiziano Cattaneo, Cecilia Morelli Di Popolo, Sara Morettini,
Susanna Sturla, Elisabetta Venco
- 25. Landscape Planning and Ecological Networks.
Part A. A Rural System in Nuoro, Sardinia** **297-307**
Andrea De Montis, Maria Antonietta Bardi, Amedeo Ganciu, Antonio Ledda,
Simone Caschili, Maurizio Mulas, Leonarda Dessena, Giuseppe Modica,
Luigi Laudari, Carmelo Riccardo Fichera
- 26. Landscape Planning and Ecological Networks.
Part B. A Rural System in Nuoro, Sardinia** **309-320**
Andrea De Montis, Maria Antonietta Bardi, Amedeo Ganciu, Antonio Ledda,
Simone Caschili, Maurizio Mulas, Leonarda Dessena, Giuseppe Modica,
Luigi Laudari, Carmelo Riccardo Fichera
- 27. Sea Guidelines. A Comparative Analysis: First Outcomes** **321-330**
Andrea De Montis, Antonio Ledda, Simone Caschili, Amedeo Ganciu, Mario Barra,
Gianluca Cocco, Agnese Marcus
- 28. Energy And Environment in Urban Regeneration.
Studies for a Method of Analysis of Urban Periphery** **331-339**
Paolo De Pascali, Valentina Alberti, Daniela De Ioris, Michele Reginaldi
- 29. Achieving Smart Energy Planning Objectives.
The Approach of the Transform Project** **341-351**
Ilaria Delponte
- 30. From a Smart City to a Smart Up-Country.
The New City-Territory of L'Aquila** **353-364**
Donato Di Ludovico, Pierluigi Properzi, Fabio Graziosi
- 31. Geovisualization Tool on Urban Quality.
Interactive Tool for Urban Planning** **365-375**
Enrico Eynard, Marco Santangelo, Matteo Tabasso

- 32. Visual Impact in the Urban Environment.
The Case of Out-of-Scale Buildings** 377-388
Enrico Fabrizio, Gabriele Garnerò
- 33. Smart Dialogue for Smart Citizens:
Assertive Approaches for Strategic Planning** 389-401
Isidoro Fasolino, Maria Veronica Izzo
- 34. Digital Social Networks and Urban Spaces** 403-415
Pablo Vieira Florentino, Maria Célia Furtado Rocha, Gilberto Corso Pereira
- 35. Social Media Geographic Information in Tourism Planning** 417-430
Roberta Floris, Michele Campagna
- 36. Re-Use/Re-Cycle Territories:
A Retroactive Conceptualisation for East Naples** 431-440
Enrico Formato, Michelangelo Russo
- 37. Urban Land Uses and Smart Mobility** 441-452
Mauro Francini, Annunziata Palermo, Maria Francesca Viapiana
- 38. The Design of Signalised Intersections at Area Level.
Models and Methods** 453-464
Mariano Gallo, Giuseppina De Luca, Luca D'acierno
- 39. Piano dei Servizi. Proposal for Contents and Guidelines** 465-476
Roberto Gerundo, Gabriella Graziuso
- 40. Social Housing in Urban Regeneration.
Regeneration Heritage Existing Building: Methods and Strategies** 477-486
Maria Antonia Giannino, Ferdinando Orabona
- 41. Using GIS to Record and Analyse Historical Urban Areas** 487-497
Maria Giannopoulou, Athanasios P. Vavatsikos,
Konstantinos Lykostratis, Anastasia Roukouni
- 42. Network Screening for Smarter Road Sites: A Regional Case** 499-509
Attila Grieco, Chiara Montaldo, Sylvie Ocelli, Silvia Tarditi
- 43. Li-Fi for a Digital Urban Infrastructure:
A Novel Technology for the Smart City** 511-522
Corrado Iannucci, Fabrizio Pini
- 44. Open Spaces and Urban Ecosystem Services.
Cooling Effect towards Urban Planning in South American Cities** 523-534
Luis Inostroza

- 45. From RLP to SLP: Two Different Approaches to Landscape Planning** 535-543
Federica Isola, Cheti Pira
- 46. Revitalization and its Impact on Public. Space Organization A Case Study of Manchester in UK, Lyon in France and Łódź in Poland** 545-556
Jaroslaw Kazimierczak
- 47. Geodesign for Urban Ecosystem Services** 557-565
Daniele La Rosa
- 48. An Ontology of Implementation Plans of Historic Centers: A Case Study Concerning Sardinia, Italy** 567-579
Sabrina Lai, Corrado Zoppi
- 49. Open Data for Territorial Specialization Assessment. Territorial Specialization in Attracting Local Development Funds: an Assessment. Procedure Based on Open Data and Open Tools** 581-595
Giuseppe Las Casas, Silvana Lombardo, Beniamino Murgante, Piergiuseppe Pontrandolfi, Francesco Scorza
- 50. Sustainability And Planning. Thinking and Acting According to Thermodynamics Laws** 597-606
Antonio Leone, Federica Gobattoni, Raffaele Pelorosso
- 51. Strategic Planning of Municipal Historic Centers. A Case Study Concerning Sardinia, Italy** 607-619
Federica Leone, Corrado Zoppi
- 52. A GIS Approach to Supporting Nightlife Impact Management: The Case of Milan** 621-632
Giorgio Limonta
- 53. Dealing with Resilience Conceptualisation. Formal Ontologies as a Tool for Implementation of Intelligent Geographic Information Systems** 633-644
Giampiero Lombardini
- 54. Social Media Geographic Information: Recent Findings and Opportunities for Smart Spatial Planning** 645-658
Pierangelo Massa, Michele Campagna
- 55. Zero Emission Mobility Systems in Cities. Inductive Recharge System Planning in Urban Areas** 659-669
Giulio Maternini, Stefano Riccardi, Margherita Cadei

- 56. Urban Labelling: Resilience and Vulnerability as Key Concepts for a Sustainable Planning** 671-682
Giuseppe Mazzeo
- 57. Defining Smart City. A Conceptual Framework Based on Keyword Analysis** 683-694
Farnaz Mosannenzadeh, Daniele Vettorato
- 58. Parametric Modeling of Urban Landscape: Decoding the Brasilia of Lucio Costa from Modernism to Present Days** 695-708
Ana Clara Moura, Suellen Ribeiro, Isadora Correa, Bruno Braga
- 59. Smart Mediterranean Logics. Old-New Dimensions and Transformations of Territories and Cites-Ports in Mediterranean** 709-718
Emanuela Nan
- 60. Mapping Smart Regions. An Exploratory Approach** 719-728
Sylvie Occelli, Alessandro Sciuolo
- 61. Planning Un-Sustainable Development of Mezzogiorno. Methods and Strategies for Planning Human Sustainable Development** 729-736
Ferdinando Orabona, Maria Antonia Giannino
- 62. The Factors Influencing Transport Energy Consumption in Urban Areas: a Review** 737-747
Rocco Papa, Carmela Gargiulo, Gennaro Angiello
- 63. Integrated Urban System and Energy Consumption Model: Residential Buildings** 749-758
Rocco Papa, Carmela Gargiulo, Gerardo Carpentieri
- 64. Integrated Urban System and Energy Consumption Model: Public and Singular Buildings** 759-770
Rocco Papa, Carmela Gargiulo, Mario Cristiano
- 65. Urban Smartness Vs Urban Competitiveness: A Comparison of Italian Cities Rankings** 771-782
Rocco Papa, Carmela Gargiulo, Stefano Franco, Laura Russo
- 66. Urban Systems and Energy Consumptions: A Critical Approach** 783-792
Rocco Papa, Carmela Gargiulo, Floriana Zucaro
- 67. Climate Change and Energy Sustainability. Which Innovations in European Strategies and Plans** 793-804
Rocco Papa, Carmela Gargiulo, Floriana Zucaro

- 68. Bio-Energy Connectivity And Ecosystem Services.
An Assessment by Pandora 3.0 Model for Land Use Decision Making** 805-816
Raffaele Pelorosso, Federica Gobattoni, Francesco Geri,
Roberto Monaco, Antonio Leone
- 69. Entropy and the City. GHG Emissions Inventory:
a Common Baseline for the Design of Urban and Industrial Ecologies** 817-828
Michele Pezzagno, Marco Rosini
- 70. Urban Planning and Climate Change: Adaptation and Mitigation Strategies** 829-840
Fulvia Pinto
- 71. Urban Gaming Simulation for Enhancing Disaster Resilience.
A Social Learning Tool for Modern Disaster Risk Management** 841-851
Sarunwit Promsaka Na Sakonnakron, Pongpisit Huyakorn, Paola Rizzi
- 72. Visualisation as a Model. Overview on Communication Techniques
in Transport and Urban Planning** 853-862
Giovanni Rabino, Elena Masala
- 73. Ontologies and Methods of Qualitative Research in Urban Planning** 863-869
Giovanni Rabino
- 74. City/Sea Searching for a New Connection.
Regeneration Proposal for Naples Waterfront Like an Harbourscape:
Comparing Three Case Studies** 871-882
Michelangelo Russo, Enrico Formato
- 75. Sensitivity Assessment. Localization of Road Transport Infrastructures
in the Province of Lucca** 883-895
Luisa Santini, Serena Pecori
- 76. Creating Smart Urban Landscapes.
A Multimedia Platform for Placemaking** 897-907
Marichela Sepe
- 77. Virtual Power Plant. Environmental Technology Management Tools
of The Settlement Processes** 909-920
Maurizio Sibilla
- 78. Ecosystem Services and Border Regions.
Case Study from Czech – Polish Borderland** 921-932
Marcin Spyra
- 79. The Creative Side of the Reflective Planner. Updating the Schön's Findings** 933-940
Maria Rosaria Stufano Melone, Giovanni Rabino

- 80. Achieving People Friendly Accessibility.
Key Concepts and a Case Study Overview** 941-951
Michela Tiboni, Silvia Rossetti
- 81. Planning Pharmacies: An Operational Method to Find the Best Location** 953-963
Simona Tondelli, Stefano Fatone
- 82. Transportation Infrastructure Impacts Evaluation:
The Case of Egnatia Motorway in Greece** 965-975
Athanasios P. Vavatsikos, Maria Giannopoulou
- 83. Designing Mobility in a City in Transition.
Challenges from the Case of Palermo** 977-988
Ignazio Vinci, Salvatore Di Dio
- 84. Considerations on the Use of Visual Tools in Planning Processes:
A Brazilian Experience** 989-998
Camila Zyngier, Stefano Pensa, Elena Masala

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Journal of
Land Use, Mobility and Environment

TeMA INPUT 2014
Print ISSN 1970-9889, e- ISSN 1970-9870

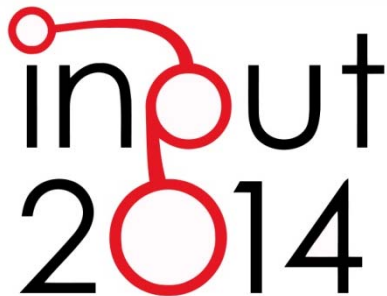
DOI available on the online version

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SPECIAL ISSUE

Eighth International Conference INPUT
Smart City - Planning for Energy, Transportation and Sustainability
of the Urban System

Naples, 4-6 June 2014

The logo for the INPUT 2014 conference. It features the word "input" in a lowercase, sans-serif font, with the "i" and "n" connected by a red line that forms a circle. Below "input" is the year "2014" in a larger, bold, sans-serif font, with the "0" also connected to the "i" and "n" by a red line.

FROM A SMART CITY TO A SMART UP-COUNTRY

THE NEW CITY-TERRITORY OF L'AQUILA

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ABSTRACT

Ever since it was founded in the Middle Ages, the city of L'Aquila has been known as a City-territory. This was because it was established through an original unification process involving approximately 70 minor centres, which transferred a number of their inhabitants into the new City, in an act that we today would call Territorial Cohesion, thereby forming a city that was inextricably linked to its territory. While it is now undergoing radical transformation with dedicated resources, it is within this context that the issue of Smart Cities has emerged, which has, however, focused its work solely on established urban systems and historic centres. By reflecting on L'Aquila's role as a City-territory, which falls within the disadvantaged inland areas, and by preparing the Project in the Junction 2 - Abruzzo Territories of the Ministry of Infrastructure and Transport and the Abruzzo Region, we are able to extend the objectives of the Smart-City to the L'Aquila City-territory and in particular to the Seismic Crater, a pertinent example of an "inland area" (or rather "Up-Country") that today has been increasingly deprived of its identified resources. With a view to the development of inland areas based on the "smart" concept and involving planned integration between the Macro-region, the Territory Project and the Urban Planning Project, this paper supports the need for immediate intervention in the L'Aquila City-territory, and more broadly speaking for the entire territorial settlement system that is a feature of inland areas in Abruzzo. Nowadays, it is not possible to prepare a development project for inland areas without providing them with suitable access to connectivity and other more general networks.

KEYWORDS

City-territory, Connectivity, Smart Up-Country, Smart Cities, Territory Project

1 L'AQUILA CITY-TERRITORY

L'Aquila was an autonomous city with a municipal constitutional system, located on the border of the Kingdom of Naples, across the only main road running down through the peninsula (the Via degli Abruzzi). In the Middle Ages, it became a major centre for commerce in the Centre-South, bringing in the thriving economy from the surrounding mountain areas that relied on trade and manufacturing (the Comitatus). This ran up until the forced enfeoffment of the Comitatus and the loss of freedom under the Spanish rule of the South, which can be seen in the construction of the fortress from 1531.

Founded in the mid-thirteenth century, the city's role was immediately highly dependent on its Comitatus, while its size had to cope with the durability and stability of the territory's town and peripheral settlements. Consequently, it was not a matter of synoecism but rather "territorial cohesion", which is similar to the Europe Union's current proposal. The success of the city of L'Aquila is based on this very territorial cohesion between external centres and inland "spaces", according to a completely original development model.

The city was founded as a result of the "territorial cohesion" process to overcome the fiscal and judicial conditions of the centres which helped to establish the city by creating a new development model. It was a major city located halfway along the "Via degli Abruzzi" at the heart of the most important mountain pasture system in Central Italy. It was an important link for North-South trade with two resources (wool and saffron) which allowed the city to accumulate capital very quickly, although at the same time it was a city-territory ever since it was founded. The baronial fortresses were demolished, although the *intra* and *extra moenia* parishes were unified in a highly original way. Each one re-established its own "space" within the resurrected city bearing the same name as its original castle and as such it remained a separate administrative body (hence the structure of a City-territory), which additionally had its own church (a place of worship and also used as a parliamentary building) and its own square with a fountain serving as the heart of the social life of each "space", surrounded by a built-up residential area separated by boundary markings from the adjoining districts (Properzi 2009).

In this historical view of L'Aquila, the City must be seen within the framework of its territory, an image that partly decreased over the following centuries, but which has now been brought back to the community's attention following natural disasters. And it is precisely the concept of the City-territory, which considers the city and its territory as a single system, to be the first keyword, from which flows the experimentation that proposes in the following text.

1.1 THE 2009 EARTHQUAKE, GENERAL PLAN AND URBAN PLANNING PROJECT

When the earthquake hit in 2009, most of the economic system was already in crisis. Overall, the local system economy in L'Aquila recorded a sudden decline in the period prior to the natural disaster. The value added per capita was the equivalent of €20,000 in 2001, which was the highest figure in the Abruzzo region. However, between 2001 and 2009 this value was reduced by over €1,000 compared to the increases recorded in almost every other area in the region. In the same period, the industrial value added fell by 23% compared to the growth, albeit modest, in the rest of the regional territory. The service dynamics were rather weak and saw a drop in employees' productivity (Cresa 2011). Even though the retail sector initially recorded a dramatic fall after the earthquake, some of these figures were shown to be extremely positive, partly due to what we would call a "distorted" situation, i.e. produced by generous capital injections from the Italian government.

The pre-earthquake crisis in the L'Aquila City-territory was characterised by a sluggish economy and urban development which over the last 20 years had been subject to post-urban structures (Choay 1992) that were

difficult to understand and even more difficult to govern (Di Ludovico D., Properzi P. 2012). This crisis coincided with an ungoverned post-earthquake situation, when polycentrism was strengthened further by the creation of the so-called "New towns", the CASE projects (Anti-seismic, Sustainable and Eco-compatible Buildings) and MAP (Temporary housing units), which established a new City-territory context. Alongside this phenomenon, we find many dispersed settlements, unforeseen sprawl over the agricultural mosaic, rarefaction, high land consumption, fragmentation of the environmental continuity, as well as damage to urban and peri-urban landscapes.

The post-earthquake situation in L'Aquila, a post-urban city, requires intervention in the City's management and development model, and its context, to respond quickly and effectively to the needs of socio-economic development and environmental protection, but particularly to overcome the crisis of the modern city. An experimental activity that is carrying out the Antea Laboratory (spatial and environmental analysis) of the University of L'Aquila and the LAURAQ (Laboratory for Reconstruction of L'Aquila) of the National Institute of Urban Planning (INU) and National Association of Historical Artistic Centers (ANCSA), identifies this tool in Urban Planning Project (Morandi 2009), the central theme of the Workshop organized by the two laboratories, from 7 to 12 April 2014 in L'Aquila. The need for a comprehensive view of development and a general project that can address and direct all the post-earthquake planning sessions, is flanked by the practice of an Urban Planning Project (a comprehensive Urban Planning Project), or better, into multiple Urban Planning Projects. In fact, any reference to this project seems to be coherent with a desired governance model for the L'Aquila City-territory, which could resolve all the critical issues and contradictions inherently found in the current rigid, static planning systems (such as the general town plan) and in the new development models for cities based on the principles of negotiation and trading.

The Urban Planning Project, which looks at the City's major issues from what we would call a context perspective, does not have to define any spatial boundaries or a specific timeframe, while making comparisons with part of the urban complexity. It is a progressive project, which is strategically viable in its parts and in the structural coherence and environmental compatibility that an Urban Planning Project should be able to guarantee. It 'a project that arises as a reference the space of the problems to be solved, welcoming the spatial indeterminacy as vital component for the success of its strategies (Di Ludovico 2013). It does not replace the formal instruments but instead looks for an effective and common method to resolve specific, sometimes localised, problems and to develop specific strategic visions through planning, keeping the eye of designer on the entire territory staked by problems.

L'Aquila, such as sample of City-territory, characterized by a strong dynamism due to post-earthquake reconstruction (thanks to a huge injection of capital), today can certainly assume the role of City-network (neither Area, neither Region) (EU 2007), a paradigm capable of balancing the unbalancing effect induced by the Major urban centres (in this case the City of L'Aquila). In this vision, which has as reference the network and thus the Connectivity (a second keyword), the Urban Planning Project can be extended to the City-territory, in the context of a more general planning (in this text defined Territory Project) addressed to the Smart-territory (EU 2011) as spatial evolution of the Smart-city, and in particular, in a weak regional space as the inland areas of central Italy, the Smart Up-Country (the third keyword in this text), which stands as a needed post-modern innovation in the inland areas, like the City.

2 FROM A SMART CITY TO A SMART TERRITORY

Following the natural disaster, the City of L'Aquila and its territory became the scene for rapid and extensive transformations, which were unplanned, unassessed and produced through isolated and incoherent planning

sessions that were set up in the absence of a comprehensive City and Territory project, and Urban Planning Projects. The Reconstruction Plans, the Urban Mobility Plan and the new Strategic Plan were prepared. However, these planning documents do not cover the specific issue of urban design, but rather they establish a series of uncoordinated projects.

Under the City-territory's chaotic governance condition (Innerarity 2013) , a condition that can be extended to other case studies not affected by the earthquake, in an urban system that was greatly affected by major reconstruction work equating to a certain extent to urban redesign and construction, the idea for a Smart City came to the fore, one which would also involve the entire "Seismic Crater" (the area hit by the earthquake in Abruzzo Region). In fact, in July 2013, the Municipality of L'Aquila and the other municipalities in the Crater signed a "Smart City Agreement" to promote and support their transformation process towards a Smart City.

In 2011, the ENEA proposed an initial Smart City test for L'Aquila as a pilot project (fig. 1), involving a Smart Ring, Smart Building Network, Smart Lighting, Smart Mobility, Smart Environment, Social Participation, Smart Node, Social Urban Network (SUN) and Smart Communities, a cultural Social Network featuring the creation of a cultural Hub.

The City of L'Aquila can rely on its University which carries out research on issues of digital agenda for Italy and Europe, covering a wide range of areas of interest. As such, it can and must set ambitious objectives on the subject of innovation in the urban and territorial environment. The City can at least reasonably aim to be a national leader on how an urban environment and its reference territory can best combine innovation, cultural activities and the quality of life of its citizens.

In light of these considerations, research initiatives in line with the vision described above have been put in place, which will be conducted directly by the University of L'Aquila through its own appointed staff and indirectly through the network of scientific contacts at the University's disposal.

The following activities are at the centre of initiatives to support this research:

- 1) the installation of wiring and any other infrastructural work needed to develop a metropolitan network (MAN – Metropolitan Area Network) to connect any civic institutions that fall within Public Administration (Municipal Administration, Provincial Administration, Regional Administration, Prefecture, Police Headquarters, University, etc), which would like to take advantage of this connectivity service to support a path of innovation within the digitalisation of Public Administration;
- 2) the installation of wiring and any other infrastructural work needed to develop an experimental optical network and a wireless extension available for the national and international scientific community (in coordination with the local University), which will develop new networking technologies and new services that can run on this infrastructure.
- 3) Regarding the issues of communication infrastructures as enabling factors of a Smart City, the University of L'Aquila is taking steps to consolidate the development of urban connectivity in line with the solution commonly used in countries that are most interested in the development of this specific issue (for example, Scandinavian countries). This approach involves the provision of a comprehensive fibre optic network which can reach every home (Fiber To The Home – FTTH). This solution finds the most favourable conditions in the historic centre of the city in which the simultaneous complete redevelopment of the sub-service network and the restructuring or reconstruction work of private buildings create the perfect conditions to work on the FTTH solution.
- 4) In December 2013, the Municipality of L'Aquila and ENEL signed a Programme Agreement to launch the project "The Smart Grids infrastructure for L'Aquila and its role in enabling technologies and services for the Smart City", which aimed to establish Smart Grids, i.e. bi-directional electrical grids that

are fitted with automation and remote control systems. This project also provides for the development of electrical mobility (eMobility) through the installation across the territory of charging systems that “interact” with the electrical grid.

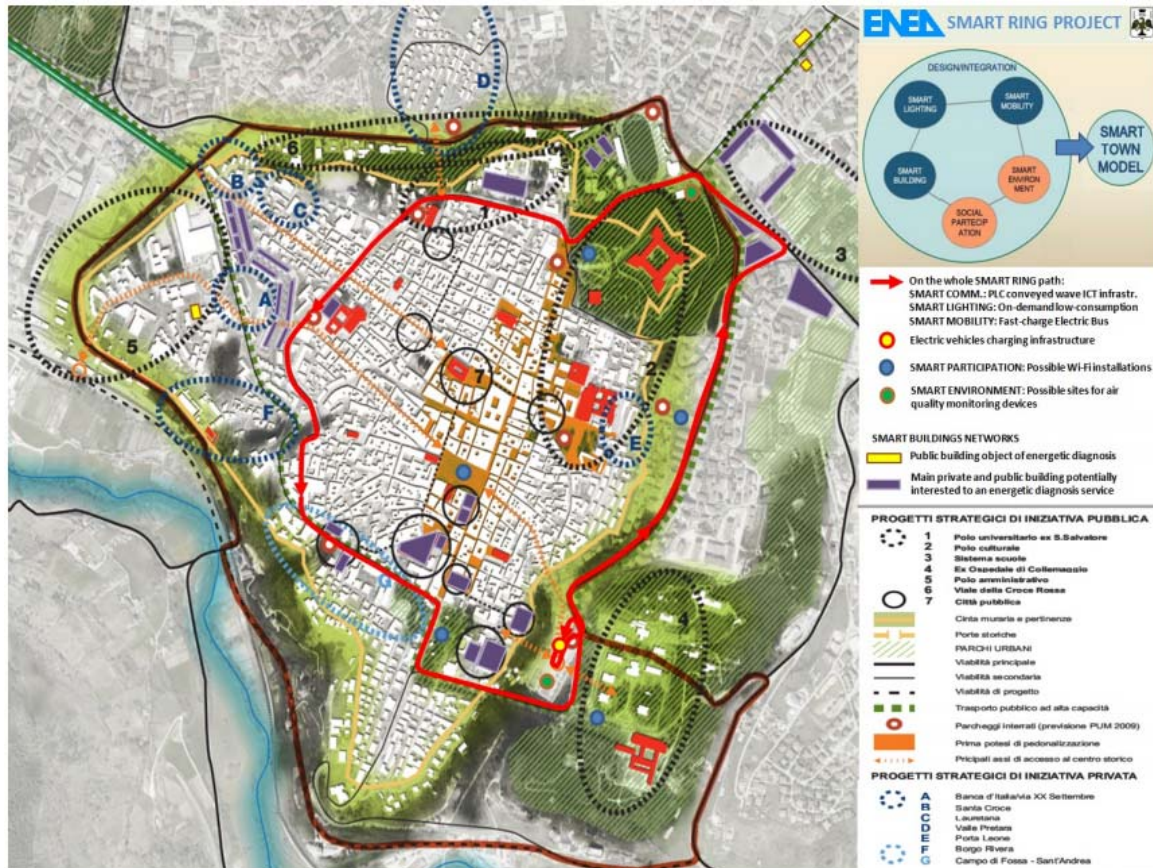


Fig. 1 ENEA's Smart City proposal

These three proposals (ENEA, University of L'Aquila, ENEL), which have not been given by comprehensive Urban Planning Projects that would have rather integrated them and referred them to other necessarily related issues (i.e. those of urban development), mainly focus on the Historic Centre and, in the case of certain specific issues, on the established City, thereby excluding part of the identity that characterises L'Aquila, namely the City-territory. L'Aquila is a typical example of a Major urban centre that regulates the socio-economic development of an entire underused area. It is precisely because of this “territorial” and development-driving role, the research of the Antea Laboratory and LAURAq propose to extend the “L'Aquila Smart-City” strategies, through the Urban Planning Project and, more generally, the Territory Project (which will be discussed in the next few paragraphs), to the City-territory, thus converging towards strategies for “L'Aquila Smart-territory”, but integrated with those of Smart City.

In a deeper insight into the territorial space of reference, one of central Italy, it is believed, however, that the strategy of “Smart-territory” does not achieve a breakthrough. In fact, in these areas, the concept of “Smart” must address and resolve critical issues more closely to the urban and territorial themes of areas still heavily under-utilized consisting of small and medium cities and sprawl, for example those related to the peri-urban agricultural system (Donadieu 2013), to the extensive cultural heritage network, to the territorial environmental and ecological networks, to the widespread networks. However, it also involves more general

themes, such as the climate change relating to the “concept of ‘climate-smart territories’ – socio-geographical spaces where actors collaborate to optimize ecosystem services and agricultural production for the improvement of human well-being in the face of climate change” (Van Etten 2013). It is necessary, therefore, to speak of Smart Up-Country instead of Smart-Territory.

2.1 SMART UP-COUNTRIES AND TERRITORY PROJECTS

In the context of regional development and, in particular, in a greatly underused context like that of Abruzzo, the issue of the “L'Aquila Smart Territory” must be expanded to the so-called “inland areas” (or rather “Up-Country”). We therefore move, through subsequent generalisations, from the concept of a Smart-City to that of a Smart-Territory and finally to a Smart Up-Country. Forecasting instruments could deliver this level of planning, moving from the Urban Planning Project, in reference to the urban dimension, to the Territorial Project. In particular, the Smart-Territories and the Smart Up-Countries could become key actions of the so-called “Territory Projects” (Fabbro 2007), and consequently for the expansion, they could become objectives for European and national planning (for example, through specific Operational Programmes).

The new “smart” issues which need to be addressed, as has already partly been done, mainly concern the accessibility of resources. For the city, it means having an efficient network infrastructure involving efficient information services. For the territory, and specifically for the inland areas, it means shortening the supply chain between rural areas and urban centres and building a network of villages or, more generally, of cultural heritage. It means tourism, it means connecting local networks to widespread networks, bringing a territory that is rich in history and productive potential out from isolation.

2.1.1 RURAL SPACES IN A SMART UP-COUNTRY

Rural spaces in inland areas, for example those found in Central Italy, suffer greatly when in competition with the more productive areas located in the valleys or along the coastal sections. To some degree, these spaces have similar characteristics to those of peri-urban spaces, i.e. loss of fertility, agricultural land used for renaturation (in Abruzzo from 1990 to date, there has been a reduction of 18% in the use of agricultural land), destruction of the countryside, etc. However, these spaces would welcome the opportunities of a market selling fresh agricultural products, thereby benefitting from the economic advantages offered by a short supply chain and creating jobs for the entire sector, for example in terms of accommodation (Carabba *et al.* 2013).

The management of rural spaces in inland areas requires an integrated approach. It is particularly necessary to promote their multi-functionality in order to enhance their many non-agricultural uses as well. For example, a “Smart” approach would introduce options such as: Farmers' Markets or Hobby Farms, a network of farms linked to rural villages but also to major urban areas (to reach the objective of zero food miles, also through Rural Mobile Shopping and Markets); the formation and networking of agricultural Parks; Energy crops, which are grown to be turned into different forms of energy, e.g. heat production, electricity, cogeneration, biofuels and so on (this also takes into consideration the cost of energy in Italy); “climate-smart territories”, i.e. geographical and social spaces where ecosystem services are maintained or restored, improving well-being of local people while continuously optimizing mitigation and adaptation to climate change (see http://web.catie.ac.cr/wallace2013/conferencia_ing.htm); “Rural tourism” which could be developed through the use of modern technologies (for education) based on local knowledge (wine, oil, etc, but also organic farming) and the promotion of local produce; “Smart Villages”, rural villages which apply the same objectives as Smart Cities; “Agricultural Wellness”, which involves strengthening the flow of

information between producers and consumers; the "Rural Traffic Network", which studies the flows and sustainability of infrastructures in rural areas that have often deteriorated considerably (motorways, railway lines and main roads also run through the inland areas in Central Italy); the "Smart Culture Heritage", broadening modern communication technologies to the cultural heritage of inland areas, such as archaeological sites, castles, historical rural buildings, but also historical agricultural landscapes, etc. All these many issues highlight management models and techniques which aim to urge local communities to reappropriate rural spaces, to try to establish communication between rural societies and urban societies, and to constitute a substantial technological infrastructure project for inland areas. A project which is primarily based on the upgrading and expansion of networks across the surrounding territory for technological infrastructures that are already established along the main road infrastructures, such as those found in the smart channels of motorways or main roads. In this direction moves the experimentation of Urban Planning Projects of the Antea Lab and LAURAQ, which seeks to combine the theme of Smart Up-Country (essentially technological infrastructure), with that of the Project and the Networks, but also with that of the reuse and enhancement (again, one could speak of regeneration, as for the City) of the rural area, the complex of environmental, landscape and cultural assets and tourism.

2.1.2 CONNECTIVITY FOR THE DEVELOPMENT OF INLAND AREAS

It goes without saying that nowadays we cannot prepare a development project for inland areas, as declined in the last few sentences of the previous paragraph, without providing them with suitable access to connectivity (DAE 2013, DAI 2014). This issue should duly be considered as a necessary condition for development, although for years now Italy has paid little attention to the matter, resulting in a lack of direction. In fact, there have been attempts to justify the lack of attention and, therefore investment, due to commercial operators not being able to find sustainable business models. In reality, inland areas that are an integral part of the L'Aquila system would merit public intervention purely due to their status as areas of "market failure" (as the European Union expects and recommends). We could therefore argue that, by virtue of the desired attention on the development of inland areas, investment should be put in place to provide widespread state-of-the-art connectivity to small municipalities, often formed of many different communities, without succumbing to the temptation of assessing the cost per capita of the work immediately after it has been carried out. Instead it should be valued in terms of the medium-long term social budget. By limiting the attention for now on inland areas that see the City-territory of L'Aquila as a barycentre, predominately corresponding to the Seismic Crater, the reconstruction process underway will create conditions that, if properly used, could form the requirements for comprehensive connectivity in these areas. Very briefly, in terms of technological connectivity, the proposed activities at the experimental level with Urban Planning Projects for the City-territory, the results of the research of Antea Lab and LAURAQ, can be summarized as follows:

- 1) to provide fibre optic connectivity to the public network and private buildings in municipalities planning to redevelop their sub-service network or carry out major restructuring/reconstruction work;
- 2) to upgrade old public networks/channels built by the Abruzzo Region and by local administrations, which are now unused but could provide coverage that would be able to guarantee connectivity to a significant number of municipalities in the Seismic Crater (15 out of 56);
- 3) to offer the Seismic Crater as a location to initiate extensive backhauling in inland areas as a second-tier activity by Infratel (a public company working to reduce the digital divide in Italy), which would certainly have a greater impact than a first-tier activity resulting in a series of individual backbone connectivity operations spread across the whole country that do not offer support for a genuine step

change for inland areas, instead only allowing access to a minimum level of connectivity from which it is difficult to imagine any development project.

In the inland areas, these operations have become a matter of extreme importance. It is clear that development inland areas is not possible without this particular issue being properly taken into consideration. On the other hand, the general socio-economic climate does not allow us to believe that the rest of the country has any more time on its hands to improve connectivity conditions compared to areas where the infrastructure level of seems to be a theme forgotten. In other words, under these precise circumstances, the definition of an ambitious and socially sustainable development model for communication infrastructures in inland areas, starting from areas hit by the earthquake in 2009 and more generally from possible City-territory of the inland territorial system, could become a reference model for the entire national landscape, where inland areas play an essential role.

3 TERRITORY PROJECTS FOR A SMART UP-COUNTRY

New communication technologies and expert knowledge of sustainability and reuse, which were described in the previous paragraphs, are still interesting subjects to develop in the conceptual field. However, without support from implementation instruments (such as territorial programming or planning), they cannot have a concrete impact across the territory. On the other hand the experimental instrument of the proposed Urban Planning Project, there must be an overview of the Territory.

One possible instrument, which is deemed suitable to express and achieve "Smart" objectives in the City-territory and the connected Up-Countries, comes from a study conducted on the entire Abruzzo Region (Italy), still under development, concerning the so-called "Junction 2 Territories" identified by the Ministry of Infrastructure and Transport. It serves as a suitable benchmark, including in relation to scale, to develop the idea and objectives of the Urban Planning Projects and the Smart Up-Countries up to the Abruzzo 2009 Seismic Crater.

The Abruzzo Region has established its own Project in the Junction 2 Territories (from now on "PdT2 Abruzzo") (RegAbr 2013) as a coherent and integrated intervention system for the development of the regional territory, in the context of the Lazio-Abruzzo Strategic Territorial Platform, while identifying the "Central Abruzzo Quadrangle" in the framework of the "Median Macro-region", as well as the development project of the relative Settlement, Cultural, Natural and Environmental System (fig. 2).

When the regional Settlement System is seen as a whole in all its complexity, it should be interpreted in relation to the demographic features of the centres, the morphological aspects of the systems or in its interaction with rural, natural and cultural landscapes. However, it is particularly pertinent to take into account its relationships with other systems and cities. In particular, the Central Abruzzo Quadrangle covers a rather large part of the inland areas in Central Italy, and in particular the Seismic Crater, most of which are characterised by critical issues with the rural, natural and cultural system, but also the settlement/productive and tourism systems.

In line with new trends for interpreting the European area, the Quadrangle has been placed in relation to the "Median Macro-region", which is interpreted in terms of its relationships through the city network and positioned within widespread networks that represent its potential and role in the European and Mediterranean dimension. The identified infrastructural Frameworks support average loads of about 100,000-200,000 inhabitants and cover the whole of Central Italy, although they are not yet complete and capable therefore of stimulating the flows determined by the productive and tourist sectors across the regional and macro-regional territory. The main objective of the "PdT2 Abruzzo" is to reinterpret and

complete the infrastructural fabric to stimulate these flows and to connect weak Territorial Settlement Systems with stronger ones and, on a larger scale, Median Italy with the Euro-Mediterranean area.

The features and potential of the Territorial Settlement Systems from this interpretation based on the Frameworks and networks of the city, as well as the connected Tourist Systems with their landscape and cultural qualities, have helped to identify fundamentally different development policies (priorities) as well as complementary development policies (useful for the full implementation of the first policies), both in terms of tangible and intangible aspects (strengthening/completing the connections, reinforcing/consolidating the services, recovery/redevelopment). These policies are suitable for the development of this context, intrinsically establishing its scalability over time to facilitate and accelerate its implementation.

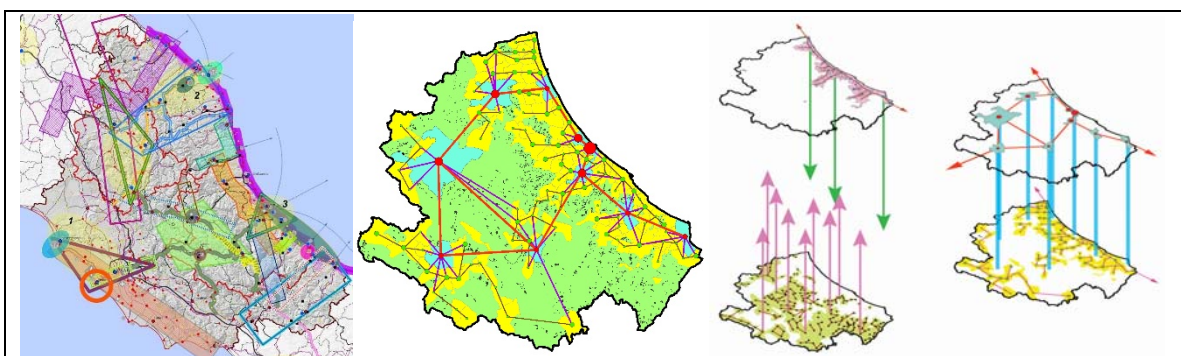


Fig. 2 To the left: the Median Macro-region and Territory Project (in green the Central Abruzzo Quadrangle); in the centre: a deepening of Territorial Settlement Systems in Abruzzo Region; to the right: Territorial Settlement Systems and City Networks (top left: Linear coastal cities; bottom left: Inhabited countryside areas; top right: Major urban centres; bottom right: Networks of villages or minor Urban centres)

Through the definition of a structured Strategic Agenda for certain Issues (reorganisation of a Territory, Environment or Landscape) and Systems (Settlement or Tourist), the "PdT2 Abruzzo" pays particular attention to the characterisation of tourism. This can also involve the development of key policies for the Smart Territories and the Smart Up-Countries, in accordance with detailed Urban Planning Projects. The settlement Systems affected by these specific policies are the "Network of villages and Minor centres" and the "Inhabited countryside areas". These territorial sectors of the Up-Country affect the L'Aquila City-territory and have always been considered underused. They are subject to a substantial relational deficit with the "Major centres" (major urban areas, including L'Aquila) and the "Linear coastal city", a deficit which could be recovered by integrating structural strategies with "Smart" objectives for inland areas, applied to contexts such as those found in the L'Aquila City-territory and coordinated (or made coherent) with the proposed Urban Planning Project through a process of sharing in the framework of Smart Communities.

Experimental research suggests, as a reference to the socio-economic development, the tool of the Project ("Urban Planning Project" at local level, "Territory Project" at regional level), which interprets the regional space with a new model of integrated territorial settlement systems and networks of cities, which recognizes in the local context a not urban-centric model but relating to the identification of the City-territory, which extends the strategies of the Smart-City to inland areas highlighting the role of Rural Space-Smart and its innovative themes. The experiments proposed with the Joint Territory 2 Project - Abruzzo, structured on the Central Abruzzo Quadrangle, and the consistency of these experiments with those of Urban Planning Projects on the local level, introduce a set of alternative tools to classical planning (which generated the post-urban city mentioned in the first introductory paragraphs) based on the concept of strategic planning, effective for the achievement of the objectives summarized in this text, tools that in the particular case of central Italy, lead the Up-Country at the center of development projects.

4 CONCLUSIONS

Moving from the objective of a Smart-City to that of a Smart Up-Country essentially means highlighting the underuse of areas of “market failure”, which have only been brought to the attention, albeit in weak forms, of the new 2014-2020 programming by the last few government study documents (see the partnership agreement on inland areas), without a structured program, but especially without a thorough reflection on the tools of implementation and the unresolved issue of governance (too many stakeholders and decision-makers uncertain), factors that determine today a substantial block of territorial changes, but also urban changes.

To date, the inland areas of Central Italy, and in particular the areas in Abruzzo and the Seismic Crater, formed by an inefficient network of towns and cities of small-medium dimension (such as L'Aquila) from the critical peculiarities of the post-urbanism, today still have the characteristics of underutilization, in the face of a very important urban, rural, landscape and environmental heritage, further compounded by incomplete infrastructural frameworks, tangible and intangible, that effectively exclude the same areas from local and global networks.

Intervene on the failure of urban and territorial policies of the last decades in the inland area, whose past development was based on the European polycentric model, mainly means to overcome the model of the modern city still characterizing, and in particular the governance model of the Italian territory in the last 20-30 years (zoning), that has basically crippled territorial development and that of the related networks. In this sense, is under construction an experimental activity conducted by AnTeA Lab (University of L'Aquila) and LAURAq (National Institute of Urban Planning (INU) and National Association of Historical Artistic Centers (ANCSA)), which focuses on the potential of the Project tool: a Territory Project, an Urban Planning Project but also a Knowledge Project; a Project based on a reticular interpretation of the space addressed to the integration through Territorial settlement systems and Networks of cities, end not to the revival of the dual interpretation coast-mountain that has always characterized the policies of central Italy. The experimental activity means the reticularity as an extension to the territory (and thus to the inland areas) of the connective nature of the Smart-City (in fact we're talking about City-territory), innovating its meaning and redefining itself as Smart-Up Country, and use the tool of “Project” implemented through new and streamlined governance tools, to deal effectively the urban and territorial issues and renew the City-territory in Smart sense, where the word “Smart” is associated with a broader meaning related to a new model of the City, also in planning terms and not just technology.

Territorial projects and Urban Planning Projects, geared on the interpretation model (which might be called macro-regional) consisting of the Territorial settlement systems and Networks of cities, are able to show a relational view of the area concerned, where the Smart Up-Country (extension of the Smart City to inland areas) are connected by projecting their own territory in the European space, a result that the classical tools of planning are no longer able to achieve for a long time.

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Fig. 1: taken from the presentation entitled "Workshop – Smart, sostenibile e sicuro: il futuro dei centri storici 2, Lucca 18 October 2012, Claudia Meloni - ENEA researcher.

Fig. 2: taken from "*Median Italy: territorial diversity as the cornerstone of regional development*", di D. Di Ludovico, P. Properzi, A. Santarelli, in: The 1st International Symposium "NEW METROPOLITAN PERSPECTIVES. The integrated approach of Urban Sustainable Development through the implementation of Horizon/Europe2020".

AUTHORS' PROFILES

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Graduated in 1999 in Civil Engineering at the University of L'Aquila. In 2004 he obtained the Ph.D. degree in Urban Planning from the Department of Architecture and Urban Planning of the Faculty of Engineering at the "La Sapienza" University of Rome. He has conducted a research fellowship and worked as a lecturer in Urban Planning Laboratories, while also working as an adjunct professor in Urban planning on the Civil Engineering and Architecture Degree Course at the University of L'Aquila. Currently works as a researcher in Urban and regional planning at the Department of Civil, Building-Architectural and Environmental Engineering at the University of L'Aquila. He conducts research on environmental, landscape, territorial and strategic Planning and Programming, with a particular emphasis on Inland areas, Territory and Landscape Projects, and Macro-regions, within the area of environmental assessment and on the specific subject of the integration of Assessments and Plans. Furthermore, his research focuses on the construction and management of Knowledge-based Systems for planning, including through GIS techniques. He is currently the Secretary of the National Urban Planning Institute (INU) –Department of Abruzzo and Molise, as well as the Managing Director of INU Publishing and the Director of the Urban Planning Laboratory for the Reconstruction of L'Aquila (LAURAQ) of INU and ANCSA.

Pierluigi Properzi

Has been a full professor of Urban Planning. He currently works as an adjunct professor in Urban planning in the Civil Engineering and Architecture course at the University of L'Aquila. His research work is focused on two interacting plans: one on environmental sustainability and the Countryside-Territory, in reference to the creation of shared Region Profiles, and the other on the interaction between Plan/Programme in reference to the creation of complex territorial projects through new concerted actions and new non-institutional dimensions. His research interests address the Vast Area dimension, both in the QUATER project and in the PLANECO Group project (MURST 40%) and more recently in PRIN SPHERA. His coordination in the definition of new regional legislative Articles has allowed checks of the intersections between the development and sustainability processes in the territory's governance system. The funding received from the CNR, MPI-MURST and MIUR, for projects under a 60% share and for projects of national interest, has helped to achieve the results which are documented in specific publications or in research reports by Ministries and/or National Organisations, which are referred to in the list of publications. He is President of the National Urban Planning Institute – Department of Abruzzo and Molise – and the national coordinator for INU research.

Fabio Graziosi

Was born in L'Aquila, Italy, in 1968. He received the Laurea degree (cum laude) and the Ph.D. degree in electronic engineering from the University of L'Aquila, L'Aquila, in 1993 and 1997, respectively. Since February 1997, he has been with the Department of Electrical Engineering, University of L'Aquila, where he is currently an Associate Professor. He is a member of the Executive Committee, Center of Excellence Design methodologies for Embedded controllers, Wireless interconnect and System-on-chip (DEWS), University of L'Aquila, and the Executive Committee, Consorzio Nazionale Interuniversitario per le Telecomunicazioni (CNIT). He is also the Chairman of the Board of Directors of WEST Aquila s.r.l., a spin-off R&D company of the University of L'Aquila and the Center of Excellence DEWS. He is involved in major national and European research programs in the field of wireless systems and he has been a reviewer for major technical journals and international conferences in communications. He also serves as Technical Program Committee (TPC) member and Session Chairman of several international conferences in communications. He is a member of IEEE and has authored over 150 papers in technical journals and conference proceedings. He has supervised 6 Ph.D. students and 4 Post-Doc researchers. His current research interests are mainly focused on wireless communication systems with emphasis on wireless sensor networks, ultra wide band communication techniques, cognitive radio and cooperative communications.