

The Image of the Smart City

Subjects: [Urban Studies](#) | [Geography](#) | [Regional & Urban Planning](#)

Contributor: Giuseppe Borruso

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Smart City

city

urban geography

sustainable development

urban planning

regional planning

image of the city

1. Images of the Smart Cities

The image of the city was first introduced by Kevin Lynch in 1960 ^[1], and referred to the ways in which urban space is perceived by their users, and how these acts are based on mental maps, whose elements can be put into well-defined categories: paths, nodes, edges, districts, and landmarks. Such categories, needed to drive those who live and move into the city, hold a physical and material component, strictly related to the spatiality of the city. The physical form of the city, therefore, could evoke images in citizens and city users, defined as “imageability”, allowing the formation of security and intensity in the relations among the people and the city itself ^{[2][3]}. The work by Lynch led researchers and scholars to reflect and debate on these categories, and explore their validity and sustainability through time. The theory was widely studied in urban planning and geography, together with other social sciences, with several studies focusing on the different aspects of the methods originally adopted, and on the main elements of classification of the images themselves ^{[4][5][6][7]}.

The digital revolution, particularly the more recent one coming out from the widespread development of ICT-affected urban environments, contributed to new suggestions and opportunities for a change in the images of the city, and on the ways to evaluate and interpret it, thanks to the widespread use of social networks and media, as well as mobile phones and related apps. That also opened a wide set of applications of methods for analyzing the image of the city, as well as identifying its constituting elements ^{[8][9][10][11]}.

Talking about the Smart City, an often underestimated question could be: what is the image of the city, and how can we represent it? Research on a popular search engine (Google) on the “images” of the Smart City gave a set of results where a real, tangible city cannot be seen. The search provides, as results, images of all kinds. There is generally a city, made of tall skyscrapers and wide road avenues, with several icons, symbols, and signs added, as well as Wi-Fi symbols, lines connecting dots to recall wires, connections between different digital nodes on communication networks (**Figure 1**).

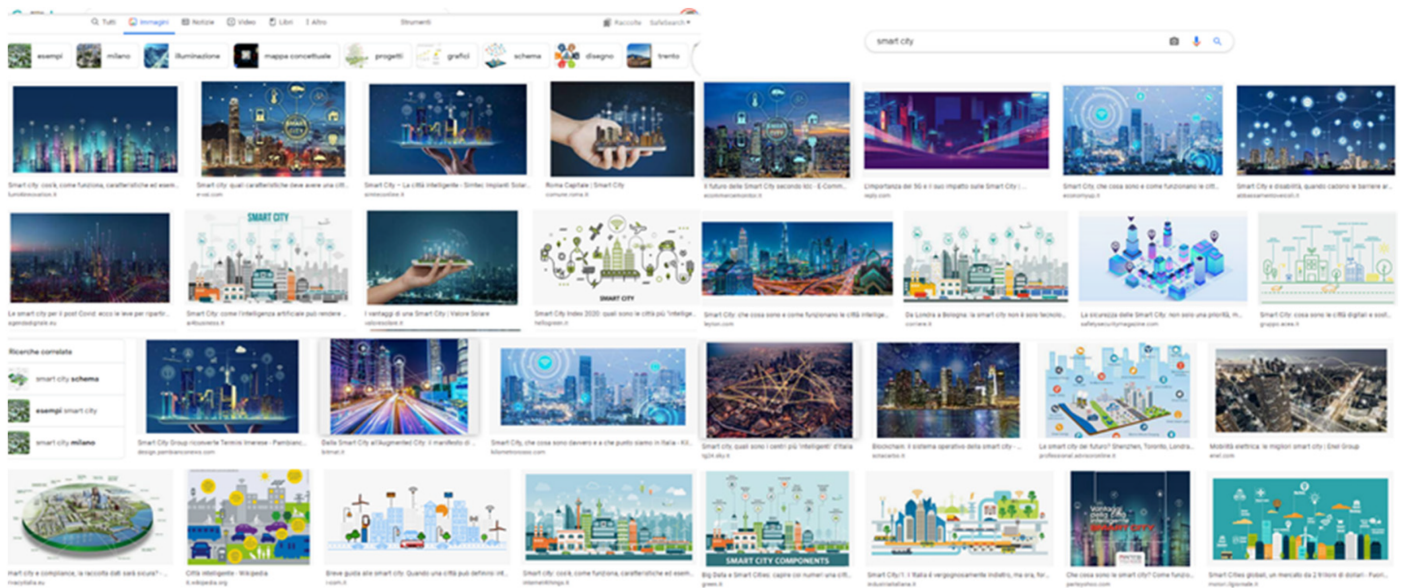


Figure 1. The “images” of a Smart City. Source: Google, accessed on 8 January 2022.

Such an apparently trivial consideration is central in interpreting and understanding the complexity of the Smart City, given the difficulty in visualizing and representing it. There is not a way to see and properly represent it. A building and a street can be visualized, walked, touched, and crossed, which is impossible for the “smartness” of a building or of a road. The Ideal City of the Renaissance was visible, although idealized, and could be imagined, represented, planned, partly built, and lived in. The Smart City today is immaterial; it recalls the ICT (Information and Communication Technologies) that are generally very small or hidden, and visible only in their more technical aspects, such as the mobile phone and Wi-Fi network receivers, routers, or antennas, and the smart devices (smartphones and tablets). Also, and maybe mainly, from the political point of view, it is something that cannot be easily proposed and “sold” to the population and electors, if not in terms of the physical, network infrastructure hardware or in the soft component software. It is in fact particularly difficult to communicate something “smart”, as there is generally very little to communicate or inaugurate. According to various observers, the Smart City is essentially the last utopia of the 21st century [12][13]. Furthermore, it is evident that the Smart City is not a well-defined concept, as it can be associated with a large number of different interpretations, ideas, visions, and projects [14].

Also, for this reason, the Smart City is difficult to interpret for a political decision-maker. Furthermore, the main technological aspects proposed by Smart City hardware (optical fiber, Wi-Fi, 5G, smartphones, apps) shift the attention towards intangible components of the city characterized by rapid obsolescence.

The Smart City therefore seems to be turning in this direction, effectively excluding a part of the population that does not have access to such technologies: a digital divide, even during the pandemic [15][16][17]. In other words, although the term Smart City is widely used today [18][19][20], still no full light has been shed on its full meaning, and different research contributions were realized on the topic [21][22][23]. We can certainly state that the Smart City is the outcome of an evolution of the thought and reasoning of the city with reference to sustainability, civic

participation, and the rapid evolution of technology (Digital City, Computable City and Virtual City) [\[24\]\[25\]](#), whereas recently, the debate moved towards more humanistic and naturalistic views [\[22\]\[26\]](#).

The Smart City, at present, should be a city that tackles the needs of its citizens and city-users, without focusing on their technological skills or devices. It should provide solutions through technological infrastructure and devices, such as smartphones and apps, now widely used, but the true change consists of putting the ICT-related procedure “under the bonnet” and embedded into the processes, and therefore not necessarily visible and detectable by the single citizen. The term therefore evolved in time from more purely digital aspects to wider ones (**Table 1**).

Table 1. Evolution of the concept of Smart City. Authors: Borruso G. and Balletto G., 2021. Source: Original elaboration by authors, inspired by ABB and TEH—Ambrosetti, 2012 [\[27\]](#).

Years	Concept of Smart City	Focus
Early 2000	Digital City	Hardware
Mid 2000	Socially Inclusive City	Software
2010	Quality of Living City	Hardware/Software
From 2020	Health and Sustainability City	Orgware

2. Building Blocks of the Smart Cities

This is the result of the New Economy’s short-term memory and separation from the administrative processes, focused, instead, on the uses and applications. The New Economy has been using, from the beginning, new technologies, but not always resulting from real needs and potentials. This accelerates the aging of new technologies, which already present such character. Furthermore, the New Economy accelerated the process of internationalization of economic systems up to configuring the well-known globalization, reducing distances and times of the production, economic, and social processes [\[28\]](#).

In such a framework, the organization of the city, and, in particular, that of metropolitan cities and their related production systems, are reorganized in the direction of new long- and short-range networks and hierarchies of nodes, towards the extreme configuration of the City–State completion [\[29\]](#). Furthermore, the knowledge and availability of information represent the raw materials from which the urban and its territorial renewals are formed. If, in the past, the raw materials were from mines and quarries [\[30\]](#), today, the raw materials derive from data mines, favoring the creation of economic opportunities such as the circular economy [\[31\]](#); and help solve complex public problems, improve governance, and empower citizens [\[32\]\[33\]](#). In this synthetic framework, the goal is conceptual understanding through a comparative synthesis of the Smart City and its image through the main typologies and geographical contexts to evaluate future trends.

3. Italian Smart Cities: A Problem of Definition

What is the situation of Smart Cities in Italy? What are the cities we can define as “Smart”? This question is certainly not easy to answer, even if, in this paragraph, we will try to provide some ideas. Scholars put the attention on different aspects of the city, from their representation and image [\[34\]\[35\]](#), to the critical aspects raised by the Smart City itself [\[36\]\[37\]](#), to the issues of planning [\[38\]\[39\]](#). With the historical conformation of the Italian urban texture, it is difficult to think of “dream” cities born from the Blueprint project, and the infrastructural heritage of the built environment and spaces of the existing cities need to be considered [\[40\]\[41\]](#). Rather, it is easier to encounter a Brownfield context or a mixed Blueprint-Brownfield context from a Smart perspective, or to intervene from scratch in new neighborhoods, born from the project or from the conversion of areas previously intended for different functions. Such projects and initiatives often suffer from a very strong influence of the private component at the level of investments, and therefore of “orientation” in the political–urban planning choices of the city towards technological solutions [\[23\]\[24\]](#). Furthermore, public–private partnerships linked to Smart Cities are often closely linked to technological components, and poorly integrated with urban policies [\[25\]\[26\]](#). From the point of view of the denomination, there are many cities that refer to the “Smart City” label within their organization, and with reference to the projects explicitly funded on this item. Furthermore, as often happens, different rankings attribute different weights to different indicators. Among the rankings, the ANCI “Urban Agenda” portal provided updated information on Smart Cities and related projects in Italian cities (the portal has no longer been operational since 2019). In 2021, for the ICity Rank of ForumPA [\[42\]](#), Florence was confirmed as the most digital capital of Italy for the second consecutive year, followed by Milan (in second place) and Bologna (in third), with Roma Capital City, Modena, Bergamo (on a par with fourth place), Turin, Trento, Cagliari, and Parma to close the top ten. Other rankings, such as that of Ernst and Young [\[43\]](#), place Trento at the top of the Smart Cities, and the cities of Turin, Bologna, Mantua, Milan, and Bolzano (respectively, in 2nd, 3rd, 4th, and 5th place) according to the related Smart City Index. Without going into the details of the different rankings, we can identify some elements that recur and unite these cities: belonging to a metropolitan dimension, or, usually, an average urban dimension and a location in the North or Center-North, part of the old or better, new industrial triangle. In urban contexts, economic development seems to be combined with the “technological” sustainability demands of the Smart City, and in the various aspects of the six dimensions of “smartness” [\[44\]\[45\]\[46\]\[47\]](#). In particular, the metropolitan dimensions, not only administrative, but functional, of some urban contexts can allow governance and development actions of new solutions and real markets linked to innovative aspects. The urban reconversion of “Citylife”-type areas, as far as it concerns large conversion projects, as well as the development of services based on technological innovation, find an adequate scope of application.

4. Smart Cities and Emergencies: Some Reflections and Research Suggestions

The health emergency that emerged with COVID-19 has highlighted how the Smart City model refers to constant growth scenarios. The shock, or rather the stop, imposed by the international health emergency exposed urban vulnerability in many of its primary services: health, education, and mobility. COVID-19 has, in fact, imposed two different speeds on citizens, businesses, and public administrations. If, in the personal sphere, it forced us to follow a slower pace, making us give up part of the hectic activities we were used to, in the social and collective sphere,

on the contrary, it pushed the accelerator of digital transformation processes and the adoption of new technologies and IoT devices (Internet of Things). There has been a push forward towards safe, efficient, sustainable city models, but it is still unclear whether they are citizen-friendly. In particular, starting from the six Smart dimensions of the Smart City [\[48\]](#), the economy (Smart Economy) is, increasingly, centered on technological innovation in order to restart. Smart People are increasingly involved in the choices of the community thanks to new communication tools. In addition, the Administration (Smart Governance) pushes to improve remote and digital services; more intelligent and sustainable mobility (Smart Mobility) (in the post-COVID-19 phase, with electric mobility and the use of bicycles); the environment and sustainable development (Smart Environment). In this framework, the material part of the city intersects: that of the consolidated historical city and the suburbs; and that of the regulatory instruments, referring to a past time, and where there is no flexibility necessary for the post-pandemic city. For example, how should a city respond to the conflicting objectives of regulating the use of scooters and services such as Uber and Lyft? Hence, there is a frantic search for real-time data to encourage flexibility and mobility emerging in a new regulatory framework between user needs and safety, not just health. The legislative process of the many emerging forms of mobility is long and inherently slow.

Many innovative solutions bring unknown advantages and risks; therefore, writing legislative rules is already a task full of pitfalls, which clashes with a previous and complex regulatory system that, in recent years, has been amplified by as many and numerous European directives. Without the infrastructures (in this case, telecommunications), various activities could not have been established, such as: online shopping, call conferences, smart working, remote lessons, telemedicine, etc., which respond to the need for flexibility of work, no longer distinct as an activity limited in time and space. It is not clear whether this is the cause or effect of the limited welfare policies, which change significantly from country to country, helping to give a more or less complete meaning to the suffix Smart placed in front of “work”.

The techno-digital revolution, similar to the electric revolution, has led to a wide availability of devices, data connections, and the opportunity to connect them together, developing applications with high added value: able, on the one hand, to improve the quality of urban life, but also to interfere in privacy and personal spaces. In fact, with the increase in life expectancy, especially that in Italian metropolitan cities, there has not been an equally increasing individual and collective quality of life. Will the new technologies save the cities of the future? Also, it is worth mentioning 5G and artificial intelligence founded by Big-Data. In this sense, Big-Data emerges as a great contribution towards sustainability: they are necessary, but not sufficient for the cities of the future, which are now designed as large hyper-connected ecosystems, equipped with sensors and other devices capable of collecting and processing large amounts of data.

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