

SMART COMUNICACION FOR SMART CITIES. CASE STUDY: GENOA MUNICIPALITY'S WEBSITEAUTHOR: Diego Calandrino¹DIRECCIÓN PARA CORRESPONDENCIA: diegocalandrino@gmail.com

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ABSTRACT

As part of the debate on urban transformation towards the smart-city concept the article aims to be an operative proposal and provides an interpretation of the smart factors affecting and characterising the communication among Municipality, citizens and local businesses. The study focuses on the on-going international debate on this topic and more in specific focuses on the tools used to date, while returns the interest on the Functions of communication via web as the natural dimension of a smart-communication that is consistent with the characteristics and the e-skills of ecosystems making the smart city. The analysis of the current European literature on smart indicators together with a comparison of the current websites of smart cities at international and national levels has allowed us to propose an integrated communication model. The latter aims to lead to "the match between the digital-man and social-man" by translating the Traditional Functions of the official website of Genoa Municipality into Smart Functions. In order to contribute to the international literature about these issues, future studies will show the degree of usability of the proposed model, highlighting the role of citizens' attitudes and behaviour due to their perception of this smart model's value.

KEYWORDS: smart city; indicators; e-governance; e-skills; web accessibility; integrated communication model.

RESUMEN

La contribución pretende ser una propuesta práctica que forma parte del debate sobre la transformación urbana hacia el concepto de ciudad smart city y quiere dar un ejemplo en la interpretación de las variables clave que afectan y que rodean la prestación de la administración pública con los ciudadanos y las empresas el territorio. La contribución del estudio contribuye al debate internacional en relación con el tema y las herramientas utilizadas hasta la fecha, muestra el interés de las funciones de comunicación de la web como el tamaño de una comunicación inteligente en consonancia con los temas y las competencias digitales de los ecosistemas que componen la ciudad inteligente. El análisis de los indicadores y la literatura europea del tema, y la comparación de los sitios web de las ciudades que promueven modelos de transformación inteligente en el plano internacional y nacional nos ha permitido proponer un modelo de comunicación integral que crea la reunión deseada "entre el "hombre

¹ Executive Director - Energy Manager, Municipality of Genoa, Genoa, Italy.

digital y hombre social" se traducen en funciones tradicionales inteligentes de la página web corporativa de Génova. Con el fin de contribuir a la literatura internacional sobre el tema, los estudios futuros mostrarán el grado de facilidad de uso de las herramientas de comunicación integradas propuestas destacando la importancia de las actitudes y comportamientos de los ciudadanos relacionadas con la percepción y el valor real de este modelo inteligente.

PALABRAS CLAVE: smart city; indicadores; gestión de gobierno; competencias digitales; accesibilidad web; comunicación integrada.

INTRODUCTION

Cities are the product of a transformation and historical sedimentation mainly generated by anthropic phenomena. From the first forms of urbanization, cities are the exemplary demonstration of social organization, in which the largest number of human functions sits.

Contemporary cities are growing both in number and population. Two centuries ago, the Earth from space, appeared as the lights of only two towns by a million people: London and Beijing, while today that number has risen to 450. Light is the more visible human activity from space and, more than other, demonstrates the impact of man on Earth. The areas with the greatest visual impact are the most urbanised and correspond to Western United States, Southern and Western Canada, Western Europe and some parts of Southeast Asia.



Figure 1. The light of man on Earth

Source: Defense Meteorological Satellite Program, NASA, Earth's city lights, 2014.

In the 60's, Lewis Mumford², sociologist and urban planner, said, "Yesterday the city was a world, today the world has become a city".

² Mumford L. (1961), *The City in History. Its origins, its transformations and its prospect*, New York.

The city, in recent decades, has become a focal point of policies and strategies, fulcrum of national and international economies, acquiring a central part of the evolutionary process of the countries.

Economic crisis, huge growth of the population in urban areas and increase of natural resources consumption are reached on unacceptable levels; in this scenario the concept of smart city is functional to summarise social, environmental and economic challenges. While the cities are no longer able to cope with these challenges by means of traditional methods, these must be answered through new intelligent solutions in order to preserve the city's sustainability. The concept of smart city has been used during the last twenty years and has been seen as a strategic concept to gather modern urban production factors in a common framework (Caragliu, 2009). The adjective "smart" and the concept of smart city can be understood as highlighting the importance and potential of ICT supporting the city to get a competitive profile and imply a positive urban-based technological innovation and change via ICT (Hollands, 2008). However the definition of smart city has been given different connotations in the latest ten years. Today it is commonly accepted within the definition of smart city to consider the social inclusiveness along the functional concept of ICT technology infrastructure, leading to "the encounter between the digital-man and social-man" as proposed by Carlos Moreno. According to Moreno it is necessary to internalize the new polymorphic forms of experiencing the city, thus everyone (e-Democracy) can benefit from them, produce services and models of social innovation.

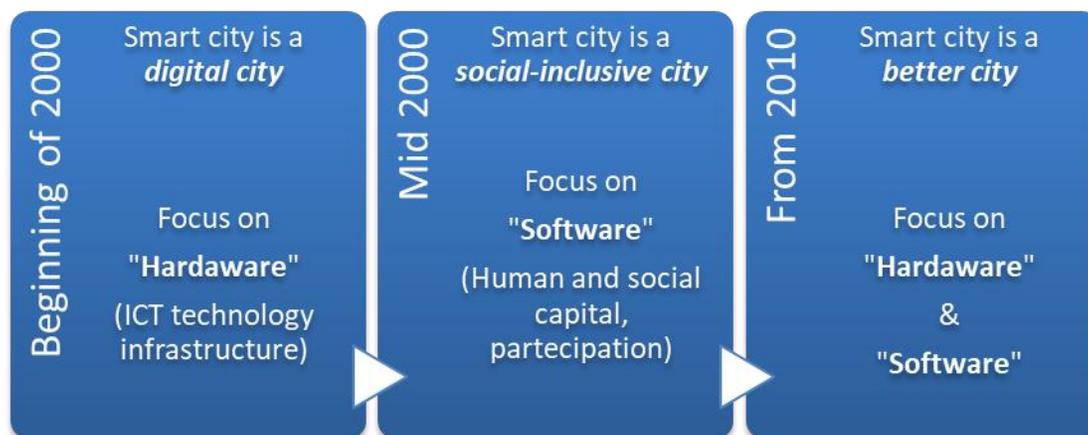


Figure 2. Evolution of the Smart city's Definition

Source: ABB - the European House Ambrosetti.

OBJECTIVE AND METHODOLOGY

The article aims to be an operative proposal and provides an interpretation of the factors affecting and characterising a smart-communication among Municipality, citizens and local businesses. Specifically, our analysis focuses on the tools of digital communication used to date in an national and European scenario, while returns the interest on the "Functions" of communication via

web as the natural dimension of a smart-communication that is consistent with the characteristics and the e-skills of ecosystems making a smart city. The analysis of the current European literature on smart factors and indicators together with a SWOT analysis of the current websites of smart cities at European and national, Italian, levels has allowed us to propose an integrated model of communication.

The methodology observed is based on:

- an operative definition in order to identify the factors and indicators used to measure the smart cities;
- the SWOT analysis of the current European and national, Italian, cases in order to make a descriptive scenario of local authorities' websites; and
- the proposal of a new model to organize the website of Genoa Municipality consistent with the international guidelines relative to smart city.

Definition of a Smart City

From the international literature it possible to define three key concepts within the management of a smart city:

1. ECOSYSTEM: the city is a complex set of interconnected entities, which we define ecosystems. To drive the evolution it's important to establish a model informed by a strategic vision to supervise the integration among the various involved entities at a general level.
2. INTEGRATED SERVICES: This new era of technology enables greater integration between utility and community infrastructure systems, driving the evolution of smart cities and the utility of the future. For this reason, it's crucial to have a clear management role of government able to connect these systems.
3. INTELLIGENCE: the smartness represents the collective ambition to evolve, leveraging the technology as a collective idea of progress, where the actors are the city and its citizens. The digital renaissance of cities needs to be complemented by a humanist view to enable individual consensus and an active participation of citizens.

At its core, the idea of Smart Cities is rooted in the creation and connection of human capital, social capital and information and Communication technology (ICT) infrastructure in order to generate greater and more sustainable economic development and a better quality of life. Building on the work of the European Smart City Project, as well as numerous other sources, we propose six Smart City characteristics:

- Smart Governance
- Smart Economy
- Smart Mobility

- Smart Environment
- Smart People
- Smart Living

The six characteristics of Smart Cities are described in more detail as follows:

Smart Governance - By Smart Governance we mean joined up within-city and across-city governance, including services and interactions which link and, where relevant, integrate public, private, civil and European Community organisations so the city can function efficiently and effectively as one organism. The main enabling tool to achieve this is ICT (infrastructures, hardware and software), enabled by smart processes and interoperability and fuelled by data. International, national and hinterland links are also important (beyond the city), given that a Smart City could be described as quintessentially a globally networked hub. This entails public, private and civil partnerships and collaboration with different stakeholders working together in pursuing smart objectives at city level. Smart objectives include transparency and open data by using ICT and e-government in participatory decision-making and co-created e-services, for example apps.

Smart Governance, as a transversal factor, can also orchestrate and integrate some or all of the other smart characteristics.

Smart Economy - By Smart Economy we mean e-business and e-commerce, increased productivity, ICT-enabled and advanced manufacturing and delivery of services, ICT-enabled innovation, as well as new products, new services and business models. It also establishes smart clusters and eco-systems (e.g. digital business and entrepreneurship). Smart Economy also entails local and global inter-connectedness and international embeddedness with physical and virtual flows of goods, services and knowledge.

Smart Mobility - By Smart Mobility we mean ICT supported and integrated transport and logistics systems. For example, sustainable, safe and interconnected transportation systems can encompass trams, buses, trains, metros, cars, cycles and pedestrians in situations using one or more modes of transport. Smart Mobility prioritises clean and often non-motorised options. Relevant and real-time information can be accessed by the public in order to save time and improve commuting efficiency, save costs and reduce CO2 emissions, as well as to network transport managers to improve services and provide feedback to citizens. Mobility system users might also provide their own real-time data or contribute to long-term planning.

Smart Environment - By smart environment we include smart energy including renewables, ICT-enabled energy grids, metering, pollution control and monitoring, renovation of buildings and amenities, green buildings, green urban planning, as well as resource use efficiency, re-use and resource substitution which serves the above goals. Urban services such as street lighting, waste management, drainage systems, and water resource systems

that are monitored to evaluate the system, reduce pollution and improve water quality are also good examples.

Smart People - By Smart People we mean e-skills, working in ICT-enabled working, having access to education and training, human resources and capacity management, within an inclusive society that improves creativity and fosters innovation. As a characteristic, it can also enable people and communities to themselves input, use, manipulate and personalise data, for example through appropriate data analytic tools and dashboards, to make decisions and create products and services.

Smart Living - By Smart Living we mean ICT-enabled life styles, behaviour and consumption. Smart Living is also healthy and safe living in a culturally vibrant city with diverse cultural facilities, and incorporates good quality housing and accommodation. Smart Living is also linked to high levels of social cohesion and social capital.

Beside the six characteristics above we recognise the means by which those characteristics are achieved as the “components”, which can be conceptualised as the building blocks of smart city initiatives. They comprise the inputs, technologies and processes of specific initiatives, as well as the norms or standards deployed. The relationship between characteristics and components is summarised in the figure below.

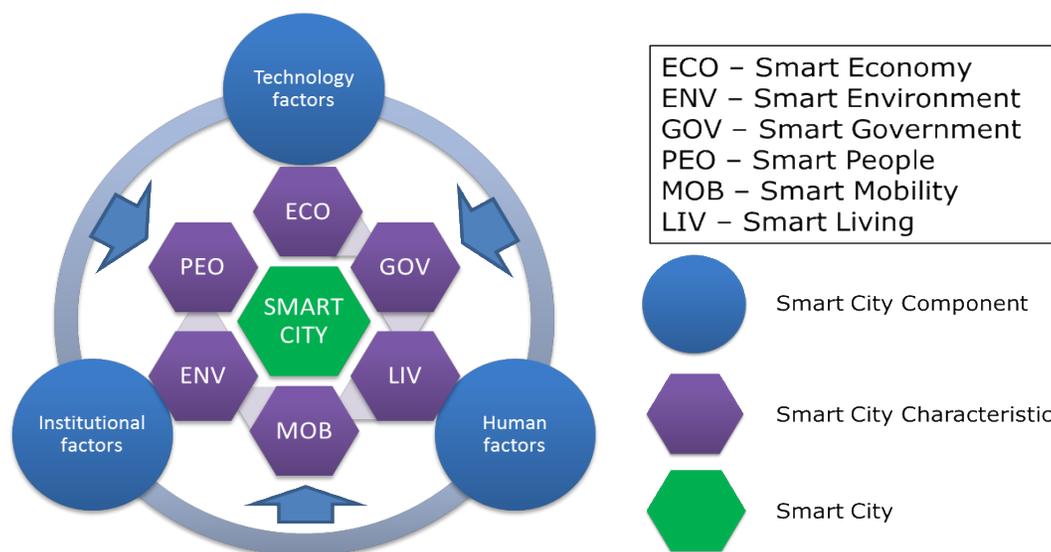


Figure 3. Smart city's Definition.

Source: Directorate General for internal policies - Mapping Smart Cities in the EU, 2014.

To describe a smart city and its six characteristics it is necessary to develop a transparent and easy hierarchic structure, where each level is described by the results of the level below.

Each characteristic is therefore defined by a number of factors. Furthermore each factor is described by a number of indicators. The factors

are defined in several workshops always having the overall target, smart city development in mind. In this article 31 factors are chosen to describe the 6 characteristics of Genova. Since the performance of each factor is measured by of 1-4 indicators we consider important to include these in our analysis, with a total of 74 indicators. Because of their intrinsic capacity to describe each factor we have shaped the “function” of a Smart Communication not only on the factors but also on the indicators (see Appendix). As result, we propose 72 Smart Function as the set of functions to be used in the design of a new model of institutional website enabling a direct and transparent correspondence among smart characteristics and Municipality's priorities

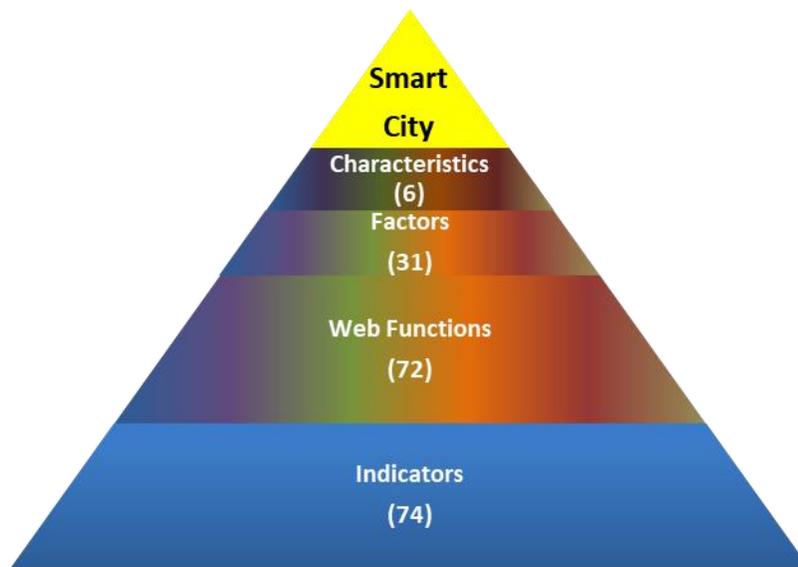


Figure 4. The hierarchic structure of the Smart city's definition and the functions of a Smart Communication

Source: Diego Calandrino

The European and National Scenario – SWOT Analysis

This section shows the findings of the analysis performed for selected cases within the current European and national (Italian) contest in order to make a descriptive scenario of Municipalities' websites.

The website of cities striving to reorganise themselves into smart cities were analysed by focusing on the setting of contents provided and the organization of services that directly translate smart characteristics and factors.

For the analysis of those website, the method used consists in a swot analysis, identifying strengths, weaknesses, opportunities and threats. This tool has allowed us to analyse the visual organization of each chosen website.

It should be noted that our findings do not consider the overall legislative framework where each website sits. Different degree of legislative reception results in each European country developing different set of roles for the management of the public transparency and its content. As result, the

organisation of the content and its management by the municipality can vary significantly from country to country within Europe.

The European Contest

Within the current European scenario three cities were selected for our analysis: London, Amsterdam and Barcelona. These cities share with Genoa a similar curriculum with respect to their participation to the European Projects for the urban transformation into smart city.

Tale 1. SWOT Analysis for the European scenario

	<u>London</u>	<u>Amsterdam</u>	<u>Barcelona</u>
Strengths	<ul style="list-style-type: none"> • London Datastore; • Smart Plan; • Schools Atlas; • Get involved Menu; • Value of open data; 	<ul style="list-style-type: none"> • Responsive site • I am visiting, I am local, I am business; • Smart Content • Clear layout; 	<ul style="list-style-type: none"> • Responsive site • User-type accessibility • Smart content • Enhanced Governance and Participation subject areas • Enhanced aesthetic design; • Smart City Areas;
Weakness	<ul style="list-style-type: none"> • Major's Priorities rather than Smart Content; • Non responsive 	<ul style="list-style-type: none"> • The international version does not include the content of public transparency and governance; • Open data on another domain 	<ul style="list-style-type: none"> • Detailed levels of information on different domains (previous hold versions); • Very dense content for each level of navigation;
Opportunit	<ul style="list-style-type: none"> • Can easily migrate into a layout for smart topics; 	<ul style="list-style-type: none"> • Can be easily modified to contain the contents of governance; 	<ul style="list-style-type: none"> • Can be easily unified into a single domain;
Threats	<ul style="list-style-type: none"> • Smart vision as part of Business & Economy. 	<ul style="list-style-type: none"> • Different layout and domain for the Dutch version of the website. 	<ul style="list-style-type: none"> • Does not provide an easy navigation for subject areas on the Government Areas.

Source: Diego Calandrino

Within the smart mobility, *London* is already experimenting with frictionless payment methods that would allow you to load credits onto your smartphone and simply stroll onto public transport. No need even to remove the device from your pocket or purse. Near field communication will pick up the signal and automatically deduct the fare from your account. No queuing up to buy tickets or load a transit card. That means more efficient travel for you and lower costs for the operator. That's a paradigmatic example of the kind of utopian promise we've come to expect from smart technologies. The call to citizens is equally clear: Engage. London values citizen feedback and interaction so much it created the [London Datastore](#), an open portal designed to display multiple data sets in ways that are easy for citizens to consume. "This isn't just about public transparency," says Gann. "It's about an opportunity to create services from that data. And I think that's going to encourage us to actually put more types of data on there." City leaders know that how people respond to the information is another crucial form of data.

Amsterdam aims to become one of the world's most sustainable cities by 2040. Helping the city to reach this goal is a unique partnership between businesses, authorities, research institutions and the people of Amsterdam called [Amsterdam Smart City](#) (ASC). Since its inception in 2009 ASC has grown into a broad platform, with more than 70 partners that are involved in a variety of projects focussing on energy transition and open connectivity. This bottom-up approach to sustainability encourages active involvement of citizens to test-drive new technologies. Amsterdam's ultimate goal is that these smart, sustainable projects reduce carbon dioxide emissions in line with the targets set at European, national and city levels. For Amsterdam, this amounts to a 40 percent reduction in carbon dioxide levels in 2025 compared to 1990.

Barcelona has quickly become a reference point at international level on smart city. To date, the strategy proposed by the Catalan city continues to attract strong interest and is recognized as a successful practice from which to take example. For this reason it is useful to try to understand how this initiative was structured and what are the pillars on which rests in terms not only technological but also social and cultural rights, given that the success of the 'Barcelona model' lies in the word 'culture' and in openness of a city that has understood for years the value of knowledge and cooperation as a means to improve the functioning of an urban environment and its infrastructure. These are the same concepts that should be the basis of any smart city.

The Italian Contest

A general rating of smartness has been calculated for 111 Italian provincial capital cities analysed at 2014. The findings, available at www.icitylab.it and reported below, show that Genoa is the 18th smarter city in Italy, while Milan it is the smartest with a rating of 622.95.

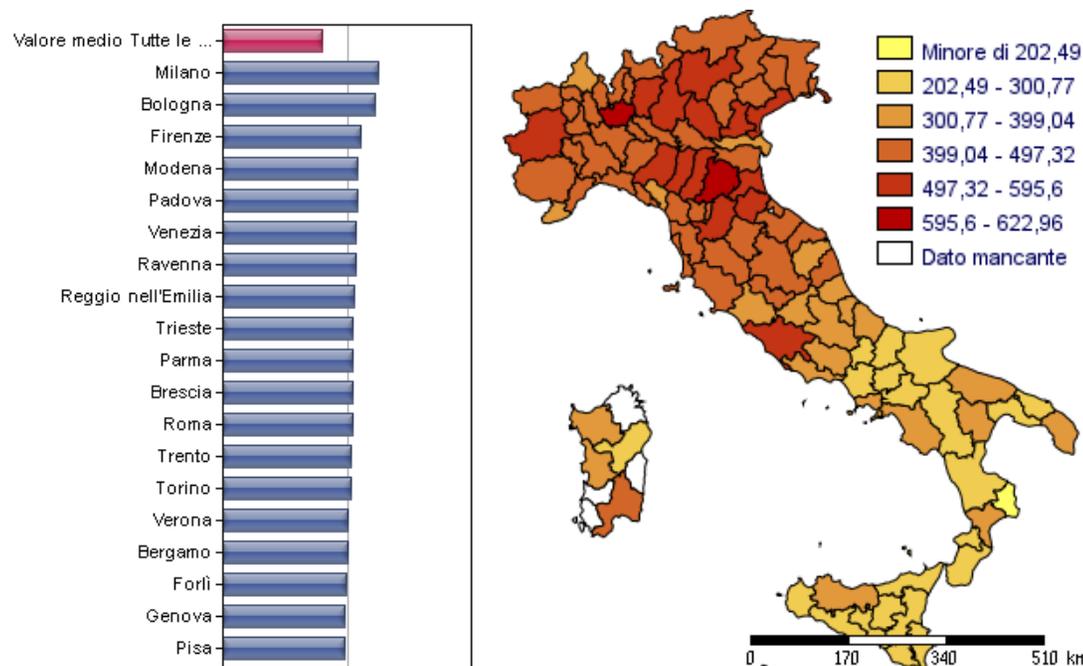


Figure 5. The smartest Italian Cities

Source: www.icitylab.it

Considering the above we have selected the city of Milan, Bologna and Turin for our SWOT analysis. In addition, the city of Palermo and Treviso were included because of the particular status of development of their official websites. Table 2 shows the findings of our analysis.

Table 2. SWOT Analysis for the Italian scenario.

	<u>Milan</u>	<u>Bologna</u>	<u>Turin</u>	<u>Palermo</u>	<u>Treviso</u>
Strengths	<ul style="list-style-type: none"> • Responsive site • <u>Participation Portal</u>; • A clear Government's structure portal; • A clear access to the main contents of the Website; • Multi-Languages feature; 	<ul style="list-style-type: none"> • Eight easily accessible subject areas (smart Content) • <u>Civic Innovation Portal</u>; • Clear layout; • <u>Citizen Personal Account</u> • <u>Digital Agenda</u> as participation ; 	<ul style="list-style-type: none"> • Responsive site; • Participation Portal; 	<ul style="list-style-type: none"> • User-friendly design with colour-code feature; • Extensive <u>Participation Portal</u> with dedicated survey functionalities; • Clear and accessible contents at the bottom of each webpage; 	<ul style="list-style-type: none"> • User-friendly design with colour-code feature; • Explicit reference to a smart model or re-organise information; • <u>ID Card or elective representative responsible for each Subject areas</u>;

Weakness	<ul style="list-style-type: none"> • Open Data portal on a different domain • Extensive use of English vocabularies rather than clearer correspondent Italian words 	<ul style="list-style-type: none"> • Non responsive • Open data on another domain; • None Smart Vision but agreement for a project program to Bologna; 	<ul style="list-style-type: none"> • None Navigation Bar; 	<ul style="list-style-type: none"> • Subject Area structure rather than Smart Characteristics; • Non Responsive; 	<ul style="list-style-type: none"> • Smart content but “not that smart”; • Non responsive
Opportunities	<ul style="list-style-type: none"> • Can easily migrate into a layout for smart topics; • Online Services Rather than Subject Areas 	<ul style="list-style-type: none"> • Can be easily turned into a responsive website; 	<ul style="list-style-type: none"> • Online Services Rather than Subject Areas; 	<ul style="list-style-type: none"> • Can be easily turned into a responsive website; • Smart Contents rather than Subject Areas; 	<ul style="list-style-type: none"> • Can be easily populated with Smart contents;
Threats	<ul style="list-style-type: none"> • Smart City only as part of the EU project opportunities of the city • Smart City website on a different website. 	<ul style="list-style-type: none"> • Smart City & Digital Agenda as part of Economical Development subject. 	<ul style="list-style-type: none"> • Smart City As part of the Environmental Subject. 	<ul style="list-style-type: none"> • None other smart approach has been used but the participation, transparency and open data. 	<ul style="list-style-type: none"> • It looks like a smart web but is not organised according to the smart factors.

Source: Diego Calandrino

Proposal – A Smart Website for Smart Genoa

Cities need to better understand how to direct investments in ICT to provide greater benefits for the environment and the society. ICT solution providers are interested in emphasizing how they can provide enabling technologies, which is demanded by their customers – the cities.

The contribution represents a proposal to apply the criteria defined and shared from international government into an innovative process of communication between the citizenship and institutional instances.

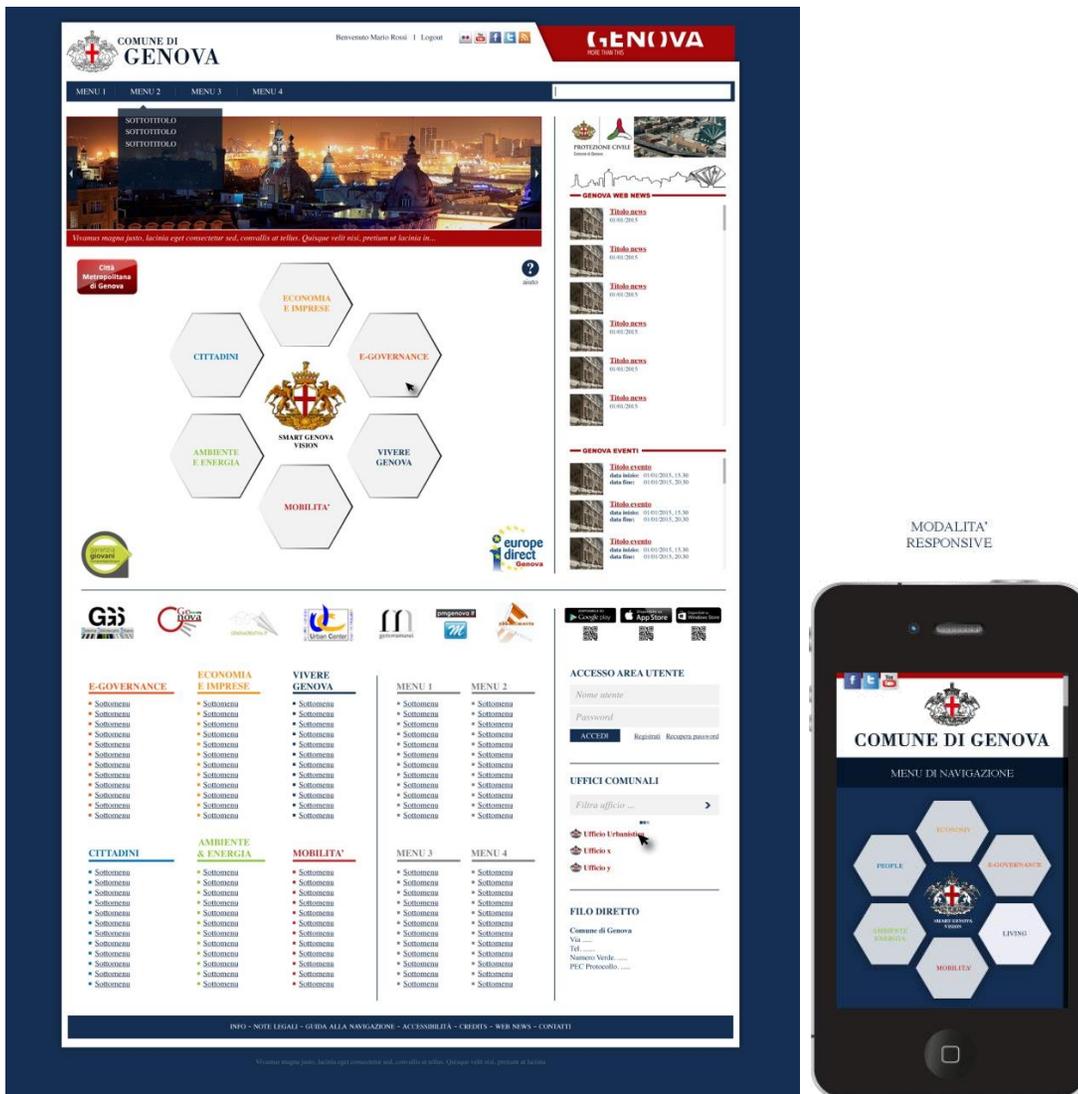


Figure 6. The Proposal for a new smart website for Genoa City with responsive mode.

Source: Diego Calandrino

The main idea behind the graphic design of the website shown in figure 6 consists in the use of a website no longer as Graphical-Container but rather as Graphical-Content capable of promoting in an intuitive and intelligible way (and therefore more effectively) the Genoa’s Smart Vision, starting from the six smart characteristics as pillars of its Vision and ending with the subjects characterising the priorities of the Municipality. At the core of the proposal is a new model to organize the website of Genoa Municipality. The model is based on the assessment of the smart functions of communication shown in the Appendix of this contribute. Starting from the “traditional subjects” of the current city website, the assessment aims to match those subjects with the 31

factors identified for Smart Genoa. As result, we have developed what they³ call the Smart City Wheel, shown in Figure 7.

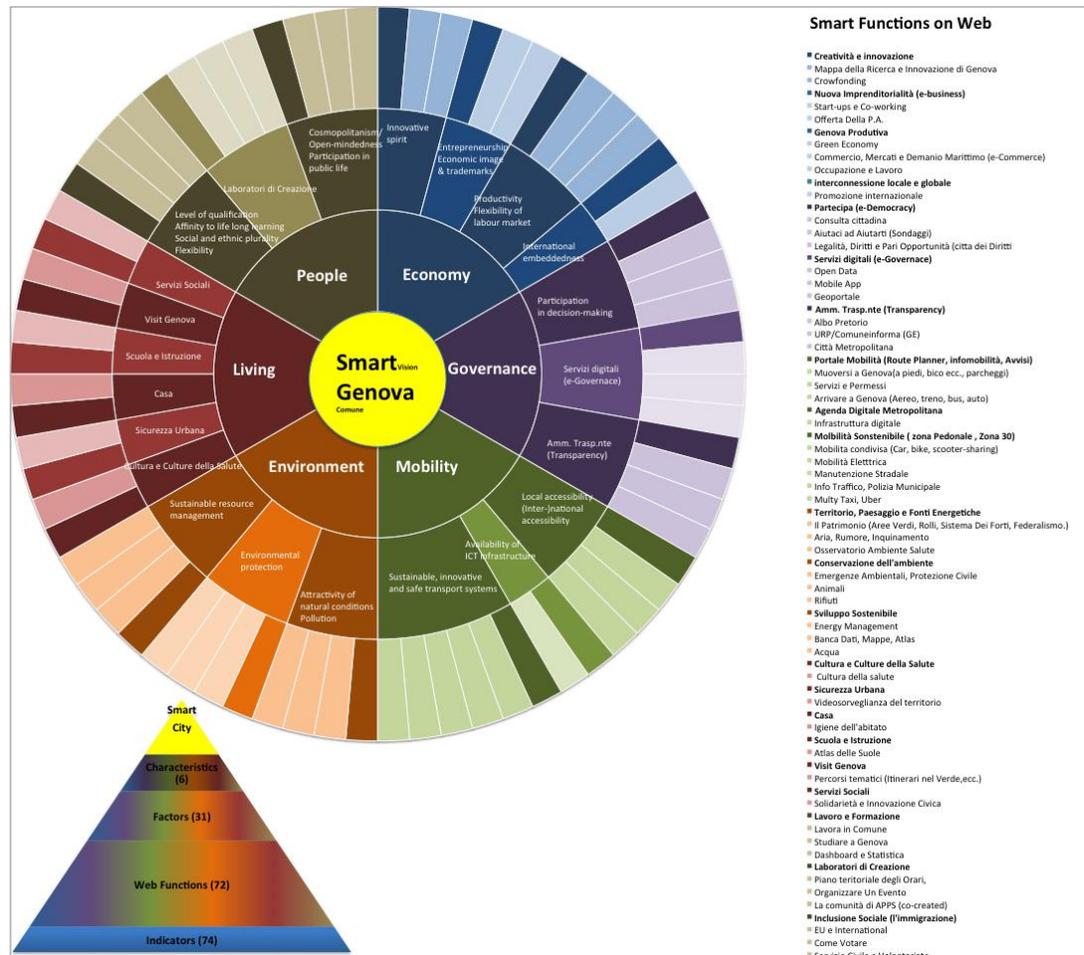


Figure 7. The Smart Wheel of Genoa's Website

Source: Diego Calandrino

At the hub of the wheel, you find smart people, smart government, smart economy, smart environment, smart mobility, and smart living. At the edge of the wheel you find the set of 72 functions to be used in the design of a new model of institutional website enabling a direct and transparent correspondence among smart characteristics and Municipality's priorities.

It should be noted that it is not the intention of the author of this contribution to exhaust the work associated with the design of a new website for Genoa. However it is our opinion that a more detailed graphic-design work should be sought to bring the proposal to another level even beyond the example shown in

³ The model of wheel has been inspired by the work of many others, including the work of Boyd Cohen, [[What Exactly Is A Smart City?](#), Fast Company, 21 September 2012].

Figure 8. In this regard we feel appropriate to report the graphic style used in the EU Project TRANSFORM, as a valid example for further analysis.

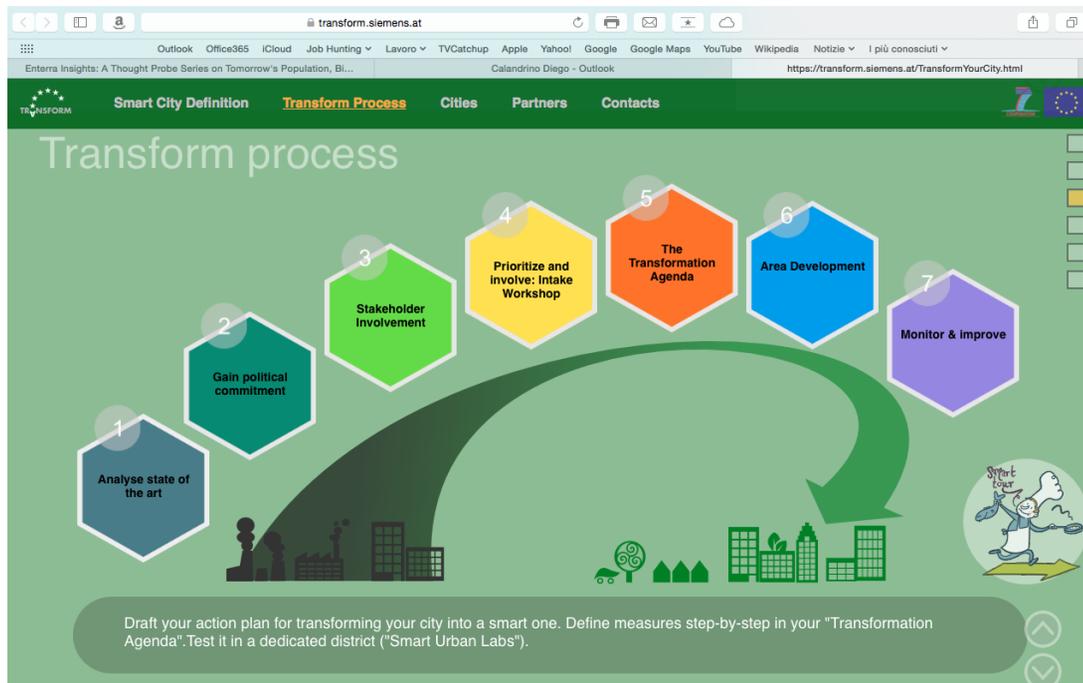


Figure 8. The Transform Project as a good example of graphic style for further development

Source: <http://www.transformyourcity.eu>

CONCLUSION

A “Smart City” is intended as an urban environment that, supported by pervasive ICT systems, is able to offer advanced and innovative services to citizens in order to improve the overall quality of their life.

But after more than a decade of discussion and active implementation of Smart City initiatives, questions about the nature of human interactions in the systems are beginning to emerge. What does it really mean to be an involved citizen in the new landscape of technologies?

Collecting data turns out to be the easy part. Sharing it and finding ways to make it useful for people are the real challenges.

In the absence of a standardised approach both at European and National levels, the SWOT analysis shows that there is the need for the creation of a common process to help local government to deliver the desired urban-transformation into a Smart Model.

In this context, the contribution is a pioneering proposal for a website able to support the ICT services of a Smart City and to implement the inclusion of citizens in the cities’ decision-making process throughout a functional communication level. The implications for a new, “smart”, breed of

municipality's human resources are clear: "embrace technology, and include citizens in your decisions".

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