

The 'Dark Side' of the Smartness

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Abstract. Even if there is not a universally shared definition, the term "Smart City" recalls a sustainable, hyper-technological city that is self-sufficient in terms of energy; this type of city uses communication systems between the various technologies to optimize the efficiency of services and to better connect all citizens. Its huge acceptance, both by the scientific community and the urban governance institutions, highlights how the time of reinterpretation of the city had arrived. The smart city, correlated by the transition of the old to the new economy, is based on innovation aimed at achieving maximum efficiency in the urban system through the synergy between traditional functions attributable to the tangible part of the city (residences, services, infrastructures, etc.) and new functions attributable to the intangible one (IoT, virtual and augmented reality, etc.). Reaching these goals drives cities into a circle of continuous evolution, which implies, like all changes, both positive aspects, and side effects, i.e., a 'dark side'. Aim of the paper is to highlight this aspect and its implications. This is found in economic-social dynamics, such as gentrification, filtering and sprawl, environmental and geo-political dynamics, related to finding the resources needed to support digital urban technological innovation and to guarantee high standards of quality of life, and governance dynamics, linked to the capacity of changing the ways of administrate the change and changing radically - thanks to technology - the way of addressing the daily - as well as the strategic - problems and challenges of the city.

Keywords: Smart city · Innovation impacts · Technology effects

1 Introduction

Apart from the - rare - cases of newly founded cities – as Masdar city or Songdo - the implementation of a "smart" logic within a city always implies an operation of transformation of the existing urban fabric.

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In general, any public investment decision and, in particular, the decision to transform a land or building by local territorial bodies, concerns the present use of economic resources, susceptible to alternative allocations, in view of future benefits [1].

Throughout the process by which the project is identified, the primary objective remains to evaluate the best alternative that ensures the best use of limited resources. The alternative is realized through the comparison of the analysis of the situation that will be determined "with the project" with the analysis of the situation "without the project", i.e., without the specific interventions promoted by the transformation project of a specific urban area [2].

It is easy to understand that the situations that are determined "with" or "without" the project are different from those "before" and "after" the project.

In the first of these situations, in fact, a change and an evolution will be determined regardless of whether or not a project is implemented. In the second situation, on the other hand, attention is mainly focused on change and evolution, which can undergo different aspects and variables, such as real estate or land gains after the introduction of the project itself [3].

Moreover, the project cannot exist if its objectives have not previously been established in coherence with the superordinate ones. The project therefore becomes the technical-economic tool with the characteristic of being evaluated in terms of public interest and economic policy objectives.

The project consequently assumes the role of a tool to intervene, to control and to unite the programmatic objectives of the national plan and the territorial plans with the possible achievements and investments in a specific territory to be developed [4].

Evidently, a transformation project of a territorial area can have both positive and negative consequences that are also connected to other sectors (for example, the agricultural or industrial market). For this reason, the relationships between the various sectors (both upstream and downstream) and the one involved in the project must be considered. The importance of indirect effects is the reason why the system of market prices may not reflect the real value that the community attributes to the project, thus resulting in the system less suitable for the evaluation of benefits and costs. In the case of "smart" transformations of parts of the city this is even more true because of the general consensus towards these transformations that, to date, do not take into due account the collateral effects determined on the economy and on society. These, as will be deepened in the following paragraphs, concern both economic and social effects that, through modifications of the real estate value, determine processes of gentrification, sprawl and crowding out to the detriment of the weaker sections of the population. They imply also environmental and geo-political effects, attributable to the retrieval and disposal of - rare - resources necessary to support the digital urban technological innovation [5] - i.e., cadmium, tungsten, etc., or all those materials that become indispensable for the proper functioning of all the devices related to to-date technological hunger, as well as effects on governance, linked to the risks of hacking the management systems of public services or smart homes, and problems related to the world of information _ fake news, improper use of information deriving from big data of social networks to obtain entrepreneurial advantages, theft of digital identities, etc.

2 Socio-Economic Effects

The transformation of parts of the city according to a "smart" logic makes the latter similar to central areas in the "traditional" meaning of the term, with all the consequences of the case. Residential choices in favor of these locations which involve positive externalities (such as high quality of the settlement fabric, proximity to high-ranking public services - health, education, training, availability of communication infrastructures - physical and digital - at high speed, etc.), compete with the demand expressed by many production activities, increasing the price. Add to this the continuous search for a balance between the cost of housing, which tends to decrease as the distance from the center increases and the cost of mobility, to be understood both in terms of the monetary cost of the transport service and in terms of cost opportunity of the time spent in the move, which, on the contrary, tend to increase as the distance from it increases [6].

The potential effects of this process for the central areas are evident: the congestion and commuting, due to insufficient transport infrastructures and a mobility anchored to the car as the main means of movement, generating both higher economic costs for individuals and families, and lower quality of life.

The competition between the various economic subjects for access to this new kind of central areas and the price that each of them is willing to pay consequently determines both the territorial distribution of the land values and the urban settlement structure. The impacts of these phenomena translate into different phenomena, such as gentrification, filtering and sprawl.

Gentrification has been one of the main themes in the field of urban studies for at least three decades. Its relevance is particularly evident today in the case of urban renewal operations in a smart key, where a change in revenue values is generated.

The gentrification represents that process that sees a part of the population with a higher income "replace" another, with lower income, within low-income neighborhoods. This expulsion of the economically weaker groups, occurs because the acquisition of the properties deriving from a greater income offered, motivated by the attraction for the cultural climate and the informal, convivial and creative atmosphere that is breathed in these neighborhoods, generates conversely an increase in effective income that leads to changes in the social composition of the neighborhood.

Starting from the fundamental contributions of Ricardo and Von Thünen, the urban economy considered the rent generated substantially by the demand for accessibility. The proximity to the urban center, therefore, maximizing the "position value" [7] and minimizing transport costs [8], would represent a certain advantage able to guarantee the stability or growth of real estate values over time. The rent would thus take on the characteristic conical shape, variable in height and width depending on the "city demand" and the consequent dynamics of urbanization of inhabitants and activity [9], but stable in form. It is assumed that rent measures the demand for inhabitants and activities that benefit from proximity, a necessary and sufficient condition to determine its value.

However, the classical theory is not able to explain the presence of deteriorated neighborhoods in central areas of the city [10], nor the fluctuations of rent values in

comparative terms between the various parts of the city having the same distance from the center. The slow changes in the physical quality of the building and the consequent population changes in the various urban districts are out of phase in time and of a contrasting sign in space.

In various cities there are found in central areas highly degraded neighborhoods both from a social and economic/environmental point of view. The obsolescent buildings welcome increasingly poor and marginal inhabitants; commercial services close or move; public places (green spaces, social services and open spaces) enter a phase of growing neglect and abandonment due to the high levels of crime and vandalism. Real estate values go down [11].

After a certain time, however, gradual signs of improvement may appear suddenly obsolete production volumes are transformed into original spaces for innovative activities, such as artists and architects' studios, photographic laboratories, fashion, art galleries. Gradually the renovations of housing and buildings and the conversion of technical spaces and industrial areas multiply. The growing building and urban quality initiates a demographic turnover attracting a younger, cultured and dynamic population able to pay prices in continuous growth.

The phenomenon does not occur sporadically at the level of the individual building or of the individual block, but rather concerns entire urban districts. The whole process can be the result of the interaction of so many individual decisions that mutually influence each other in a certain spatial "neighborhood", or the consequence of public administration decisions about the creation of new public goods and/or services premises (parks, squares, infrastructures for accessibility, etc.).

Among these, the mechanism for creating the phenomenon has divided scholars over the last thirty years. Is it a process driven by demand or supply? The rich scientific production on the subject is polarized around two positions. Sociological studies, mainly believe [12–14] that this is a cultural phenomenon driven by demand: the return of middle-high class from the pretty but isolated villas of the suburban residential areas to the lively and varied city life.

The supporters of the supply mechanism, starting from Smith [15], affirm that it is the capital that, under the right conditions, can find it convenient to invest in the degraded neighborhoods of the city and to promote a supply of housing and urban quality, such as to determine population turnover towards the top of the social scale due to the gap that is generated between the current rent, depreciated by the degradation, and the potential rent that is expressed after the realization of the intervention. If this last explanation is convincing in relation to "smart" transformation interventions that require important investments and infrastructural modifications, the former seems better to respond to those cases in which the creation of "smart communities" revitalizes the neighborhood and makes it attractive for middle-high income classes.

Regardless of what the trigger factor is, the life cycle of the urban neighborhood, characterized by an initial phase of construction, a subsequent use and maintenance regime, and therefore degradation, is restarted with renewal interventions due to the gap it creates between the expected rent and the current rent, that is between capitalized rent and potential income. This is the summary of the Rent Gap Theory (RGT) [13, 16–20].

Similarly, the filtering theory[1], aiming to identify the variables that influence the residential choices of the population in an urban environment, is based on the characteristics of the supply. It shows, as the qualitative characteristics of the real estate in the territorial context, can attract the localization of families, thus triggering processes of social polarization or decline. The mechanism is substantiated on the one hand by a demand for quality expressed by "proprietary" and therefore more affluent families that replaces its own assets to move towards a higher quality (filtering up) and on the other by a primary demand (single income families, for rent, students, etc.) that prefers the lower quality homes available, but characterized by lower rent values (filtering down). In other words, filtering is the process in which a home or neighborhood changes real estate values relative to those of the city as a whole.

The mechanisms of substitution of the weaker "social" fabric, no longer able to sustain the new prices, in favor of more affluent classes and, in a complementary way, of poorer classes that go to occupy the areas left free by the wealthier classes which have moved, however, are not a zero-sum game because the weakest part of the population is numerically larger than the more affluent one. This gap determines the need for new areas at affordable prices, which inevitably, due to the dynamics described above, will be located on the margins or outside the existing fabric.

Thus, the so-called phenomenon of urban sprawl is formed, that is to say the spread of cities far beyond the administrative boundaries and towards the smaller centers of urban belts that supply good services and in which the cost of housing is lower. This element must also be crossed with the growing demand by families for a greater housing quality, both with reference to the house itself and to the external environment - greener, less traffic, less parking problems, conditions more easily found outside the big urban concentrations. All this must be placed in a general process of settlement diffusion that has affected the metropolitan territory and the growth of medium-small centers, and that has crossed with suburbanization. The economic-productive organization that favored large industrial concentrations towards more flexible and dispersed settlement patterns throughout the territory has changed, also thanks to technological innovations in telecommunications. The public infrastructure policy has extended the positive externalities for production and residential settlements, joining the spontaneous processes of the market, and making sure that even in the urban suburbs and in the medium-small centers located at short-medium distance from the urban centers there is an infrastructural endowment and public and private services such as to attract economic activities and population. Concerns about urban expansion are no new. In a 1958 essay entitled "Urban Sprawl" that appeared in Fortune, Whyte [40] warned Americans that their propensity for using five hectares to do one's job was not just "bad looks" but even in a "bad economy". In the following years, the movement to contain or reduce sprawl grew in fits and starts following loosely correlated cycles with the economy and the administrations in power. Often, the momentum is renewed by

[1] The first version of this theory was developed in the 1920s by Burgess, a member of the Chicago school. In those years Chicago was in its phase of maximum expansion and with this theory Burgess tried to explain its localization model.

finding new slogans. Those who once supported growth control later sided with New Urbanism, sustainable development and smart growth.

A typical concept of American literature on urban development, smart growth, which in the smart city is one of the theoretical referents [21], is a development model "*that serves the economy, the community, and the environment. It changes the terms of the development debate away from the traditional growth/no growth question to how and where should new development be accommodated*" [22]. Even if the origins of the term are not clear, the rapid growth of smart growth can be traced back to three key documents published in the late 90s [23]: *Growing Smart Legislative Guidebook: Model Statutes for Planning and the Management of Change*; *The Tool Kit for Smart Growth* (published by the Natural Resources Defense Council and the Surface Transportation Policy Project); *The Smart Growth and Neighborhood Conservation Act* (issued by the State of Maryland). Although there are no two organizations that define smart growth in exactly the same terms, the logic of a smart growth is based on four propositions:

- whatever the causes (economic forces, consumer preferences or wrong public policies) the dominant form of urban development in the post-war period has the character of an urban sprawl;
- urban sprawl can be defined as a low-density, unplanned, car-dependent development, homogeneous and aesthetically unpleasant;
- urban sprawl has negative effects on environmental quality, social cohesion, public finance and human health.
- urban sprawl, and its associated ills, can be mitigated by policies that promote compact urban growth, a mixed use of the territory, the creation of urban cycling and pedestrian contexts, a shift based primarily on public transport, urban redevelopment policies and of conservation of agricultural land.

The principles resulting from this perspective, which have gained wide recognition, are:

- create a wide range of housing opportunities and choices;
- create walkable neighborhoods;
- encourage a sense of community and collaboration among stakeholders;
- promote, attractive and distinctive places with a strong sense of place;
- make predictable, fair and affordable development decisions;
- encourage mixed use zoning;
- preserve open spaces, agricultural fields, natural beauty and areas characterized by environmental problems;
- provide a wide variety of transportation choices;
- strengthen and direct development towards existing communities;
- promote a higher density of land use.

Research has shown that these principles save money and promote economic growth. Mark and Puentes [24] highlighted three significant ways in which the adoption of this approach is able to improve the local and regional economy. First, by focusing development around existing infrastructures, the costs of public services can be significantly reduced. Fewer roads and sewers will be required, public transport and

public service journeys (waste collection, police patrols, etc.) will be shorter, and so on. Second, it has been noted as denser labor markets, healthier city centers, less congestion and greater concentrations of communities contribute to improving worker productivity and increasing average personal income in a region over time. Finally, they found that when a city's economic image improves and its poverty rate declines, the surrounding periphery experiences an increase in income, house prices, and population. Particularly interesting in this regard is a study on the fiscal impacts of alternative development models which compared the relative costs of sprawl and smart growth in New England and the Mid Atlantic. The study found that, given the same increase in the number of users over a 25-year period, a development model based on the logic of "smart growth", focusing on urban centers, on smaller lots, on mixed uses and higher densities would preserve over half a million acres of land compared to a sprawl-based development model. Furthermore, a smart growth development would significantly reduce the kilometers of new roads and sewers needed. Overall, using a "smart growth" development model, the total cost savings would be nearly nine billion dollars for local governments and three billion for state governments.

It is therefore evident that the transformation into "smart city" of parts of the city, driven in particular by the large telecommunications companies [25], involves a dynamic based on the variation of prices [26, 27], centripetal on one side and centrifugal on the other. The first refers to the attractor capacity for the wealthier classes developed by that part of the city once it has been transformed, becoming in fact a centrality. The second refers instead to the effects of expulsion of the weaker classes that will move to areas with lower value of rent, farther from the center, thus fueling urban diffusion and land consumption. Paradoxically, this dynamic in turn recalls the transformation of these areas into a "smart growth" logic that, with the addition of the digital and creative components [21], leads to the request of a "smart" urban transformation of such marginal (or peripheral) areas and therefore the process at its original starting point. It therefore seems that the "smart" urban transformation does not take into due account the effects on the sustainability of the process, with particular reference to the effects on land consumption and social impacts.

To avoid this type of dynamic, which can be traced back to the so-called "market failures", solutions are often proposed linked to the intervention of the State through processes of imposition of maximum price ceilings (such as the agreed fee), which however lead to further negative effects on the demand and supply mechanism, on the quality of the building fabric and on the transparency of transactions. More effective, however more burdensome, it appears instead to be an approach that privileges an action on the whole city system rather than on a single part, thus annulling the relative modifications in the rent values.

3 The Environmental and Geopolitical Effects

The smart city is also the place and result of interactions between anthropic and physical-environmental elements. These elements play an important and growing role in the smart city, defining its essence as technological means for exploiting its potential, at the same time producing a brand new set of waste not yet fully understood on its

post-life ending, as well as in accompanying the increase in terms of rent linked to the smart city.

The coexistence of these elements, however, is believed to become sustainable in the smart city thanks to the preponderant technological factor [28], which overcomes the traditional mediation function of planning between these contexts and which becomes a central element. In the smart city, the sustainable management of resources. raw materials, energy and waste, in environmental, economic and social terms, is one of the main objectives. However, the management of resources supply and consumption appears critical even in the smart version of the city. In fact, in the smart city, although the aim is to achieve better levels of energy efficiency and performance to cope with broader environmental aspects, those related to geo-resources are neglected, due to the growing demand arising from the technological market. From the point of view of the management of mineral raw materials, within the smart city' needs, it must be necessarily included not only the "classic" raw materials, always indispensable for the physical development of the city (such as cements, lime, aggregates, steels, aluminum, ceramics, ornamental and building stones), but above all include a long list of "new" and "high-tech" raw materials [29], essential for the technological network that supports the smart city: REE (Rare Earth Elements: Yttrium, Lanthanum, Cerium, Praseodymium, Neodymium, Promezio, Samario, Europio, Gadolinium, Terbium, Dysprosium, Olmium, Erbium, Tulio, Itterbium, Lutetium), Scandio, Gallium, Indium, Germanium, essential for electronics, LED lighting, communication systems, cellular networks and LCD systems; Tungsten, Tin, Niobium and Tantalum, fundamental for alloys, superconductors and permanent magnets; Lithium, graphite, Cobalt and Nickel, essential components for the new accumulators on which the transition from internal combustion to electric transport is based [30].

In most of the "classic" building and ceramics raw materials, the wide geological availability of the EU and Italian territory in particular, guarantee a centuries-old, constant and satisfactory supply of urban areas. This is also true in the cases of iron for steel and aluminum, raw materials whose origin is largely from non-EU areas, and for which there are currently no concerns, given their great availability in contexts characterized by good stability geopolitics and excellent relations with EU markets [31].

The main problems in the exploitation of the most common building raw materials are those inherent to the tensions generated by the whole mining activity in the European territory. Concerns over land use present in Europe since the dawn of time (agriculture or mine?) have overlapped concerns over the environmental impact of mineral extraction, which has been strongly opposed by public opinion in recent years, more and more directed towards ideas of environmental management that results in the so-called "NIMBY syndrome" [32]. If the historical European mining laws already set precise limits to the conflicts over land use, the activity of quarries and mines is currently subject to numerous and stringent regulations, implemented at several levels (EU, national states, regions), aimed at guaranteeing the sustainability of mineral raw material extraction, in terms of landscape and environmental impacts. According to EU indications, for example, these activities tend to be increasingly centralized, compatibly with the geological availability of materials, in districts circumscribed with clusters of mining centers, in order to minimize the consumption of the soil, and possibly near to

urban and processing centers - cement plants, ceramic districts, etc., in order to limit energy costs and CO2 emissions.

This work of rationalization and resolution of economic and social conflicts is currently extended only to the European continental sphere and does not concern that in a very limited way the raw materials related to new technologies.

Indeed, the transformation and development of urban areas, from energy-intensive to smart, changing the materials on which it depends, results in a delocalization and an increase in scale, qualitative and quantitative, of conflicts [33]. The raw materials related to electronics, new materials and new energy production and storage systems, in addition to being "strategic", are also "critical" for two main reasons: the presence of the main depots in territorial contexts unrelated to the EU area, characterized by very ancient geological features or peculiar geological units; and the presence in areas characterized by complex geopolitical relations or problems with EU countries, or, often, in areas of high geopolitical instability and characterized by armed conflicts. It is precisely in these last territories, mostly located in sub-Saharan Africa, central and western, that the impact of the transformations in progress has been discharged; the peak in demand for strategic and technological minerals has worked as a detonator of conflicts in newly formed countries, entering weak political and economic contexts, characterized by endemic poverty, corruption of the ruling classes, latent or declared ethnic conflicts. A further factor of social and economic degradation was then experienced in these countries with the recovery and spread of artisanal mining, characterized by unsustainable environmental practices, wild extraction of resources and heavy forms of exploitation, even forced labor, of workers. In these situations, it is not infrequent to see armed groups financing their activities by selling minerals extracted from areas under their control.

Tackling all these issues certainly requires the action of supranational entities. An attempt to intervene on the part of the EU has taken place with the recent "Conflict Minerals Regulation", promulgated in 2017, which follows a similar legislation in force in the USA and which should come fully into force starting from 2021. The mineral correlation is recognized war conflicts, the new law intends to make illegal mining activities in the countries in conflict more difficult. The first objective is therefore to break the link between illegal mining of minerals, their marketing on European markets, financing for conflicts and their extension. The minerals subject to this law are cassiterite (Stagno mineral), coltan - columbo-tantalite: Niobium and Tantalum mineral, wolframite - Tungsten mineral - and gold. These are some of the raw materials that, in recent times, have fed the so-called "four minerals war" in central Africa - Democratic Republic of the Congo, Rwanda, Burundi, supported by the "hunger for universal technology", which ultimately finds in the smart city its maximum expression.

This is the unpublished and little-known face of the smart city, with an ecological footprint no vaster than in the recent past, but increasingly polarized in fragile places both in environmental and in human rights terms [34]. The smart city, although tends to contain energy consumption [35] compared to past city models, requires materials for new purposes, in particular for energy storage in batteries - Lithium, Cobalt, Graphite, Nickel, Aluminum, Manganese and Copper. In other words, the smart city consumes

energy differently from the past, through materials that are not exactly energy, of the third and fourth world and produces new types of waste, i.e. e-waste.

The re-use of such waste requires a real epochal change and is substantiated in the passage from the linear - neoclassical - economy to the circular economy, with the awareness that the return will always be less than one due to technological progress, and it will be much lower with each reuse. In other words, e-waste can be considered a potential raw material - second, but with a deadline. Although the aforementioned law is a good start, it immediately shows its flaws. Apart from the limited list of raw materials - which at present should be added at least Cobalt minerals, the text provides for a "responsible market" clause, according to which European industrial groups that import and use "conflict minerals" must control yourself to avoid purchases in war zones and self-certify the origin of the minerals. The disciplinary measures are internal to the multinational firms, which are advised not to import into the European market raw and semi-finished minerals coming from war zones. In this framework the role of the European States and Magistrates who are not authorized to punish crimes is completely absent. Despite its obvious limitations, the "Conflict Minerals Regulation" [36] appears to be a fundamental step towards the sustainability of mining and therefore of cities, in view of the technological transition that characterizes smart cities, alongside the set of indications that guide the current EU policies towards "Critical Raw Materials". After all, the English, French and Italian colonies that have marked the history of the last two centuries, were nothing more than the substantial part and under everyone's eyes, of the ecological footprint of a "city or an entire state" [37]. Today, instead, we are witnessing new forms of hidden colonial exploitation that generate an ecological footprint "of more cities and states". It seems almost paradoxical that, to remind ourselves of the new exploitative colonies, we arrive through creativity.

4 The Effects on the Governance

The main issue related to smart city appears to be the governance, as set of methods, procedures, decisions enclosed within a vision of the city as a while, and not just as a techy 'Black box' where a further layer is added upon the existing set of components of the city.

In general, the term 'smart cities' should be extended, to consider communities - as it is, already, the case, as this term is often accompanying cities in the declinations of smartness - and, furthermore, concepts as 'territorial' and 'peripheries'.

If it is true that cities represent now the most typical way of thinking about human settlements, it is also true that cities, as dense and central places, are no more the only places where attention has to be put. Less dense environments as peri-urban, rur-urban areas and peripheries, where urban characters are present but with lower levels of accessibility and services, represent the real places where the major challenges arise: the discomfort in fact is growing in these areas, the most vulnerable ones, from where explosions, riots and protest are born: yellow gilet, Brexit, US elections, generalized fear of immigration and violence, even if crimes are diminishing, are deeply influenced by the fears and unmet expectations arising from these areas.

Recalling an image referred to the pillars of the Smart City [38], the governance was considered as the ‘invisible hand’ capable of keeping the different elements or - as said - pillars of the city tightened together. The idea was that of recalling the need to move from ‘government’ to ‘governance’, therefore allowing setting up some kind of ‘traffic laws’ to allow the interaction between people, the physical and the ICT infrastructures.

The pillars sustaining the Smart City are Connections, Data and Sensors, these referring to the different elements that constitute a city in its ‘smart’ conceiving.

Connections referred to the physical - as well as the immaterial - sets of networks present in the city. On one side the physical dotation of the infrastructure connecting the different parts of a city. In this case the digital backbone of stations, wires, hubs where the digital data flow. On the other side, it implies the presence of the flows and sets of connections along the network. That is the amount of interaction that individuals and groups can set on the network.

Data represent another one of the pillars. The ICT revolution is producing data at an unprecedented pace, both voluntarily and involuntarily, often with a non-complete awareness by producers. Organizations produce massive amounts of data, now mostly becoming available on open platforms, following movements referring to freedom of information and allowing citizens to have free access to such infrastructure. On the other side, big data play a major role in providing - ideally and theoretically - a wide amount of information and - after all - knowledge on the behavior of groups and individuals, as well as of inanimate devices.

This latter point is still an unexplored realm. More than 50% of data is to-date created unmannerly, by devices or automated data generators, this contributing to the traffic along the network. With the increasing number of IoT - Internet of Things - and smart devices connected, the ‘automatic’ city is more and more feeding itself of traffic flows.

About the user-created data, feeding the so-called big data, here it is important to separate the role of voluntary actions, where users actually create data and disseminate them. This is the case of the so-called “citizen science” in which people contribute in an active way to produce data helping scientists, city planners, decision makers, to gather bottom up data on the ground, de facto helping in integrating platforms of data that a single organization would find time consuming and costly to fill. However, most of user-related data are taken from the traces left by every action done on-line, from a Facebook post to a credit card transaction, to the point and path data taken and used in platforms as Google dashboards with the chronology of our movements - used into applications for traffic estimate - as well as for market research and profiling. Big data on users are also taken quite regularly by organizations for planning solutions: i.e., Transport for London acquiring the Tube Oyster’s data on O/Ds or Singapore tracking movements of cars and users.

Sensors - as evident from above - can be from automatic devices, as well as from ‘citizens as sensors’ as described above. However, apart from these creating data feeding the big data, citizens-sensors mean also involvement in public activities and participations, as open platforms, social networks and media and active city hacking.

The pillars sustaining the Smart City are bounded by a ring of regulation/ governance, that to-date seems to be the hard task, the difficult element to define and

correctly channel in order to implement correctly a smart city evolutionary path. The period spanning from the beginning of the years 2000 through to the '10s of the present century has witnessed changes in the interpretation of the Smart City meaning.

In the initial stage of the years 2000, the attention was mainly drawn on the hardware component, that is the smartness of the city represented by the realization of the physical infrastructure on which the Internet connections and data were able to be set and flow. That is the conception of the smartness as the realization of a 'new' utility, after water, energy, basic communication, a smart city, relying on an infrastructure as well, was thought to be the necessary step for keeping a city techy and intelligent, or smart. Some years later, in the mid 2000s, the attention was drawn on apps, or on the software solutions, giving for granted and acquired the hardware component. This is also the period of the social networks and media arising and therefore shifting the attention towards the capacity of social - or the like - platform in enabling the capacities of bottom-up participation of citizens to the decision process. The evolution in the years '10s is towards the integration of hardware and software, and the 'smartness' is perceived on other, different concepts, as the increase of the quality of life. Such aspect appears to be an interesting one in the evolution of the concept and posing serious challenges and expectations on the governance of the technological change imposed to smart cities.

Up to present days, smartness has been considered only as urban, and as a techy element, forgetting a couple of concepts. On one side the consideration that urban environments are spreading, not just creating cities and new urban areas, but distributing the characters of the urban to non-strictly urban environments. That means that sparse contexts are characterized by urban characters of buildings, costumes and activities, without the density, concentration and accessibility of the proper central, urban locations, where the provision of services, and particularly the techy, ICT ones, become easier and more efficient - if compared to countryside (or better: suburbs, peripheries, rur-urban and peri-urban areas) - to set up and to work properly, serving a wide amount of citizens and city-users.

On the other side there is the 'techy' drunkenness, or the idea that a city is 'smart' because it embraces the most recent ICT technologies and supply the widest amount of them to citizens and users, therefore assigning the intelligence and smartness just to some contemporary cities. If it is true that the pace and impact of ICT is unprecedented in time and space, it is still and undoubtedly true that new technologies have always been adopted in cities to enhance its way of functioning: from the energy and water distribution, to innovations as electricity, innovations in mobility in transport, these have always been novelties in urban environment, than spreading to other contexts. And generally, innovations in these sectors have also been coupled with changes in the policies and governance of the cities. The impacting innovation characterized by private cars had several consequences not only on industry but also on society and, namely, from the time of car mass production and diffusion, profound changes occurred also in the different policies, let alone urban ones, with the obligation, in many cases, of extra spaces to be allowed and dedicated to a particular users' niche - expanding - of car owners, who is generally and implicitly granted an extra-portion of public space just for the fact of owning or using a car.

At present time, the 'smartness' of the Smart City does not seem to be - yet - fully exploited into the paradigm changes in governance as other innovations did in the past. The ICT innovations, devices and tools, as well as applications, seem mainly painted over the city, or a digital conversion of analogical procedures, more like a glittering layer of paint rather than as a substantial, cutting edge revolution in the ways of conceiving and planning the city. In fact, generally, 'smart' applications seem more to be working to solve current needs or problems, in a way translated from the 'business as usual' very often created by the very same 'smart' technology, rather than boosting a change in the procedures underneath the same process. The problem in addressing so appear to be - in the writer's opinion - not in the technology but oh humans, particularly in the capacity of changing the ways of administrate the change and changing radically - thanks to technology - the way of addressing the daily - as well as the strategic - problems and challenges of the city.

In few words, and recalling what Green [39] stated, technology does not mean innovation, particularly in the smart city debate. Several voices are rising underlining that innovation and technology is headed towards integration of technology into bureaucracy and political choices. In Green's words "Today's age of seemingly endless data, theory matters more than ever. In the past, when they collected minimal data and had little capacity for analytics, cities had few choices about how to utilize data… The key barrier to data science is good questions… Cities are not technology problems, and technology cannot solve many of today's most pressing urban challenges. Cities don't need fancy new technology—they need us to ask the right questions, understand the issues that residents face, and think creatively about how to address those problems. Sometimes technology can aid these efforts, but technology cannot provide solutions on its own." [39].

The Dark Side of the Governance appears therefore the excess of available technology and data from different aspects of the city, following profound investments in users' education and on devices, but without a parallel profound rethinking of the process in the light of new technologies and opportunities, actually more as a translation and replication of existing procedures, with the consequence of losing the true benefit of the technological investment and losing sight of the true main character of the (smart) city itself, the people.

5 Conclusions

In the present paper we tried to express some doubts on the, often enthusiastic, evaluations expressed in terms of the potential of ICT in enhancing the city performances in producing urban environments that can be defined as smart in heading towards the utopian targets of the full sustainability.

In particular, the transformation of parts of the city according to a "smart" logic makes the latter similar to central areas in the "traditional" meaning of the term, with all the consequences of the case: modifications of the real estate value, processes of gentrification, sprawl and crowding out to the detriment of the weaker sections of the population. It is therefore evident that the transformation into "smart city" of parts of the city, involves both the attraction of the wealthier classes and the expulsion of the

weaker classes that will move to areas with lower value of rent, farther from the center, thus fueling urban diffusion and land consumption. Paradoxically, this dynamic in turn leads to the request of a "smart" urban transformation of such marginal (or peripheral) areas in a vicious cycle. In other words, seems that the "smart" urban transformation does not take into due account the effects on the sustainability of the process.

Moreover, ICT is a large consumer of rare materials. The short life cycle of intelligent systems has made it possible to highlight the need for new materials for the city, not only construction materials, but above all new and rare materials, contributing to increasing social different and political tensions in developing countries.

On the contrary, with reference to the governance, there are at least two elements that put a threat in fully exploiting a 'revolution' of a smart city. On one side there is a strong difficulty of considering the ICT-related components and particularly their implications into real planning and organizational processes. In one sentence, there is a strong difficulty in innovate with the available - and, perspectively, with the incoming - technologies in the processes governing the cities. At present the attention is drawn on some aspects of the problem, as how technology can help us in tackling the effect of malfunctioning of the systems, not trying the propose a true and permanent solution. As a matter of examples, solutions are more addressed towards monitoring, recycling, eliminating, gathering data on waste, rather than on searching for a solution on how to avoid - or limit - them. Similarly, in a certain stage, the 'smartness' was drawn towards app for managing queuing in public offices, while a more effective attention on the process of creating queues - as changing paper documents into properly digital or dematerialised ones - should produce better result on top of the process (leaving the eliminating-queues app the role of managing the residuals). That is particularly difficult because technology is quite easy to change, while procedures, that depend on human culture and habits, are longer to be eradicated or changed from the inside, at their root.

On the other side a conceptual 'dark side' lays into the difficulty - or incapacity - of representing the Smart City in a proper iconography. The ICT revolution in the city at present did not present a visible footprint, as other revolutions that took place in the city did: the revolutions of railway systems, electric lights, private car diffusion in cities had deep influences on the urban forms and also on the policies. New railway stations, energy power plants could and can be opened, inaugurated and attributed to one or another administration. On the contrary, the Smart City holds an iconographic framework that is a virtual one, painted more as a commercial than as a plan for new 'ideal city', as the Renaissance taught us. This is true for the different 'techy' applications, as the hardware component - cables, wi-fi hot spots, etc. - as well as for the software ones - i.e., apps, particularly their attribution to an image of the city. But still they can be part of a political agenda and represent something visible and 'tangible' on smartphone's screen. On the other side, the 'proper' application of the technological side, that is the 'true' innovation of planning and political decision making process, changing things under the bonnet, is something yet too important but at the same time not representable as an image of the city or expendable towards the public. 'A good news is not a news', and the implementation of an ideal dramatic procedural change in the municipal process - i.e., the elimination of paper procedures for citizens - could not have the same effect of a new 'hard' infrastructure or physical component of the city.

As a consequence, the full exploitation of the Smart City, or what will be the name of the new 'Ideal City' of the years to come, will be not complete until it will reach the level of graphical representation and perception and it will be hosted into programmatic and planning actions as a building block of the city.

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