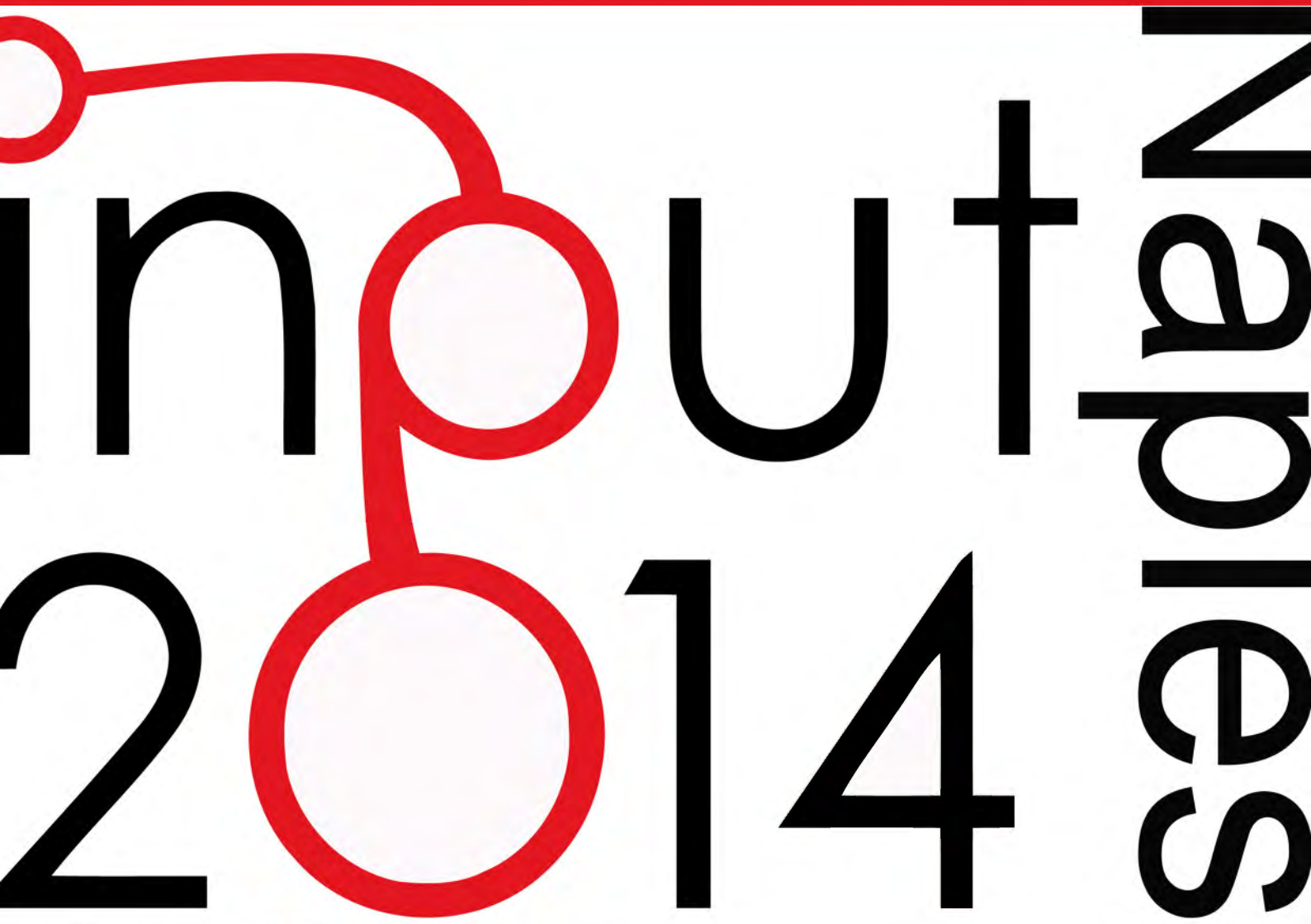
TeMA

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).



Smart City

planning for energy, transportation and sustainability of the urban system

Special issue, June 2014

print ISSN 1970-9889 e-ISSN 1970-9870
University of Naples Federico II

TeMA Journal of Land Use, Mobility and Environment

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
Lycence: Cancelleria del Tribunale di Napoli, n° 6 of 29/01/2008

Editorial correspondence
Laboratory of Land Use Mobility and Environment
DICEA - Department of Civil, Architectural and Environmental Engineering
University of Naples "Federico II"
Piazzale Tecchio, 80
80125 Naples
web: www.tema.unina.it
e-mail: redazione.tema@unina.it

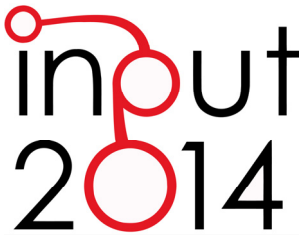
TeMA Journal of Land Use, Mobility and Environment

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.

The Italian National Agency for the Evaluation of Universities and Research Institutes (ANVUR) classified TeMA as scientific journals in the Areas 08. TeMA has also received the Sparc Europe Seal for Open Access Journals released by Scholarly Publishing and Academic Resources Coalition (SPARC Europe) and the Directory of Open Access Journals (DOAJ). TeMA is published under a Creative Commons Attribution 3.0 License and is blind peer reviewed at least by two referees selected among high-profile scientists by their competences. TeMA has been published since 2007 and is indexed in the main bibliographical databases and it is present in the catalogues of hundreds of academic and research libraries worldwide.

TeMA Journal of Land Use, Mobility and Environment

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.



TeMA Journal of Land Use, Mobility and Environment

TeMA Journal of Land Use, Mobility and Environment

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.

TeMA
Journal of
Land Use, Mobility and
Environment

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

Contents

TeMA Journal of Land Use, Mobility and Environment

TeMA Journal of Land Use, Mobility and Environment

TeMA Journal of Land Use, Mobility and Environment

TeMA Journal of Land Use, Mobility and Environment

TeMA Journal of Land Use, Mobility and Environment

TeMA
Journal of
Land Use, Mobility and
Environment

TeMA
Journal of
Land Use, Mobility and
Environment

TeMA
Journal of
Land Use, Mobility and Environment

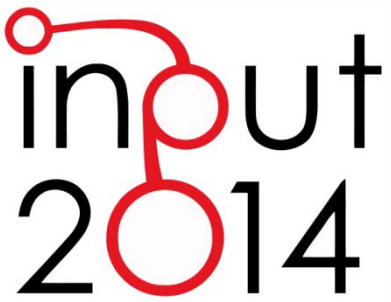
TeMA INPUT 2014
Print ISSN 1970-9889, e- ISSN 1970-9870

DOI available on the on-line version

SPECIAL ISSUE

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

Naples, 4-6 June 2014



URBAN SMARTNESS VS URBAN COMPETITIVENESS

A COMPARISON OF ITALIAN CITIES RANKINGS

ROCCO PAPA[a], CARMELA GARGIULO[b], STEFANO FRANCO[c], LAURA RUSSO[d]

[a,b,c,d] Department of Civil, Architectural and Environmental Engeneering,(DICEA) University of Naples Federico II
e-mail: (a) rocco.papa@unina.it
(b) gargiulo@unina.it
(c) stefanofranco56@gmail.com
(d) laurarusso88@hotmail.it
URL (a) www.roccopapa.it
(b) www.dicea.dip.unina.it

ABSTRACT

This paper describes a part of the research carried out by the Department of Civil, Architectural and Environmental Engineering (DICEA) of the University of Naples "Federico II", within the *Project Smart Energy Master for the energy management of territory,* financed by PON 04a2_E R&C Axis II, from 2012 to 2015.
Today that the idea of smart city draws the attention of urban planners and policy makers and, at the same time, global competitiveness is considered essential for the success of a city, the paper aims to investigate the relationship between the concept of smart city and that of competitive city, identifying common characteristics and differences and answer the question: is "smartness" a new concept for urban studies?
The analysis has been conducted in the Italian context, comparing the competitive structure of Italian provinces with their performance as smart cities. To rank Italian provinces because of their level of competitiveness, a previous ranking, carried out in 1995, has been updated with the most recent data available and the new hierarchy, thus obtained, has been compared with that of Italian smartest cities proposed by Forum PA.
The benchmarking shows that smartness and competitiveness are strictly connected: today, a city needs to improve its smart quotient in order to be more attractive and so more competitive, in fact, the efficiency and livability of cities, sought by potential citizens, can be improved by using ICTs, as supported by the advocates of smart cities, and represent a strategic factor for gaining a competitive advantage.

KEYWORDS
Smart City; Urban Competitiveness; Benchmarking.

1 INTRODUCTION

Today, over 52% of the world's population lives in urban areas (The World Bank 2013), therefore cities are now nerve centers for the global economy. If from the '90 improved urban competitiveness was considered the path to economic nirvana (Begg 1999), nowadays, although cities competitiveness continues to be a central theme for planners and policy makers, a new paradigm of the city is emerging, that of smartness.

Indeed, despite the label "smart city" has recently become more widespread, its roots can be traced already in the end of '80s and early '90s (Papa, Gargiulo, Galderisi 2013) when, with a great effort of imagination, the concept of "wired city" appeared for the first time and the future development that the use of innovative technology would have brought to the transformation of the landscape was expected (Beguinot, Cardarelli 1992). In this scenario, where the not-so-new idea of smart city draws the attention of urban planners and policy makers and, at the same time, global competitiveness is still considered essential for the success of a city, the paper aims to investigate the relationship between the concept of smart city and that of competitive city, identifying common characteristics and differences.

In this paper we try to answer the question: is smartness a new concept for urban studies?

The analysis has been conducted in the Italian context, comparing the competitive structure of Italian provinces with their performance as smart cities.

For ranking Italian provinces because of their level of competitiveness, we have used, as starting point, a previous study carried out in 1995 at the Department of Urban and Regional Planning of the University of Naples "Federico II", that orders Italian provinces into 5 different classes because of the role that each plays in the competition at different scales (Galderisi, Gargiulo 2002).

We have updated this ranking with the most recent data available, exploiting the statistical methodology used in 1995 to identify the propensity to competition of Italian urban areas, and then, we have compared the new hierarchy thus obtained with that of Italian smart cities proposed by Forum PA, which classifies 101 Italian cities measuring their level of smartness based on 89 indicators (Forum PA 2013).

The benchmarking between the two rankings and the different variables used to define them allowed us to verify in which terms Italian smartest cities perform in the challenge for gaining a competitive advantage.

2 URBAN COMPETITIVENESS

In the era of globalization, urban competitiveness can be defined as the demonstrated ability of cities to attract capital, business, talent and visitors (The Economist 2012): those cities that become more globally linked and responsive to the competitive needs of business will attract investment and jobs while those that do not will decline (Rondinelli *et al.* 1998).

A myriad of ranking measuring country competitiveness first, city competitiveness then, can be found reading the scientific literature and surfing the Internet (Beaverstock *et al.* 1989, DATAR 2003, Taylor *et al.* 2004, Hall 2005): how do Italy and Italian cities perform?

In 2013, Italy ranks 44th according to the *World Competitiveness Scoreboard* (Institute for Management Development 2013*)* and 49th as reported by the *Global Competitiveness Report* (World Economic Forum 2013) and a comparable position is that of Italian cities, in fact, according to the global cities ranking proposed by The Economist Intelligence Unit – *Hot spots. Benchmarking global city competitiveness* – Milan ranks 47th and Rome is 50th out of 120. Moreover, the hierarchy made by The Economist shows that, despite the economic crisis that affected many Western countries, U.S. and European cities are the world's most competitive cities today, accounting for 24 of the top 30s (The Economist 2012), but Italy contradicts this trend.

A more detailed analysis of urban competitiveness in the Italian context is proposed in the next paragraph.

2.1 MEASURING THE LEVEL OF COMPETITIVENESS OF ITALIAN PROVINCES

Although several studies evaluate urban competitiveness at international level, only few focus exclusively on Italy; the analysis *"Processes of internationalization and evolution of urban systems: a reading of the competitive structure of Italian provinces*[1]*"* is one of them. It was carried out at the Department of Urban and Regional Planning (Di.Pi.S.T.) of the University of Naples "Federico II" in 1995; its aim was to investigate Italian provinces' level of competitiveness depending on the international, national and local context (Galderisi, Gargiulo 2002).

We have chosen to use this previous work as the baseline and take it a step further with a new set of measurements, the latest and most representative, in order to have a new, up-to-date, ranking of urban competitiveness in Italy.

2.1.1 VARIABLE SELECTION

Based on the scientific literature review about the past international researches on urban competitiveness (Bonnafous *et al.* 1991, Bonneville *et al.* 1991, Gibelli 1994, King 1991, Morandi 1994), the 1995 study identified six macro-areas considered strategic for gaining a competitive advantage at international scale:

- Mobility and Communication
- Economy
- Production
- Human Capital
- Research and Training
- Environment

Each of the six categories was composed of a flexible number of variables, for a total of 39, capable of measuring the level of competitiveness of the analyzed urban areas respect to a specific aspect.

We have modified some of the variables used in 1995: a number has been eliminated because today considered no longer representative, while some have been replaced by equivalent variables of which more recent data were available. In the end, a total of 31 variables have been selected (Tab. 1).

MOBILITY AND COMMUNICATION	*International airports*	ENVIRONMENT	Population density
	Passengers on international flights		Residential square meter price
	Networks for telephony and telematics		Hotel per 1000 population
	High-speed connections		Crimes per 1000 population
ECONOMY	Employed in firms/total number of employed	RESEARCH AND TRAINING	*Universities*
	Per capita income		Universities per 1000 population
	Household final consumption expenditure pp		Educational facilities
	Number of bank branches		*Number of patents*
	Per capita GDP		Number of patents per 1000 pop.
PRODUCTION	*Number of firms*	HUMAN CAPITAL	*Population*
	Number of firms per 1000 population		*Population of the provincial capital*
	Export/import		Economic Activity rate
	Enterprises growth rate		Unemployed per 1000 population
	Enterprises death rate		Graduated per 1000 population
	Exhibitions		Spending pp for recreation and culture
	Exhibitions per 1000 population		

Tab. 1 Selected variables by macro-area. Determinants are in italics to distinguish them from Indictors

[1] "Processi di internazionalizzazione ed evoluzione dei sistemi urbani: una lettura della struttura competitiva delle province italiane".

As done in the study of reference, the variables can be split into two different groups:

- DETERMINANTS (12)
- INDICATORS (19).

Determinants are that variables discriminant for competitiveness on an international scale, while indicators, which are proportional to the demographic weight of the territorial systems to which they relate, are indicative for competitiveness on a local scale (Galderisi, Gargiulo 2002). Most indicators have a positive influence on urban competitiveness, but some others, such as the number of unemployed and crimes per 1000 population, act in a negative way.

We used different sources of data – ISTAT, Tagliacarne Institute, Infocamere, Ministry of Economic Development – but, for a few number of provinces[2] some of the data was missing.

2.1.2 RANKING METHODOLOGY

The 110 provinces composing Italy have been articulated into five classes according to the different level of competitiveness, due to the greater or lesser presence of those resources identified as strategic for the creation of a competitive advantage: those provinces with a consolidated role on the international scene belong to the *first class;* those potentially international belong to the *second class;* those of national relevance belong to the *third class;* those potentially national belong to the *fourth class;* those provinces of local level belong to the *fifth class* (Galderisi, Gargiulo 2002).

Determinant variables have been exclusively used to identify those provinces of international level, or first class: for each of the twelve determinants, the 110 cases have been ranked and only those which were at the top of the ranking (1^{st}; 2^{nd}) with respect to each variable have been included in the first class.

A different and more complex methodology has been used in the case of indicators: each of the nineteen rankings – one for each indicator – has been divided into five ranges of equal size, corresponding to the five classes of competitiveness. Considering the totality of the indicators, the frequency with which each province falls within one or another of the five ranges/classes, has allowed us to allocate each province to the class in which it falls more frequently (Tab. 2).

Looking at the results obtained, more than half of the cases fell in fifth class, so it has been chosen to recalibrate some of the classification in order to better understand the differences amongst Italian provinces and have a more significant distribution of the cases into the five classes of competitiveness: the rankings in which over 50% of the values fell in one of the five classes have been recalibrated.

For the recalibration, we have calculated the variation between the last value of a class and the first of the following one and, when the gap was greater than 20%, we have re-classified the observations into five classes, excluding the upper one, which we then joined to the new first (or second, or third, ...) class.

We have recalibrated each ranking as many times as the number of variations between two consecutive classes was higher than 20%. For example, the *"Hotels per 1000 population"* ranking has been recalibrated because the 92.7% of the cases fell into the fifth class and the second class didn't exist; this happened because the performances of the provinces of first class, Bolzano and Rimini, were extremely higher that the others, creating a distribution of the cases biased towards the last class. We have recalibrated the classification by calculating the variation between the last value of the first class and the first value of the third one; saw that the variation was higher than 45% (>20%), we have repeated the division of all the cases in five classes, excluding Bolzano and Rimini, which we have then joined to the new first class created.

[2] For the most recent provinces – Barletta-Andria-Trani, Carbonia-Inglesias, Fermo, Medio-Campidano, Monza e della Brianza, Ogliastra, Olbia-Tempio – data for three indicators were missing, while for the province of Cremona and Padova only data for one indicator were missing.

Province	CLASS					Province	CLASS				
	I	II	III	IV	V		I	II	III	IV	V
Belluno	6	4	3	2	4	Cremona	2	4	2	7	3
Bologna	6	2	6	4	1	Cuneo	4	2	4	6	3
Bolzano/*Bozen*	9	2	1	5	2	L'Aquila	2	3	2	8	4
Milano	6	4	5	1	3	Lodi	1	5	1	7	5
Modena	6	4	4	4	1	Nuoro	1	3	3	6	6
Reggio nell'Emilia	5	4	3	5	2	Pescara	1	1	4	10	3
Rimini	6	4	4	4	1	Piacenza	3	3	3	6	4
Arezzo	0	7	4	4	4	Ravenna	4	1	5	7	2
Ascoli Piceno	2	5	4	5	3	Salerno	1	0	3	8	7
Bergamo	3	6	3	5	2	Teramo	1	6	2	7	3
Brescia	2	7	2	7	1	Torino	3	2	5	8	1
Fermo	4	5	1	2	4	Trento	4	4	4	6	1
Firenze	2	10	3	3	1	Vicenza	3	4	3	5	4
Genova	1	7	3	6	2	Agrigento	1	0	1	5	12
Lecco	3	5	3	4	4	Aosta	4	4	3	1	7
Lucca	0	7	4	7	1	Asti	2	2	3	5	7
Macerata	3	6	5	3	2	Avellino	1	1	3	5	9
Mantova	3	5	2	4	5	Barletta-Andria-Trani	0	2	2	4	8
Massa-Carrara	0	8	3	5	3	Benevento	1	2	2	4	10
Monza e della Brianza	4	6	2	1	4	Brindisi	0	2	0	6	11
Padova	2	6	6	3	1	Caltanissetta	0	1	2	3	13
Parma	4	5	5	3	2	Campobasso	2	0	2	7	8
Pesaro e Urbino	3	6	4	4	2	Carbonia-Iglesias	0	0	2	5	9
Pistoia	0	6	5	6	2	Caserta	2	2	2	2	11
Roma	4	5	3	3	4	Catania	0	1	4	5	9
Siena	2	7	4	4	2	Catanzaro	0	3	3	2	11
Sondrio	2	6	2	4	5	Cosenza	1	2	0	4	12
Grosseto	0	6	3	4	6	Crotone	1	0	2	1	15
Alessandria	2	1	7	5	4	Enna	1	0	2	2	14
Biella	2	3	5	5	4	Foggia	0	3	1	4	11
Como	4	3	6	5	1	Frosinone	1	3	5	4	6
Ferrara	3	4	7	3	2	Isernia	2	3	2	4	8
Forlì-Cesena	3	4	5	5	2	Latina	0	3	5	5	6
Gorizia	1	3	6	5	4	Lecce	1	2	0	8	8
Imperia	1	5	6	3	4	Matera	2	1	0	7	9
Livorno	0	4	5	5	5	Medio Campidano	1	1	2	2	10
Novara	1	4	5	4	5	Messina	1	2	2	7	7
Pavia	2	2	7	3	5	Napoli	4	1	1	5	8
Perugia	2	5	6	4	2	Ogliastra	0	2	2	3	9
Pisa	3	4	7	2	3	Olbia-Tempio	1	4	1	3	7
Pordenone	4	3	5	3	4	Oristano	1	1	2	2	13
Prato	2	5	5	3	4	Palermo	1	2	1	4	11
Treviso	4	3	6	3	3	Potenza	1	1	3	7	7
Trieste	3	5	5	2	4	Ragusa	2	1	1	3	12
Udine	2	5	6	4	2	Reggio di Calabria	1	0	2	5	11
Varese	2	5	7	3	2	Rieti	1	4	1	4	9
Venezia	0	4	8	4	3	Rovigo	2	3	5	3	6
Verbano-Cusio-Ossola	3	2	5	5	4	Sassari	0	2	4	4	9
Vercelli	2	3	5	4	5	Savona	2	4	3	4	6
Verona	1	6	7	4	1	Siracusa	1	2	0	4	12
La Spezia	0	6	3	6	4	Taranto	1	1	4	2	11
Ancona	2	5	4	7	1	Terni	1	3	4	4	7
Bari	0	1	6	7	5	Trapani	0	1	2	3	13
Cagliari	0	1	6	6	6	Vibo Valentia	0	1	1	3	14
Chieti	1	4	4	5	5	Viterbo	0	3	4	6	6

Tab. 2 Frequency of the provinces with respect to the five classes of competitiveness

Furthermore, for this indicator the recalibration has been used twice because also the variation between the last value of the third class and the first value of the fourth one was higher than 20%.

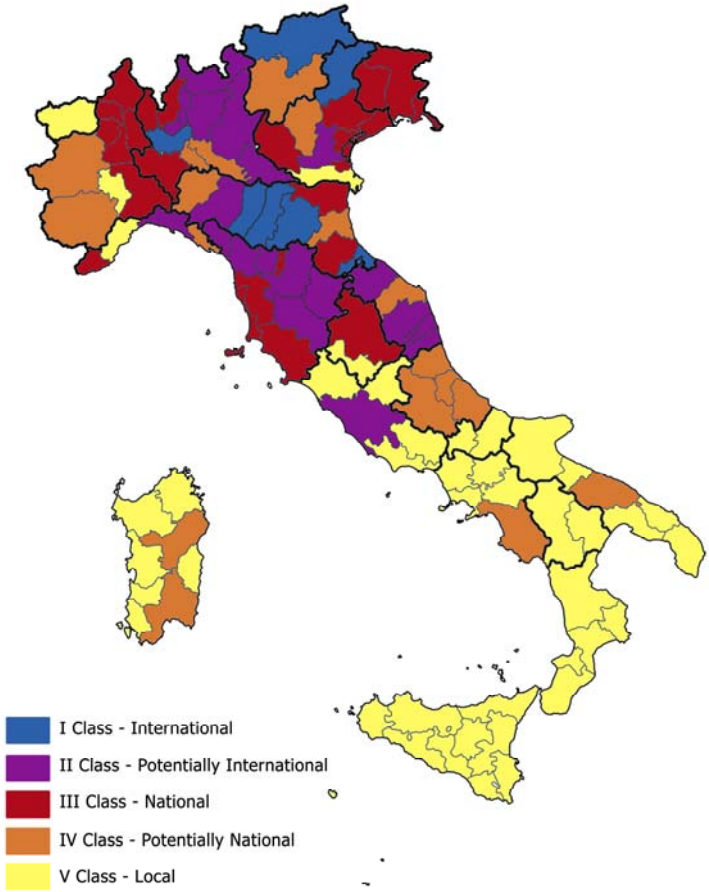


Fig. 1 Ranking the level of competitiveness of Italian provinces

In some cases, when a province showed the same frequency in two or three classes, its assignment to a class rather than another depended on the type of indicator: we considered “Economy” and “Production” the most highly weighted macro-areas. For example, in the case of Brescia, which showed the same frequency in second and fourth class, the allocation to the second class seemed more appropriate because five out of seven indicators for which Brescia ranked in second class belong to the “Economy” and ”Production” areas.

2.1.3 RESULTS

The analysis of data in relation to the two different groups of variables – determinants and indicators – has given rise to different considerations.

Considering the first group of variables, the provinces of Milan and Rome are rated as the Italian two most competitive urban systems with a consolidated role at the international scale; in fact, Milan dominates eleven out of twelve rakings, while Rome is at the top of nine out of twelve of them. Furthermore, Bologna has stood out positively by occupying the second position for the *Per-capita Income* and *Exhibition* variables.

Different information was provided looking at indicators (Fig. 1): the considerable gap between North-Central Italy and the South is the first result: if only five North-Central provinces falls in fifth class (Aoste,

Asti, Savona, Gorizia, Terni), excluding Abruzzi, there isn't any South province in the first three classes and only four are in the fourth one (Bari, Salerno, Cagliari, Nuoro).

Further evidence has been brought by the case of Rome, which was previously identified as province of international level, and now ranks in second class; one possible reason can be that the second group of variables, the indicators, gives a measure of resources endowment proportional to the population weight of the urban system and the province of Rome, strong by an absolute point of view, loses its relevance.

A positive finding is that of Emilia Romagna, the Italian region with the highest number of provinces belonging to the first class – four out of nine – and an overall high level of competitiveness. The case of Emilia Romagna shows that a polycentric urban structure can positively influence the regional system as a whole. Together with Emilia Romagna, Tuscany has stood out for a widespread medium-high level of competitiveness, in fact, although none of its provinces has international relevance, all of them belong to the second (six out of ten) or third class (four out of ten).

An additional finding that might seem unexpected is that of the province of Turin, which has fallen in fourth class, among those provinces potentially national, despite other studies have considered it as an urban area with an international level of competitiveness. A possible explanation of this result could be found in the scale adopted by this analysis: for some leading urban realities, the provincial level could have led to a flattening of the relevance of the strategic resources of their capital city (Galderisi, Gargiulo 2002).

3 URBAN SMARTNESS

Since the beginning of 2000s, a large debate on what it is called "smart city" has attracted the interest of the scientific community, becoming a topic of great importance.

The idea of this new urban dimension, that has to be built through the conscious inclusion of technological innovation into the systemic structure of the city (Fistola 2013), is not new, but its origins can be traced in the '80s, when the development of ICTs has started to clear distances and people began thinking to the city as a limitless space (Papa, Gargiulo, Galderisi 2013).

Although there is a plenty of studies focusing on urban smartness, a shared definition of the concept is still missing, but the scientific literature agrees to consider *smart* a city well performing in six macro-areas: Economy, Environment, Mobility, Governance, People, Living (Komninos 2002; Giffinger *et al.* 2007; Shapiro 2008; Van Soom 2009).

Several cities are developing a great number of initiatives aiming to become smarter, many of these are gathered in the report "Mapping Smart City in the EU" – commissioned by the European Parliament's Industry, Research and Energy Committee – that defines the success of a smart city on the depth and effectiveness of targeted improvement within each initiative and on the coherence or balance of the portfolio of initiatives across the city (EU 2014). In addition to it, the report identifies the countries with the highest number of smart cities and Italy ranks third, following the UK and Spain.

A different point of view is that of Boyd Cohen's *Smart City Wheel,* defined as "a holistic framework for considering all of the key components of what makes a city smart" (Cohen 2012) and used for drawing up a list of the ten European smartest cities, in which Italy doesn't appear.

Focusing on the Italian context, several studies have ranked Italian cities because of their level of smartness, each of which using different variables and data (Between 2013, Forum PA 2013).

In this analysis, we have decided to consider the ranking made by Forum PA in order to have a hierarchy of Italian smart cities.

3.1 MEASURING THE LEVEL OF SMARTNESS OF ITALIAN CITIES

ICity Rate is the annual report drawn up by Forum PA, a company specialized in facilitating knowledge exchange on innovation between public and private stakeholders. The report aims to support the decision making of public administrations by providing a picture of the Italian situation related to the economic, social and environmental dynamics (Forum PA 2013). The analysis assessed 103 provincial capitals on 110[3].

3.1.1 VARIABLE SELECTION

Starting from the wide range of information and data available to the public administration today, Forum PA has selected a total of eighty-nine variables describing six different macro-areas, the same mentioned above and widespread in the literature: Economy, Environment, Mobility, Governance, People, Living. All the indicators have been aggregated into one final index, called *the Smart City Index*.
Different type of data sources have been used for the analysis, such as ISTAT, UNIONCAMERE, ANCI, Openpolis and ActionAID; although the smart city index ranks 103 provincial capitals, a great number of variables used by Forum PA refers to the province as a whole, because for many indicators data of municipal level don't exist .

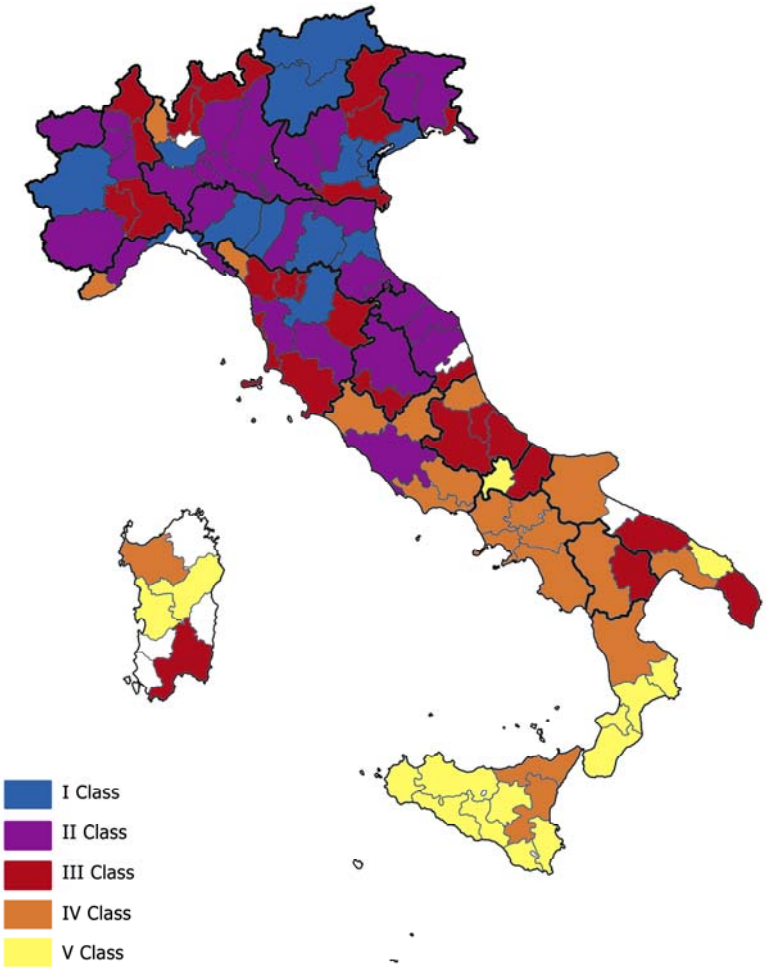


Fig. 2 Ranking the level of smartness of Italian cities.

3 Data for the provinces of Monza e Brianza, Fermo, Barletta, Ogliastra, Medio Campidano, Olbia Tempio, Carbonia-Iglesias were missing.

3.1.2 RESULTS

In order to have a comparable picture of Italian urban competitiveness and smartness, we have divided the ranking made by Forum PA into five classes[4] (Fig. 2).

A first finding is that North-Central Italy hosts the cities with the highest overall rank, while South Italian cities perform relatively poorly; not surprisingly Cagliari, the least worst of them, ranks 43th.

In North-Central Italy, two urban realities dominate the others, Trentino Alto Adige and Emilia Romagna: Trento and Bolzano are respectively first and eleventh in the Forum PA ranking, both falling in first class, while Emilia Romagna includes only cities of first (four out of nine) or second (five out of nine) class and, among them, Bologna ranks second.

Further result is that of the regions hosting the cities with the wickedest performances, which are Campania, Calabria and Sicily that include only cities of fourth and fifth class.

4 BENCHMARKING ITALIAN COMPETITIVENESS AND SMARTNESS

After having separately analyzed the level of urban competitiveness and smartness in Italy, we have compared the two rankings discussed above, in order to identify common characteristics and differences.

Firstly, we should point out that a different scale has been used to build the two classifications: while that by Forum PA refers to the municipal level of the 103 capital cities, our analysis deals with the province as a whole. Furthermore, for greater accuracy, it is important to emphasize that despite a strong similarities between the six macro-areas used to measure urban competitiveness and smartness, the indicators within each macro-area often differ: none of the indicators within the “Environment”, “Mobility” and “Governance” areas within the Smart City Index is included in the Competitiveness Index, even though eighteen out of thirty one variables used to measure competitiveness are included in that shaping urban smartness.

These premises allow us to begin comparing the two rankings.

The most significant evidence that stands out is the North-South divide, noticeable in both classifications: a leader North-Central Italy includes urban systems of international or potentially international competitiveness and, at the same time, cities with a high smart quotient, despite a laggard South Italy that hosts almost only provinces of local level and cities with a quite low smart quotient. This is confirmed by the best and worst performing regions: Emilia Romagna and Sicily are respectively at the top and bottom of the two rankings.

The case of Rome represents another point of convergence between competitiveness and smartness; in fact, it falls in second class in both circumstances and not in first, even though Rome is the capital of Italy.

Nevertheless, beyond these similarities, there are also relevant differences to point out.

For example, there is a group of North provinces which ranks relatively poorly in competitiveness but performs well in smartness: Torino, Trento and Ravenna are provinces of fourth class of competitiveness, but at the same time are in the top 10 of the smartest cities, moreover Aosta belongs to fifth class of competitiveness and second class of smartness.

The case of Turin can be explained looking at the different scale used for the two classifications, in fact, Turin can be considered among the smartest Italian cities with a good performance also from a competitive perspective, but, as mentioned above, its competitive strength is weakened by the merge with its neighboring municipalities. A different reason explains the cases of Trento and Aosta, in fact, the analysis of their position in the rankings respect each of the six macro-areas within the Smart City Index shows that Trento and Aosta respectively dominate the “Environment” and “Mobility” categories, whose indicators are

4 We have divided the range by 5 (number of classes).

not taken into account in the Competitiveness Index, while they both perform relatively poorly across the "Economic" area, which instead represents the main category shaping urban competitiveness.
A similar argument may explain the cases of some Southern cities – Lecce, Matera and Cosenza – which are provinces of fifth class of competitiveness but third class of smartness: among the six macro-areas, Lecce occupies the best position in the "Governance" category (23rd), Matera in the "Environment" area (12th) and Cosenza in the "Mobility" one (32nd), which not coincidentally are the three macro-areas whose variables are not included among those measuring competitiveness.
Although these are the most evident contradictions, one more difference between the two rankings is that all the South but Sicily and Calabria doesn't fall in the last class of smartness as it does for competitiveness, but it belongs to the fourth. Naples and Potenza are two of these cases, interesting to investigate.
By conducting a deeper analysis on the smart city classification, it emerges that Naples and Potenza perform very well in the "Governance" macro-area, ranking respectively 17th and 16th and this very good result is mainly due to a group of variables which measure the urban planning and development tools endowment of the two cities, but this finding seems inconsistent with Naples' underperformance in the "Environment", "Living" and "People" categories and Potenza's underperformance in the "Living", "Mobility" and "Economy" macro-areas, in which these cities languish further down.

5 CONCLUSIONS

This research has provided a contribution in the effort to understand if the label "smart city" may fall in the branch of studies that supports research on the competitive city, whose definition dates back to the late '80s. Looking at both six macro-areas considered strategic for making a city competitive and/or smart, as well as benchmarking the two maps (Fig. 1; Fig.2), similarities are evident. Nevertheless, looking at the variables within each macro-area, some differences come out, suggesting that the idea of smart city comes from that of competitive, but it evolves differently: if a competitive city aims to attract human and financial capital, a smart city aims also to improve the quality of life of its users by using ICTs to maximize the efficiency of urban spaces (Tiboni, Rossetti 2012); however, *"because in the 21st century a city's attractiveness is directly related to its ability to offer the basic services that support growth opportunities, build economic value and create competitive differentiation, potential inhabitants, of both the commercial and residential variety, are a discriminating lot, and they are looking for cities that operate efficiently and purposefully. They are looking for smarter cities"* (IBM 2012). This means that today a city needs to improve its smart quotient in order to be more attractive and so more competitive. Not surprisingly, cases like Milan, Bologna and Bolzano show that a competitive province is always bolster by a smart capital city.
Taking the cue from this finding, it would be necessary to measure Italian urban competitiveness at municipal scale to better compare this ranking with that of smartness.

REFERENCES

Beaverstock, J.V., Taylor, P.J., Smith R.G. (1999), "A roster of world cities", *Cities*, 16(6), 445-458.

Begg, I. (1999), "Cities and Competitiveness", *Urban Studies,* 36(5-6), 795-809.

Beguinot, C., Cardarelli, U. (eds.) (1992), *Per il XXI secolo una enciclopedia. Città cablata e nuova architettura*, Università degli Studi di Napoli "Federico II" (Di.Pi.S.T.), Consiglio Nazionale delle Ricerche (I.Pi.Ge.T.), Napoli.

Economist Intelligence Unit (2012), *Hot spots – Benchmarking global city competitiveness.*

EU Report (2014), *Mapping Smart Cities in the EU*.

Forum PA (2013), *ICity Rate 2013 – La classifica delle città intelligenti italiane*.

Fistola, R. (2013), "Smart City. Riflessioni sull'intelligenza urbana", *TeMa – Journal of Land Use, Mobility and Environment,* 6(1), 47-60.

Galderisi, A., Gargiulo, C. (2002), "Processi di internazionalizzazione ed evoluzione dei sistemi urbani: una lettura della struttura competitive delle provincie italiane", in Gargiulo, C., *La città tra competizione e riqualificazione,* Università degli Studi di Napoli "Federico II", Dipartimento di Pianificazione e Scienza del Territorio – Collana di studi di urbanistica.

Giffinger, R., Fertner, C., Kramar, H., Kalasek, R., Pichler-Milanovic, N., Meijers E. (2007), *Smart cities. Ranking of European medium-sized cities*, Final Report, Centre of Regional Science, Vienna UT.

Hall, P. (2005), "The World's Urban Systems: a European Perspective", *Global Urban Development*, 1(1).

IBM Smarter Cities (2012), *Smarter, More Competitive Cities*, NY.

Institute for Management Development (2013), *The World Competitiveness Scoreboard 2013.*

Komninos, N. (2002), I*ntelligent cities: innovation, knowledge systems and digital spaces,* Spon Press, London.

Mazzeo, G. (1992), "Metodi quantitativi per la lettura delle Aree Metropolitane del Mezzogiorno", in Papa, R., *Innovazione tecnologica e aree metropolitane del mezzogiorno,* Università degli Studi di Napoli "Federico II", Dipartimento di Pianificazione e Scienza del Territorio – Collana di studi di urbanistica, 185-233.

Papa, R., Gargiulo, C., Galderisi, A. (2013), "Towards an Urban Planners' Perspective on Smart Cities", *TeMa – Journal of Land Use, Mobility and Environment,* (6)1, 5-17.

Rondinelli, D A., Johnson, J.H., Kasarda Jr. and J.D. (1998), "The Changing Forces of Urban Economic Development: Globalization and City Competitiveness in the 21st Century", *Cityscape,* 3(3), 71-105.

Russo, L. (2014), "The Effectiveness of Planning Regulation to Curb Urban Sprawl", *TeMa – Journal of Land Use, Mobility and Environment,* 7(1), 101-114.

Shapiro, J. M. (2008), "Smart cities: quality of life, productivity, and the growth effects of human capital", *The Review of Economics and Statistics*, 88(2), 324-335.

Taylor P.J., Derudder B. (2004), "Porous Europe: European Cities in Global Urban Arenas", *Tijdschrift voor Economische en Sociale Geografie*, 95(5), 527-538.

Tiboni, M., Rossetti, S. (2012), "L'utente debole quale misura dell'attrattività urbana", *TeMa – Journal of Land Use, Mobility and Environment,* 5(3), 91-102.

Van Soom, E. (2009), "Measuring levels of supply and demand for e-services and e-government: a toolkit for cities", *Smart Cities Research Brief*, 3.

World Economic Forum, (2013), *The Global Competitiveness Report 2013-2014*.

SITOGRAPHY

Boyd Cohen: The Top 10 Smartest European Cities, http://www.fastcoexist.com/1680856/the-top-10-smartest-european-cities, last visit in March 2014.

Forum PA – Icity Lab, http://www.icitylab.it/, last visit in March 2014.

AUTHORS' PROFILE

Rocco Papa

Full Professor of Land Use Planning at the Department of Civil, Architectural and Environmental Engineering of University of Naples "Federico II". Editor-in-Chief of the Scientific Journal TeMA - Land Use, Mobility and Environment since 2007.

Director of the Department of Urban and Regional Planning DiPiST of University of Naples "Federico II", from 1999 to 2005. Chairman of the Urban Transformation Company Bagnolifutura S.p.A from 2006 to 2010. Vice-Mayor of the Municipality of Naples, from 2001 to 2006. City Councilor for Livability (appointed to Town Planning and Historical Centre) for the Naples Municipality, from 1997 to 2001. Research activity, carried out continuously since 1974, has developed according to the following four main lines: the study of the interactions between urban and mobility systems; the management and governance of metropolitan areas; the safeguard of environmental quality in highly urbanized areas; the experimentation of new protocols for urban planning tools connected with the updating of techniques, methods and models of analyses, interpretation, planning and governance of territory. As City Councilor for Livability (appointed to Town Planning and Historical Centre) for the Naples Municipality he has developed in detail the following projects: the approval and implementation of the new Master Plan of Naples; the approval and implementation of the Loacl Master Plan for the area of Bagnoli-Coroglio and the establishment of the Urban Transformation Company Bagnolifutura SpA, and the restoration and requalification of the "Real Albergo dei Poveri" and of the "SS. Trinità delle Monache", the implementation of the Line 1 and Line 6 of the Metropolitan Railway. He is the author of more than 100 publications.

Carmela Gargiulo

Associate professor of Urban Planning Techniques at the University of Naples Federico II. Since 1987 she has been involved in studies on the management of urban and territorial transformations. Since 2004, she has been Member of the Researcher Doctorate in Hydraulic, Transport and Territorial Systems Engineering of the University of Naples "Federico II". She is Member of the Committee of the Civil, Architectural and Environmental Engineering Department of the University of Naples "Federico II". Her research interests focus on the processes of urban requalification, on relationships between urban transformations and mobility, and on the estate exploitation produced by urban transformations. On these subjects she has co-ordinated research teams within National Project such as Progetto Finalizzato Edilizia - Sottoprogetto "Processi e procedure" (Targeted Project on Building – Subproject "Processes and procedures), from 1992 to 1994; Progetto Strategico Aree Metropolitane e Ambiente, (Strategic Project Metropolitan Areas and Environment) from 1994 to 1995; PRIN project on the "Impacts of mobility policies on urban transformability, environment and property market" from 2011 to 2013. Scientific Responsible of the *Project Smart Energy Master for the energy management of territory financed by PON 04A2_00120 R&C Axis II, from 2012 to 2015.* She is author of more than 90 publications.

Stefano Franco

He received a master's degree in Economics and Business Management - Marketing at LUISS Guido Carli University of Rome, with a thesis entitled "Social Mobile Marketing: evolution of the communication strategies in the web 2.0 era". In February 2014, he started collaborating with the Department of Civil, Architectural and Environmental Engineering of the University of Naples Federico II within the *Project Smart Energy Master for the energy management of territory*.

Laura Russo

Engineer, Ph.D. student in Civil Systems Engineering at University of Naples Federico II. She received a master's degree in Architecture and Building Engineering with a thesis on urban expansion and the sprawl phenomena, with particular attention for Campania. She is part of the research group within the *Project Smart Energy Master for the energy management of territory.*