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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.

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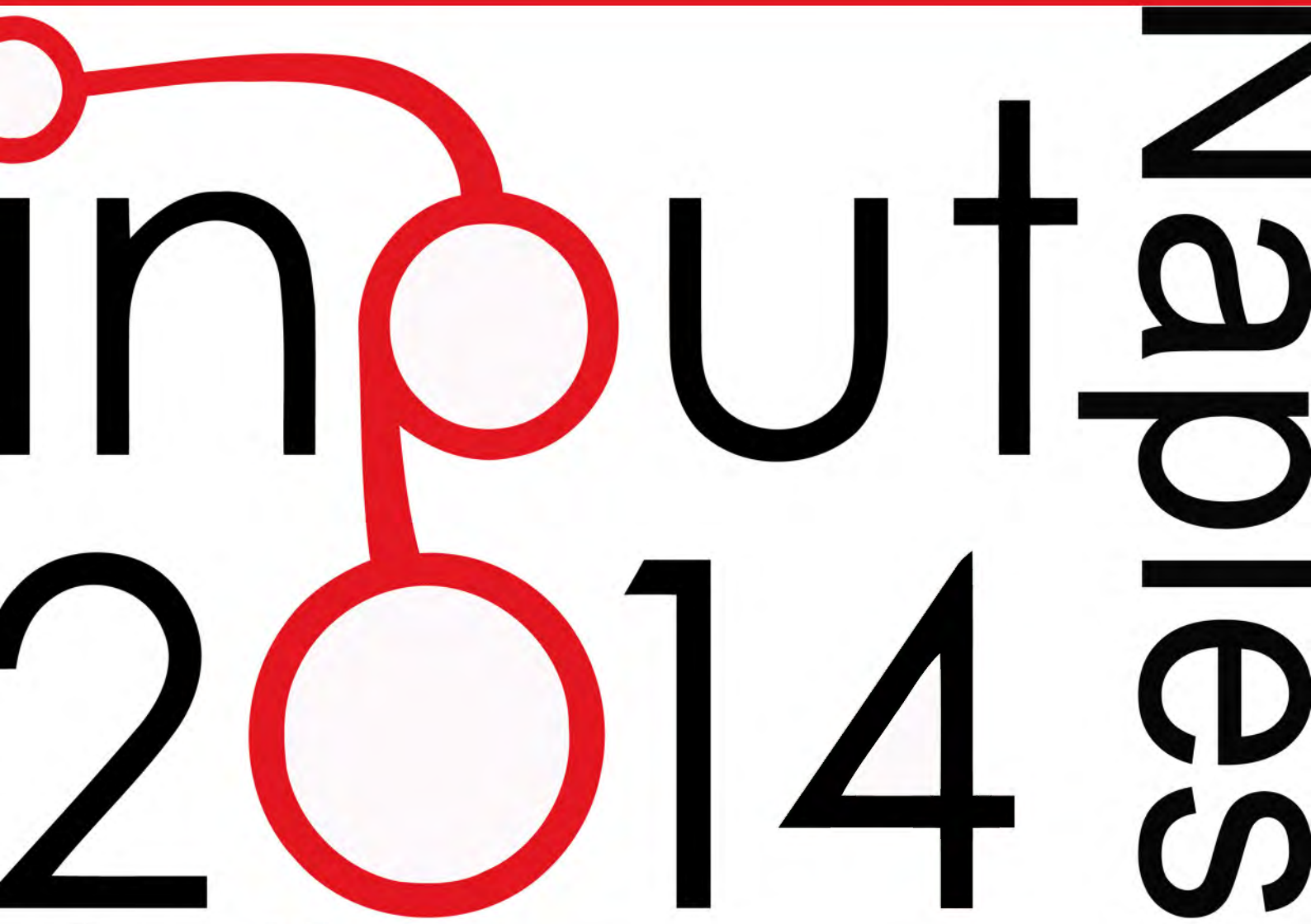

Smart City

planning for energy, transportation and sustainability of the urban system

Special issue, June 2014

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SMART CITY

PLANNING FOR ENERGY, TRANSPORTATION AND SUSTAINABILITY OF THE URBAN SYSTEM

Special Issue, June 2014

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TeMA Journal of Land Use, Mobility and Environment

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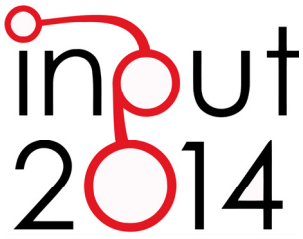
TeMA Journal of Land Use, Mobility and Environment

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

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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.

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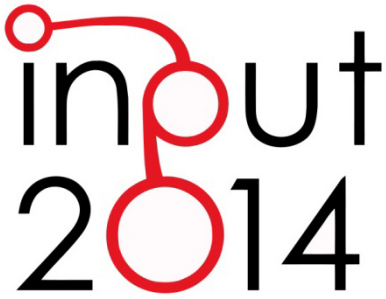

DEFINING SMART CITY

A CONCEPTUAL FRAMEWORK BASED ON KEYWORD ANALYSIS

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ABSTRACT
"Smart city" is a concept that has been the subject of increasing attention in urban planning and governance during recent years. The first step to create Smart Cities is to understand its concept. However, a brief review of literature shows that the concept of Smart City is the subject of controversy. Thus, the main purpose of this paper is to provide a conceptual framework to define Smart City. To this aim, an extensive literature review was done. Then, a keyword analysis on literature was held against main research questions (why, what, who, when, where, how) and based on three main domains involved in the policy decision making process and Smart City plan development: Academic, Industrial and Governmental. This resulted in a conceptual framework for Smart City. The result clarifies the definition of Smart City, while providing a framework to define Smart City's each sub-system. Moreover, urban authorities can apply this framework in Smart City initiatives in order to recognize their main goals, main components, and key stakeholders.

KEYWORDS
Smart City, Definition, Academy, Industry, Government, stakeholder

1 INTRODUCTION

"Smart City" is a concept that has been the subject of increasing attention in urban planning and governance during recent years (e.g. EIP-SCC, 2013; Washburn & Sindhu, 2009). It is a response to recent urban challenges, such as rapid expansion of urban population, the 70% share of cities in global energy consumption and greenhouse gas emissions, economic competitiveness, and rising citizen's expectations (Washburn & Sindhu, 2009). Meanwhile, it exploits new opportunities such as growing information and communication technology (ICT) advancements (Lee et al., 2013). However, some experts cast doubt on some Smart City initiatives by introducing them as a celebratory label (Holland, 2008).

The first step towards creation of Smart City is to understand its concept. A brief review of literature on Smart City definition shows there are still many open questions that refer to following issues:

- The necessity of creation of Smart Cities (Why?)
- The main aspects of Smart City (What?)
- The key actors in Smart City (Who?)
- The ways to create Smart City (How?)
- The right place and time to create Smart City (Where? and When?)

To answer these questions, the first step is to clarify the definition of Smart Cities. Thus, this Paper aims to provide a conceptual framework for Smart Cities. The objectives are to understand why it is necessary to create Smart Cities. What are the main components of Smart Cities? Who are the key actors to create Smart City? Where to create Smart Cities? When to create Smart Cities? Last but not least, How to create Smart City?

2 METHODOLOGY AND PROCEDURE

In order to answer the questions related to the definition of the "Smart City" concept a conceptual framework is proposed. An extensive literature review is used as the base for the conceptual framework structure. According to Onwuegbuzie et al. (2012) the literature review and the keyword analysis have been chosen as tools for analyzing and interpreting literature sources taking into consideration both scientific and grey literature available. The sources have been divided in 3 main domains according to the structure of the main stakeholders involved in the policy decision making process and plan development related to the Smart City development: Academic, Industrial and Governmental.

A keyword analysis (Onwuegbuzie et al. 2012) was used to extract relevant information from the analyzed literature. The output of the keyword analysis was checked and revised based on interviews with experts in different aspects of Smart Cities such as policy makers, industry people and academic professors. This resulted in a conceptual framework for Smart City that identified different sub-systems of the concept.

The procedure scheme is presented in figure 1.

According to the followed method and selected procedure, the paper is structured in four sections. First, a review of the existing literature is given. Then the keyword analysis is held and a conceptual framework for Smart Cities is provided. Finally, the results are described and discussed.

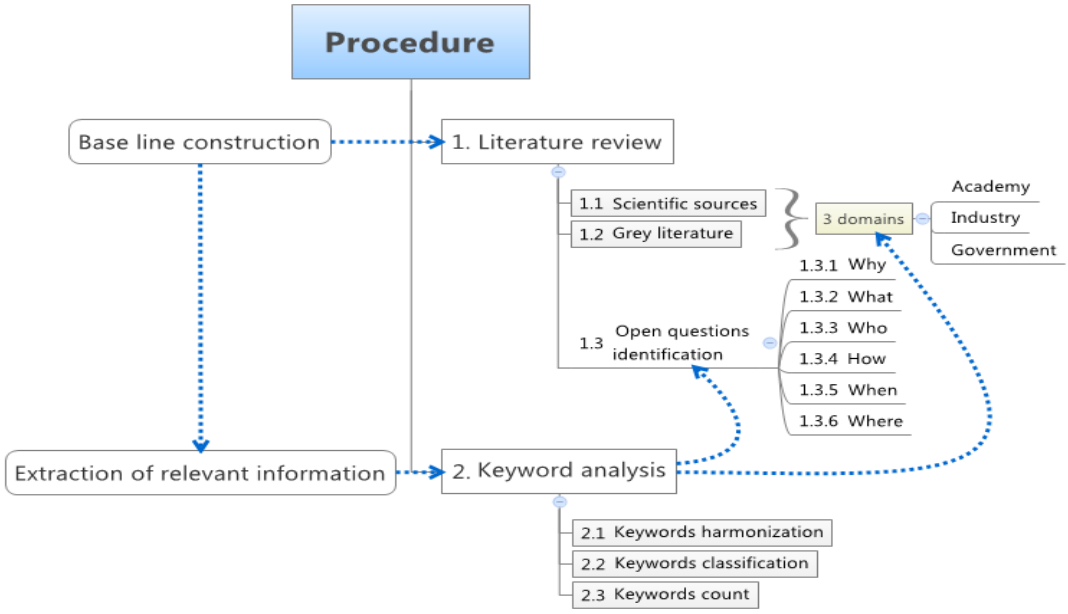

Fig. 1 Research procedure

3 STATE OF THE ART: AN OVERVIEW ON THE SMART CITY DEFINITION IN LITERATURE

There are various definitions of Smart Cities in literature and the phrase "Smart Cities" has been used in many different situations and by different stakeholders (e.g. EIP-SCC, 2013; Washburn & Sindhu, 2009). The research presented in this paper analyzed existing literature on the topic in order to provide a framework to define the Smart City concept.

Reviewing the literature shows that the concept of Smart City has been developed in three main areas: (i) Academic, (ii) Industrial, and (iii) Governmental. Reviewing these literature shows two important points: first, the meaning of Smart City is not settled yet; however, there is an agreement on the significant role of ICTs in Smart urban development. A simple keyword analysis of existing literature shows the disparity of words used in different definitions which is a sign of controversy in the concept.

Second, a difference of viewpoints exists between the three domains (Academic, Industrial, and Governmental). It derives from the different interests of each domain, as well as diverse interpretation of the word "Smart". In academic literature, with an interest in knowledge and information development, the meaning of "Smart" covers a range of technological characteristics, such as self-configuring, self-healing, self-protection, and self-optimizing (Nam & Pardo, 2011). In industrial literature with a tendency in business and industrial instruments, "smart" refers to intelligent-acting products and services, artificial intelligence, and thinking machines (Nam & Pardo, 2011). Finally, governmental documents, which aim to manage urban development, interpret "smart" with regard to an urban planning theory, "Smart Growth", which was emerged in the US in early 90s to avoid urban sprawl (Herrschel, 2013). "Smart Growth" supports compact, mixed-use and walkable cities and aims to make development decisions predictable, fair and cost effective. It encourages community and stakeholder collaboration in development decisions (EPA, 2014).

"Smart City" definition in the three domain have the same logic. In academic literature, including publications by scientific journals and Universities, Smart City concept has been applied to cover a wide range of characteristics being very detailed in some cases (Winters, 2011), and very general in some others (Canton, 2011). In spite of this variety in definitions, the use of technology and social innovation seems to

be the core issue in the concept. An example is the Smart Vision illustrated by Kanter & Litow (2009): *Someday soon, leaders will combine technological capabilities and social innovation to help produce a smarter world.*

Definition	Reference
A city that monitors and integrates conditions of all of its critical infrastructures, including roads, bridges, tunnels, rail/subways, airports, seaports, communications, water, power, even major buildings, can better optimize its resources, plan its preventive maintenance activities, and monitor security aspects while maximizing services to its citizens.	Hall, 2000
A smart community initiative becomes an integrated approach to helping entire communities go on-line to connect local governments, schools, businesses, citizens, and health and social services in order to create specific services to address local objectives and to help advance collective skills and capacities. In the same spirit, the optimum use of NICT is presented rightly as an essential element of smart communities but has a tendency to become the deus ex machina from which collective intelligence and social learning stem.	Coe, et at., 2001
A Smart City or region is one that capitalizes on the opportunities presented by Information and Communication Technology (ICT) in promoting its prosperity and influence.	Odendaal, 2003
The percentage of the adult population that holds bachelor's degrees.	Glaeser and Berry, 2006
A smart environment is an environment that is able to acquire and apply knowledge about its inhabitants and their surroundings in order to adapt to the inhabitants and meet the goals of comfort and efficiency.	Marsa-Maestre et al., 2008
The Smart City provides new instrumentation that enables observation of urban systems at a micro-level.	Harrison and Donnelly, 2011
"Smart Cities" would be metropolitan areas with a large share of the adult population with a college degree.	Winters, 2011
Key conceptual components of Smart City are three core factors: technology (infrastructures of hardware and software), people (creativity, diversity, and education), and institution (governance and policy). Given the connection between the factors, a city is smart when investments in human/social capital and IT infrastructure fuel sustainable growth and enhance a quality of life, through participatory governance.	Nam and Pardo, 2011
The Smart Cities concept is connected to notions of global competiveness, sustainability, empowerment and quality of life, enabled by broadband networks and modern ICTs. Its implementation requires the development of migration paths regarding Internet infrastructures, test bed facilities, networked applications, and stakeholder partnerships	Komninos et al., 2011
The Smart City is one that will use advanced technology and sciences – computing, neuroscience, nano science, and information science – to address the challenges of the future of the city such as energy, health, safety and commerce.	Canton, 2011
Smart Cities apply the capacities that recent intelligent cities have sought to develop as the technical platform across a host of service-related domains. At this stage of development the point of emphasis and intervention begins to shift from innovation to application, from the back-office to front-line services, and in policy terms, the emphasis also shifts from the corporate to the civic, from the market to the community, and from the bureaucratic administration of the economy to a liberal democratic governance.	Allwinkle and Cruickshank, 2011
The Smart City is a new way of leaving and considering the cities. The optimization of available and new resources, as well as of possible investments is required. The achievement of Smart City objective can be reached through the support of various information and communications technologies. These can be integrated in a solution considering the electricity, the water and the gas consumptions, as well as heating and cooling systems, public safety, wastes management and mobility.	Lazaroiu and Roscia, 2012
A Smart City is a synthesis of hard infrastructure (or physical capital) with the availability and quality of knowledge communication and social infrastructure. The latter form of capital is decisive for urban competitiveness…Smart Cities are also instruments for improving competitiveness in such a way that community and quality of life are enhanced.	Batty et al., 2012
The "Smart City" concept essentially advocates the integration of the components of an urban energy system (supply, distribution and demand; thermal, electrical and gas networks; heat and electricity generation; energy providers and end-users; planners, developers, policy makers and investors) to make it more energy efficient, less carbon intensive and more robust. This applies to the planning and implementation of the system (or more precisely of its transition to-wards becoming a "smart" urban energy system) as well as to its operation. In all cases, monitoring plays an essential role.	Pol et al., 2012
The concept of the Smart City of which there are many initiatives, projects and demonstrators, is generally underpinned by one or more ambient systems parts that require a mediation process to deliver the interconnectedness required by an ambient system.	Gui and Roantree, 2012
a city that is managed by a network and which supplies its citizens with services and content via the network using both fixed and mobile Smart City infrastructure, based on high-performance ICT.	Lee et al., 2013

Tab.1 Smart City definitions by academic literature

One of the most influential definitions in academic literature is presented by Vienna University of Technology et al. (2007): "A Smart City is a city well performing in a forward-looking way in six characteristics. It is built on the 'smart' combination of endowments and activities of self-decisive, independent and aware citizens.(tab. 1)

In Industrial literature, including publications of some international corporations such as ORACLE, IBM, and CISCO, some more practical values has been added to the concept. IBM's idea of Smart City considers cities as systems of systems. It defines Smart City as one that uses technology to transform its core systems and optimize the return from largely finite resources. Smarter cities make their systems *instrumented*, *interconnected* and *intelligent* (IBM, 2009). Instrumented means to digitize systems in order to make their function measurable and to create information. Interconnected means that different parts of a core system can communicate information to each other; and Intelligent refers to the ability to use the information to create behavioral patterns and anticipate, in order to establish informed actions (IBM, 2009).

Finally, the third domain, Governmental literature, which are published by urban public Authorities and aim to transform cities to Smart Cities. This literature has more emphasize on the administrative and financial aspects of Smart City, as well as the importance of meeting global energy and environmental targets such as energy efficiency and GHG emissions.

The most effective governmental literature is published by "The Smart Cities Stakeholder Platform" (SCSP), initiated by the European Commission (European Commission, 2014a) in order to identify and spread relevant information on Smart Cities for both practitioners and policy makers (European Commission, 2014b). As stated in "10 year rolling agenda" (2013), published by the Smart Cities Stakeholder Platform's Roadmap Group, *Smart Cities are meant to increase the quality of life of city-dwellers; enhance the efficiency and competitiveness of the local and EU economy; and move towards the sustainability of cities by improving resource efficiency and meeting emission reduction targets*. This document recognizes the integration of ICTs in different urban sectors as the core of this objective, and emphasizes on the importance of highly integrated systems on various scales: from residential to national.

To summarize, Smart City definitions are various due to the diverse interests of different stakeholders. A common definition for Smart City is not yet established; however, a brief review of literature implies that Smart Cities are future urban areas that aim to help human beings overcome their problems. They use ICTs to improve urban function in its different aspects and they require collaboration of urban stakeholders. A better understanding of the concept requires detailed investigation. Thus, in the following sectors of this paper the definition of Smart City is investigated in a more detailed and systematic way.

4 KEYWORDS ANALYSIS

The keyword analysis was done in three parallel ways. First, each definition was categorized in three main domains of (i) Academic, (ii) Industrial, and (iii) Governmental. Then, each definition was analyzed against the six questions of the paper (why, what, who, where, when, and how). Then, the key words were derived and the repetition of each key word was counted divided by each category and group. It is important to acclaim that in some cases, different keywords referred to a similar meaning (e.g. the meaning of the keywords "technology", "IT", "ICT", and "artificial intelligence" is alike). Thus, in order to harmonize the definitions and make the keyword analysis meaningful, the keywords were not automatically derived by software, but they were derived and harmonized by the author. For instance, for the mentioned example, the author chose "ICT" as the main keyword.

WHY CREATING SMART CITIES IS NECESSARY?

Recent rapid growth in urban population, along with economic and technological changes caused by the globalization, has lead into many challenges as well as opportunities for cities services and infrastructure. These are one of the main drivers for Smart Cities development. "Smart Cities" aim to decrease cities' challenges including scarcity of resources such as energy, healthcare, housing, and water, inadequate and deteriorating infrastructure (like drinking water, energy, roads, schools, and transportation), energy shortage and price instability, climate change, and demand for better economic opportunities and social benefits.(Whashburn & Sindhu, 2010)

On the other hand, Smart Cities aim to exploit recent opportunities provided by recent changes in the world. *The world economy is now globally integrated and services-based, with cities as its hubs*. Cities are the locations of Physical capital as well as human capital concentration. This attracts business activities and transform cities to centers of global competitiveness. This is aligned with global political transformation from nation-state model towards more multi-level governance, which gives cities more power and freedom to act. Moreover, recent advancements in Information and Communication Technologies (ICT), aligned with technology cost reduction, such as cheap mobile aps, free social media, cloud computing, and cost effective ways to handle the high volume data, provides cities with better opportunities and tools to understand, communicate, and predict urban functions. (IBM, 2009; Berst, 2013)

Tab. 2 presents the most repeated keywords on Smart Cities' main goals and drivers divided based on literature in three main domains (academic, governmental, industry). It shows that academic literature have a holistic approach and covers a wider range of issues. It is mostly concentrated on improvement in three main aspects: governance, Community/social development, and Environment. In industrial point of view, Smart Cities are emerged mainly due to the interaction between competitiveness and sustainable urban development. In addition Efficiency and sustainable environment and Community/social development are amongst Smart Cities' main objectives. Finally, governmental literature is more concerned with international challenges including quality of life, economic growth, environment, energy, sustainability, health and safety, and mobility.

Academic	Industry	Governmental	Total
Improved Governance	economic growth	quality of life	economic growth
Community/social development	sustainability	economic growth	sustainable environment
sustainable environment	Efficiency	sustainable environment	sustainability
	sustainable environment	Sustainability	quality of life
	Community/social development	Improved Mobility	Improved Governance
		Health and Safety	Community/social development
		Energy	Efficiency
			Improved Mobility
			Health and Safety

Tab.2 Keyword analysis: Why Smart City?

WHAT ARE THE MAIN COMPONENTS OF SMART CITY?

By the components of Smart City, we mean the most important urban domains in creating Smart Cities. These are the main targets for stakeholders to put in their attention and investment. Vienna University of

Technology et al. (2007) indicates Smart Cities' different domains as economy, people, environment, governance, mobility, and building. While IBM (2009) has a more practice-oriented division. It defines Smart Cities' main components (systems) as people, business, transport, communication, water, and energy. Berst (2013) consider different Smart City domains, Universal aspects, Built environment, Energy, Telecommunication, Transportation, Water and wastewater, Health and Human Services, Public Safety, and Payments.

Academic	Industry	Governmental	Total
Economy	Transportation	Transportation	Services
Environment	Energy	Energy	Transportation
Community	Buildings	Buildings	Community
Governance	Services		Governance
Infrastructure			Energy
			Buildings

Tab.3 Keyword analysis: What?

Table 3 presents the most repeated keywords on Smart Cities' main components divided based on literature in three main domains (academic, governmental, industry). As it is seen, academic literature have a more holistic but general view about the main Smart Cities' components, while industrial and governmental literature have a more practical and short-term approach. They mainly concentrate on urban sectors that can be directly affected by urban authorities, such as transportation, energy, and buildings.

The aggregation of keywords for all three domains results in the most repeated components: Services, Transportation, People, Governance, Energy, and buildings. In addition, there are other important keywords in literature with lower repetition: health, safety, mobility, environment, education, economy, infrastructure, and water. However, further analysis is required to identify Smart Cities' main components. For example, transportation is a sub-sector of mobility, and energy could be a sub-system of natural environment. These inter-relationships lead us to choose the following sectors as the main components of Smart Cities: Government, Mobility, Services, Community, Economy, Natural Environment, and Built environment.

In this paper, Governance means administrative and organizational Part of the city. Mobility mainly includes soft and hard networks such as transportation network and internet. Services mainly include health and safety. Community means the people and neighborhoods in terms of innovation and creativity. Economy includes economic domain of the city including market of Smart Cities. Natural environment mainly includes water and energy, and finally, Built environment is mainly buildings.

WHO IS INVOLVED IN CREATION OF SMART CITY?

The main actors in creation of Smart Cities are those who has an active engagement in creation of Smart Cities. Leydesdorff and deakin (2011) introduce University, industry, and government as three main actors of Smart Cities whose functions are subsequently organized knowledge production, economic wealth creation, and reflexive control. Later, Lombardi et al. (2012) revised Triple-helix by introducing Civil Society as the fourth main actor. Aoun (2013) in a publication by "Shneider electric" states that Smart Cities involve business and local stakeholders, with city leadership. It introduces governments, private investors, industry suppliers, NGO's and associations, utilities, and planners and developers as different stakeholders of Smart Cities. These stakeholders should collaborate to achieve Smart Cities.

CONCERTO a research project in European commission, suggests that in order to create Smart Cities, policy makers should bring all actors together, including investors, local authorities, material suppliers, designers, urban planners, developers, energy utilities, contractors, engineers, tenants, and owners (Bahr, 2013).
Tab. 4 presents the keyword analysis of different ideas about main stakeholders involved in creation of Smart Cities. This table shows that academic literature presents a holistic and general point of view: the keyword analysis for academic literature shows four main groups of People, Companies/industries, Government, and University as the key actors of Smart Cities. This is while Industrial literature have a more detailed and practical approach by adding NGOs, investors, Planners and developers, contractors, etc.

Literature	References	people	companies	government	built infrastructure	university	Private investors	NGOs	planners	Industry suppliers	Utilities	contractors
Academic	Cosgrave et al., 2013	*	*									
	Yovanof & Hazapis, 2009	*	*	*								
	Leydesdorff & deakin, 2011		*	*		*						
	Lombardi et al. (2012)	*	*	*		*						
Industrial	Aoun, 2013		*	*	*		*	*	*	*	*	*

Tab.4 Keyword analysis: Who?

Governmental documents, especially those related to real practices, have the most precise and practical point of view. Smart Cities Stakeholder Platform (2013) for example, considers Mayors/politicians, City administration, Utilities, energy service companies, network operators, developers, architects, planners, construction companies, Industries, Component manufacturers, Renewable energy industry, ICT companies, Financial institutions, R&D institutes and Universities, Inhabitants.
To summarize, Literature suggests four main groups of stakeholders involved in creation of Smart Cities: People, Government, Companies/industries and Universities. In addition, some lateral groups of planners, developers, financing organizations and NGOs are also involved in Smart Cities' development. Each of these groups consist of many stakeholders. For example, Government includes Local/regional policy makers and authorities, Municipal authorities, and Other Municipal and administration authorities.

HOW TO CREATE SMART CITY?

Answering how to create Smart Cities might be the most important part of conceptualizing them. While most literature in all three domains agree on the important role of ICT in Smart Cities development (e.g. Lee et al., 2013; Odendaal, 2003), they emphasize that technology is not solely enough (Hollands, 2008); to create Smart Cities, governmental, social, economic, and environmental aspects should get Smart (Hollands, 2008; Komninos et al., 2011; Pol et al., 2012; Vienna University of Technology et al., 2007).
The key word analysis confirms the central role of ICT-based infrastructure and services in Smart Cities' creation. Different domains are briefly unanimous on the main ways to develop Smart Cities. However, Industrial literature has a more instrument-based approach (IBM, 2009) and Governmental literature emphasize on proactivity and necessity of creating metrics in order to measure the function of urban system (Kanter & Litow, 2009). (Tab. 5)
To summarize, the application of ICT in urban services and infrastructure is the core tool to achieve Smart Cities. Meanwhile, ICT is not enough; it should be combined with other strategies: investment in Social

capital, Collaboration of different stakeholders, and integration of different components of the city. This requires gathering data and knowledge in all domains and of all stakeholders, and communicating this data through a comprehensive and interconnected urban network in order to have an integrated-collaborative Urban development.

Academic	Industry	Governmental	Total
Technology/ ICT (mainly in infra & services) collaboration Integration (interconnection) gather data/knowledge social capital	Technology/ ICT (mainly in infra & services) collaboration social capital	Technology/ ICT (mainly in infra & services) collaboration social capital proactivity metrics	Technology/ ICT (mainly in infra & services) collaboration Integration (interconnection) gather data/knowledge social capital

Tab.5 Keyword analysis: How?

WHEN TO CREATE SMART CITY?

The results show no serious concerns on timing of Smart Cities. The most common time reference in definitions of Smart Cities is the "future" (e.g. Canton, 2011; Komninos et al., 2011; Hall, 2000), which means there has been no time limit for creation of Smart Cities. This could be due to the continuous nature of Smart Cities (Aoun, 2013).

WHERE TO CREATE SMART CITY?

Which cities can get Smart? Is there some criteria such as size of the city, level of technological development and policy and legal framework that is required to get Smart? According to the literature, since smartness is a continuous improvement of urban situations (Aoun, 2013), each city can be Smarter (Shneider electric, 2014) Obviously, many factors can accelerate or hinder this "continuous improvement". For example, existing policy frameworks for Smart Cities, recent practices in integration of technology in urban infrastructure, and high level of technology advancement in a city can lead to better success in Smart development. However, there is no absolute limitation against implementation of Smart Cities.

4 RESULTS

With respect to the analysis, a conceptual framework for Smart City is provided. (Fig. 2) The first ring (yellow) answers why it is necessary to create Smart Cities. The second ring (blue) answers what are the main components in creation of Smart Cities. The third ring answers who are the main stakeholders involved in creation of Smart City and finally the boxes (purple) answers how to create Smart Cities. According to the analysis, each City can be Smart in the future (the answer to when and where to create Smart City).

Thus, Smart City is a sustainable and efficient City with high Quality of life that aims to address Urban challenges (improve mobility, optimize use of resources, improve Health and safety, improve social development, support economic growth and participatory governance) by application of ICT in its infrastructure and services, collaboration between its key stakeholders (Citizens, Universities, Government,

Industry), integration of its main domains (environment, mobility, governance, community, industry, and services), and investment in Social capital.

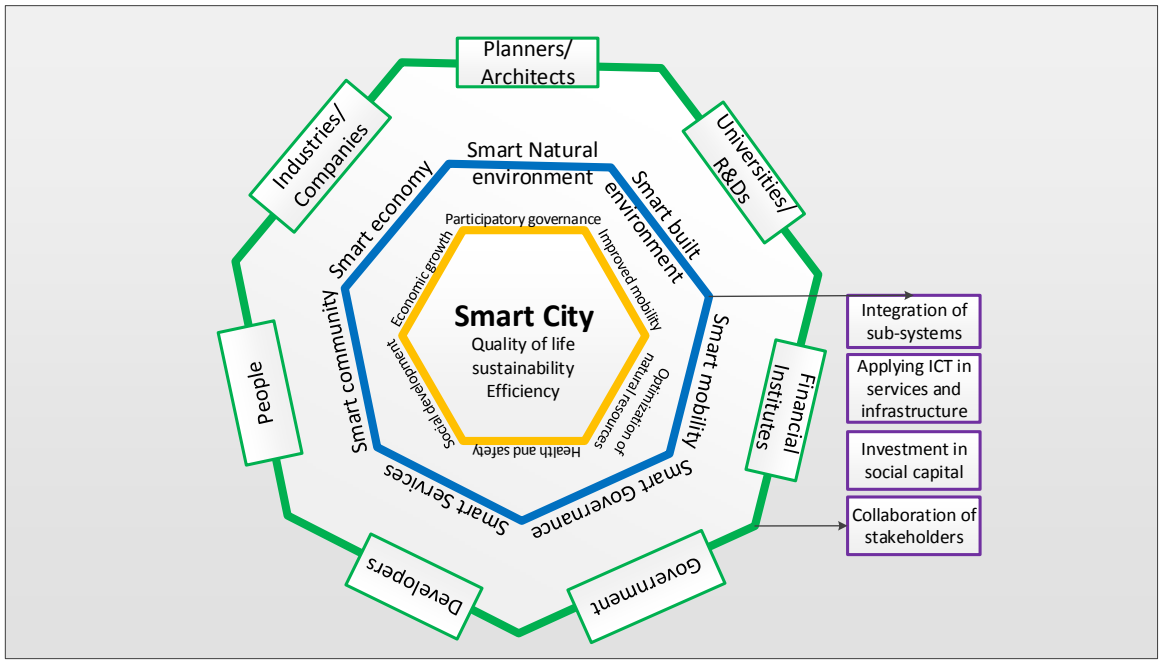

Fig. 2 A conceptual framework to define Smart City

5 CONCLUSIONS AND DISCUSSION

Smart City is a holistic approach that aims to address recent urban challenges and exploit recent opportunities provided by advancements in ICT and Urbanization. The first step to create Smart Cities is to understand the nature of the concept. This paper provided a framework to conceptualize Smart City by holding a keyword analysis to find the most used phrases in existing literature. However, it is not necessary to stick to the proposed keywords. Since each city has its unique economic, social and administrative situation, as well as different priorities, we suggest that authorities keep the main structure as the basis of the conceptualization, and then regenerate their own concept with respect to their priorities and context. However, application of ICTs in urban services and infrastructure, integration of different systems in planning and implementation, collaboration of different stakeholders in all the stages of urban development, and investment in social capital and innovation are basic alphabet of Smart City concept.

Thus, creating Smart Cities, it is necessary to identify the main goals of providing Smart Cities plans (Why), the main sub-systems and their relationships (What), and the key stakeholders involved in the plans (Who). Then, application of ICTs to enhance the functionality of urban services and infrastructure, integrated planning and implementation of sub-systems and collaborative work between stakeholders (How) should be considered to create a "Smart City".

This research is based on literature review as main source of information. Further development could include also other sources like structured interview to experts in order to confirm or discuss the results of this work.

Another development could analyze specific sub-systems of the Smart City concept that emerged from this work (i.e. Smart Energy City).

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IMAGES SOURCES

Fig. 1: Research Procedure

Fig. 2: A conceptual framework to define Smart City.

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