The Processes and Theories of the Smart City

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What is the city, but the people?
—William Shakespeare, Coriolanus Act III Scene I

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INTRODUCTION

Imagine a city with no traffic, where public transport is not only efficient but always on time and vehicles are driverless. A city where you do not have to use a car to get to essential services and everything you need is located just a few meters away.

Imagine a fully eco-friendly city, where water is recycled, and a green lifestyle is preferred. Now, imagine a city with no crime, where disasters are prevented and that, at the slightest shout from one of its citizens, action is taken to settle the quarrel. A city able to self-manage pollution, that knows its citizens' habits, controls them and helps them carry out proper sustainable behaviour. Finally, imagine that what you have just read about exists:

South Korea.
Incheon Free Economic Zone.
65 km away from Seoul.
611 km^2 of land taken from the sea.

$35 billion has been invested since 2001 and one hundred thousand people currently live there. What is this? It is the city that would like to become the perfect city if it is not already. *Songdo*. It has been considered an eco-city, ubiquitous city, u-eco-city, sustainable city and a carbon-neutral, zero-waste city (Shwary 2013), the city of utopia, the perfect city; a myriad of meanings that share a common goal - fight climate change by improving urbanisation.

Aimed at achieving this, Gale International created the city of Songdo from scratch, with the help of the architects Kohn Pedersen Fox (KPF). Songdo was the first city in the world designed to be a smart city (Ksherti *et al*. 2015) even before its physical implementation. As you will see later in this work, the cities which currently call themselves smart – a very small number – became

smart over time; they were not designed to be smart. This is the first sea change enabling us to see how special the city of Songdo is. It is the first smart indigenous city.

During its creation, the city climbed to the top of the most important world charts as far as environmental protection, sustainable energy, lack of traffic and emissions were concerned.

Going into further detail, let us see how it managed to excel in all these fields. First, the added value of this city is being able to think, from the very beginning, of the idea of social_actors and their interactions with the outside world. This had ripple effects which led to the structuring of an interconnected, sustainable city. A smartness-orientated concept from the outset that enabled its creators to create rather than mend.

All of this led to the construction of a city within a twelve-minute radius of access to services for its inhabitants: its builders estimated that twelve minutes' travel time is the threshold beyond which people prefer to use their car rather than public transport. Within this twelve-minute radius, the creators of Songdo developed the whole soul of the city, which resulted in a dense and interconnected network of goods and services suitable for meeting the needs of any kind of social actor. Through the national railway, the Korean National Railway, and the Seoul Metropolitan Rapid Transit system, the city has a network of modern transportation, providing citizens not only with underground transport but also with buses and taxi boats using its several artificial waterways.

Moreover, Songdo was designed to be covered in green spaces. 40% of urban areas were designed for the construction of green areas, the widest of which extends for 40 hectares and the shape of which takes its inspiration from Central Park in New York. 40% of the water used for residential purposes is recycled by treatment plants. Blocks built in the city to host offices were built using the most efficient techniques: about a hundred office blocks got the LEED[1] (Leadership

[1] LEED® is a voluntary certification program that can be applied to any type of building (both commercial and residential) and relates to the entire life cycle of

in Energy and Environmental Design) certification. As for workers and companies in these buildings, the Korean government meant to create a hub for business. Incheon Free Economic Zone itself was designed to become one of the first free economic areas in the world. Indeed, the free economic area is understood as and connects with, the three regions of Songdo, Cheongna and Yeongjong Island. A Free Economic Zone (FEZ)

> "is a special economic area designated in order to attract higher levels of foreign investment by a) improving business and residential conditions for foreign investment companies, and b) by relaxing various regulations to secure the freedom to engage in economic activities and offer attractive investment incentives as much as possible. In addition, FEZs provide a wide range of tax benefits, reduce regulations to ensure the freedom to engage in economic activity, establish convenient living conditions and easy-to-use administrative services for free-flowing and diverse business endeavors." [2]

As if all these measures were not enough to explain the uniqueness of the IFEZ area, it is also located less than three and a half hours' flight time from sixty-one cities with populations totalling over one million people.

In this way, Songdo aspires to be the flagship of the region. The uniqueness of this ubiquitous city is reflected in the fact that it offers its citizens a range of services that can be divided into two macro areas: public and private services. The whole system is structured to

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the building itself, from design to construction. The real added value of LEED certification is how it promotes a sustainability-orientated approach in key sectors such as energy and water saving, the reduction of CO_2 emissions, the improvement of the ecological quality of interiors, the materials and resources used, the project and site selection. Developed by the U.S. Green Building Council (USGBC), the system is based on the attribution of 'credits' for each requirement. The sum of the credits constitutes the 4 levels of certification: basic, gold, silver, platinum. "La certificazione LEED di un edifizio," LEED, accessed July 2, 2021, https://www.certificazioneleed.com/edifici/.

[2] "Concept of IFEZ," IFEZ, accessed July 2, 2021, http://www.ifez.go.kr/eng/ivi001.

provide services for either public or private use, which can be divided into six subcategories:

- Public services: traffic, crime prevention, structure management, disaster (including environmental) prevention, environment and provision of information to citizens.
- Private services: housing, shops, education, economy, health and traffic management.

As we have seen, Songdo is a city that offers goods and services that western cities, for example, will not have for many years to come. Still, it is an incomplete city. Its completion was originally due for 2015, then 2018, and finally for 2022, but its current 100,000 inhabitants fall short of the anticipated 300,000.

It has been called "the perfect smart city" (Coen 2017), but maybe it is too perfect. It is a seemingly faultless city that has been idealised for a long time. Nonetheless, as we have seen, it uses the latest technology, for example, there are no rubbish lorries, as waste is collected through pneumatic tubes installed in houses and is conveyed to a sorting facility, where it is either recycled or incinerated to create energy. Streets, electrical systems and even water pipelines are equipped with electrical sensors which can monitor real-time movement and consumption by inhabitants. Access to and climatisation of the buildings are by fibre optics, twenty-four hours a day, seven days a week, operated by a control centre.

At first sight, South Korea's smart city "looks like heaven, being studded with skyscrapers, and big gardens taking inspiration from Central Park, electric cars and car-sharing, bike paths and golf courses" (Coen 2017).[3]

On the other hand, to many, Songdo is a nightmare: its detractors call it "no man's city," even though it has a hundred thousand inhabitants, and this number is likely to increase. They see it as a sort of post-

[3] Emanuele Coen, "Benvenuti a Songdo, l'incubo perfetto." *L'Espresso*, January 12, 2017.

modern panopticon, an institutionalised prison seeing and controlling everything. Indeed, a central system called U-city Operation Centre collects and controls data about every aspect of Songdo's urban district twenty-four hours a day. It checks everything, from traffic and the weather to private consumption through a dense network of closed-circuit cameras and several low-power sensors located at every street corner and integrated into everyday items.

Inside the control centre, which is an institutionalised hub for information communicating with the country's central government and connected to the systems of other South Korean cities, men and women spend their whole days glued to screens. It is like an Orwellian big brother, but much more technological. Indeed, to many, data possession, social life and information control seem to pose a not-to-be underestimated danger for democratic effectiveness.

Viewed in this way, it looks like a city created *ad hoc,* the sole objective of which is functionality; it is a sterile place, leaving the social actor on the periphery. It is a place where every single aspect of life has been designed to passively integrate with the perfection and the structure of the city. In this context, the social actor is required to, paradoxically, adapt to the requirements of the welcoming smart city. For this reason, to some[4] this South Korean flagship does not comply with the definition of a smart city, that is, one that promotes idealistic coherence, the interaction between the physical world, social actors, digital world and technological interconnections. This less than idyllic vision of Songdo meets what Townsend, research director at Palo Alto Institute for the Future, states in his book *Smart Cities* (Townsend, 2014) that some smart cities, including Songdo, seem to grow following a merely economic paradigm, giving priority to development and the pretences of the new companies for a global development mission, while ignoring coherent urban planning and communication with its citizens. It is a city then which seems to have been specifically designed for

[4] See: Carlo Ratti. 2018. "Songdo: not so smart." *Aspenia* 80-81: 130-132.

transport, buildings, the environment, economy and safety, but is unable to meet its inhabitants' needs.

At this point of the analysis, one wonders what the sense of building a brand-new city is if it is simply a receptacle and little attention is paid to the content which, in this case, are the living people. This raises doubts about the creation of smart city models from scratch when the idea of growing smartness in already existing urban agglomerations (so that the focus moves from technology to the citizens) might be more attractive.

This book aims to clarify the boundaries of the smart city, with scientific rigour and the many facets of general sociology; to explain how the interconnections between the different social systems can be interfaced with that which will be understood as smartness, and to determine, using existing literature and theory analysis, whether the model of a smart city can still be effective.

The first chapter will deal with the origins of such a transversal phenomenon, noting how economy, politics and society serve as a motor for change. Economic theories explain how the city became the source of cash flows and as intermediaries for financial exchanges which then led to the spread of new technologies. Thanks to such cash flow the city became a source of growth that enabled surrounding areas to benefit from the flourishing economy of the city centre. There was a shift away from classical capitalism, which is based on the private ownership of the means of production, to a type of capitalism that is based on the nurturing of human capital, along with knowledge and intellectual capital.

Within the above-mentioned changes, politics and governance have an important, if not essential, place. The government and management of the smart city require a political understanding of technology to comprehend upstream and downstream processes involving the technological world. The political matrix of a smart city is then based upon new opportunities of interaction between an urban agglomeration, its citizens and government, thanks to the emergence and fast expansion of information flows. There is a transfer from a highly hierarchical power model to one that encourages a push up from the

ground, encouraging communitarianism. Society, in its turn, spurns smart phenomena aimed at the horizontal reticular model and replaces the top-down regulatory one. The domain of global digital networks that have reconfigured relationship space is the common denominator for this new logic, and this new city model is immersed in a society predicated on uncertainties; the main task of the technological world seems to be to develop smart logic and new systems of trust in the citizen.

The second chapter will analyse three of the most important theories of the smart city, showing further how difficulties in the conceptualisation of this phenomenon increase even amongst its most ardent supporters. The first research published on the smart city was, and remains, the most widely known and quoted. Giffinger and his school (2007) represented a milestone in research on the smart city, as they drew up, for the first time, a set of indicators that enabled the classification of a medium-sized city based on smartness levels. We will see that although the six-axis theory helped to define the boundaries of a wide and hard-to-be categorised set of criteria, it does not manage to provide an accurate definition of a smart city. On the other hand, the research issued after Giffinger focuses on human capital and the role of political participation within a city context. Caragliu and his school (2009) show how the core of the research into the smart city cannot and must not be concerned with the hard infrastructure, but rather the social infrastructure in its various forms. We will see how the relationship between human capital and urban development is connected to the growth of digital entrepreneurship as it needs resources such as qualified personnel. Such research will highlight how a lack of reference to society might lead to a myriad of electronic systems disconnected from the city's needs.

Finally, Hollands' theory, which demonstrates how such research critically analysed the terminology that conceals the material reality of the smart city, and how this difficulty in defining the phenomenon led to the improper use by many cities' governments. The adjective "smart" for example is often used for connotations that do not match with reality. It will then become clear how we can only aspire to

generally change defining a city as smart through the integration of different social systems.

The third chapter will analyse the theories described in the previous chapters to develop further discussion points. Three elements considered essential for a holistic comprehension of the smart phenomenon will be presented. The first element analysed will be the conception of a democracy that, with the advent of technology, has demolished the borders between the voting booth and the political debate, penetrating people's homes via their digital devices. The description of smart democracy will align with that of smart governance, because, when it comes to smart, these two concepts cannot be separated. We will see that democracy works just as it worked at the times of the Greek *agoras,* the only difference being how it is conveyed to the public. We will then pay attention to environmental, economic and social sustainability, considering whether smart cities are sustainable as well. During the 21st century, the rise of smart logic has seen a tightening of concerns due to the increase of emissions and has become a possible solution for their reduction. References to sustainability will help to define the concept of smart cities leading to the conclusion that a city cannot be called smart if it is not sustainable as well. To conclude, we will deal with security in relation to safety and privacy, which seems to be considered marginal in the sociological literature on smart worlds. We will see how smart cities need constant data management to keep them working, and how this exposes a city to possible violations. The prospect of data violation may lead to the citizens' lack of confidence in technological systems, the same confidence that is needed for technological systems to be perfectly integrated and adopted by society.

We will then try and understand, in the light of these various theories, whether it is possible to talk about a complete smart city and if such a model can still be applied.

CHAPTER 1

SMART CITY: WHY TODAY?

"The era of the smart city has arrived" (Karvonen, Cugurullo and Caprotti 2019, 1) announce, bringing to our attention how the smart city phenomenon is no longer an idea, but a reality. What is a smart city? Why do people increasingly talk about it, and most of all, what are the processes that led to its creation and development?

From the onset of the digital era, the phenomenon of the smart city has become the focal point of several research fields. Indeed, the smart city acquired ever-greater importance in the process of economic, environmental and, lately, social development, becoming the main objective of both national and international policies and strategies. It has become the ideal stage for experimenting with technologies as solutions to society's problems, including population increases that have stressed the urban structure, a prevailing increase in material consumption leading to increased CO_2 emissions, and globalisation, which has shifted the axis of the urban community from local to global.

But what is a smart city? Many authors, particularly those writing about smart cities worldwide aim to provide a definition and then develop specific research. Such authors accept a conventional definition in their explanation. No one knows what a smart city is.[5] One could say that this is an unclear concept since some of its characteristics can contemporarily be found in many subsystems. It is, therefore, no wonder that the concept tends to vary depending on

[5] As extensively researched by: Nicolò Costa. 2014. "La smart city e i professionals del capitalismo cognitivo-culturale." *Comunicazione punto doc* 10: 9-25.

which articles and research have been analysed. The concept of a smart city is indeed covered by an umbrella of definitions that have gravitas simply because they are ambitious. We refer to concepts such as sustainable development, human capital and network society, all employed to define the diversified world of smartness. Thus, a smart city establishes itself as an "evolving project" (Costa 2014, 11), without implementing final rules, directions to be followed, or defining the best way to operate. Smart urban areas are not closed, recognisable entities, but rather a set of informational, economic and spatial flows. A smart city can then be considered a theory, an ideal model enhancing the collective logic and having a proactive function in the research of innovative solutions aimed at facilitating daily routines. It is a physical place where projects lay their foundations on the digital and the sustainable, aimed at changing how social actors use technology for proficient and effective problem-solving.

As we have said, there is not just one way to make the technological process reshape the contemporary city, but rather many decisions need to be made. A smart city leads the change and remodelling of contemporary urbanism with no clear direction, contributing to what we call the fifth urbanisation (Costa 2014, 17).

The first urbanisation took place in antiquity, where the creation of the city was connected to the rural economy. The protagonists of the second one were the commercial towns befitting from international exchanges. The third began with the Industrial Revolution, which saw the rural proletariat moving from the countryside to the city. The fourth started in the 1930s, when cities had the main role in economic development and began expanding, not in width but height. The fifth urbanisation is represented by the economic growth of the 1990s resulting from intense globalisation, which led cities to become melting pots, borderless and forward-facing. It is the fifth urbanisation that this work aims to investigate.

Just as in all social processes, it is impossible to establish an exact starting point or the main cause. We, therefore, need to work backwards. We will see that the rise of mobile phones has changed the meaning of distance in urban centres. With the transition from

stable, cable-based infrastructures of the 1990s to hybrid and wireless systems of the early 20th century, digital infrastructure has changed so much it can now connect people and places that were formerly hard to reach,[6] the result of which is that formerly unbridgeable gaps have all but disappeared.

The turning point occurred in 2008: the start of the economic crisis saw in the smart logica chance for economic resurgence not for many countries

2008 was the year in which the civilised world unconsciously found itself crossing three thresholds (Townsend 2013):

1. The first one is represented by the fact that the urban population equalled the rural one for the first time. Cities expanded and rurality was exchanged for urbanisation. Urban expansion can be defined as "the biggest building boom humanity has ever undertaken" (Townsend 2013, 5), and one that is under-evaluated as well. Despite the jump from city to metropolis meaning a significant increase in invested capital, this exposed urban realities to two dichotomous consequences: on the one hand, we have constantly growing cities with connected issues ranging from overcrowding to transport inadequacy. On the other hand, we have cities tending to decline to lead to infrastructure degradation and poor economic means.[7]
2. The second threshold is represented by the rise of the grid. In 2008, hand in hand with the considerable growth of the urban population, the number of mobile phones exceeded the number of fixed ones for the first time. The ever-growing presence of smartphones in people's hands reorganised lives and communications, making dynamism and connection two

[6] See: Katharine S Willis and Alessandro Aurigi. 2013. *Digital and Smart Cities.* Oxon: Routledge.

[7] As extensively researched by Roberta De Santis, Alessandra Fasano, Nadia Mignolli, and Anna Villa, 2013. "Smart Cities: Theoretical Framework and Measurement Experiences." *MPRA* 50207: 1-30.

prevailing paradigms, but also making everything faster and more frantic. Mobile phones are the most used electronic device, so much so as to create the so-called technological obsolescence.

3. The final threshold is represented by the ascent of the Internet of Things (IOT). It has taken over society and clothed every single aspect, so much so that people are now speaking of the Internet of Everything, where an internet knowing and dealing with everything is more relevant.

It should be recognised that, despite cities being innovation centres, they are also the scenes of urban conflict deriving from this innovation itself. Engels (2011) was one of the first commentators on this. He warned that the creation of the mechanical loom and the railway, incredible sources of innovation between the late 18th and early 19th centuries, generated richness but, on the other hand, increased the mortality rate due to the living conditions of the poorer citizens working in the mills and factories.

In literature, smart cities have been analysed by following different archetypal explanations: first, focusing on technology, second on people and, third on governance. A common finding regarding technology is that the presence of technology boosts urban systems. Definitions analysing human factors consider them as a resource able to lead to urban growth and studies about governance outline how cities are user-centred and how this puts an emphasis on the citizens as the common thread connecting all the various stakeholders. As has already been said, such phenomena defy an accurate conceptualisation, making it difficult to get back to basics. However, regardless of the approach used to explain the rise of the smart city phenomenon it usually comes from an idea of a lack of balance, and inefficiency. A smart city is always – but not exclusively – good for improving something. The city, which for a long time has been seen as a phenomenon organised within a social space risks creating logistics that could lead to disorganisation. This means that, although the city occupies a physical space, the new religion of cyberspace has affected social, political and economic dynamics.

In this sense, thanks to new forms of capitalism, urbanisation, reticular forms and the rediscovery of governance, the city can become a productive force behind society (Engels 2011). It becomes the dominant paradigm of the definition of society, which is not satisfied with being called reflexive, post-modern or reticular, but which uses smartness as its model. Economics, politics and society form the basis of this new model of the city which, despite being the engine of change, has remained unaffected by well-known categories in the social field, such as cognitive capitalism, technocracy and social reticularity. Within this context, the city appears international, global and a symbol of growth. As a political phenomenon, technocracy is the paradigm of the new way of creating cities: globalisation and networked societies have changed the regulatory models of the city from top-down to bottom-up.

Economy and new forms of capitalism

The intensity of economic and financial transactions, where the city is the main point of exchange, exemplifies the extent to which the urban context has become the protagonist of new forms of economy and illustrates how the evolution of cities into smart cities has come about. Looking at smart cities from the point of view of the economy means tracing the flows of money, financial exchanges and dominant economic models; to sum up, it means identifying which forms of capitalism have arisen. In recent years, cities have increasingly played the role of protagonists in finance and telecommunications, as well as in the economy, being "more than a place in space" (Geddes 1915, 46).

Considering the disproportionate power of technology in these areas, the intensity of transactions between cities and the financial markets for services and investments has enabled the modern urban context to grow rapidly into a global network, without the need for the physicality of cities and social actors. Therefore, the concept of a global network suggests a close connection between the economic network, information and communication technology (ICT) and the flow of transport. For this reason, cities operate in specific "nodes" or "global command centers" (Graham 2000) forming a new geographical

economy, thanks to the help of ICTs that allows them to show themselves as financial intermediaries and business centres. The global nodes of the connected society become, therefore, closely linked to each other, creating a parallel, networked society that moves alongside the flow of money and economic exchanges. The operational concept of the network is beginning to make its way into an imagined, new form of society, which, as we will see, will be the basis of reasoning on which the smart city is created. Interpreted as a place of a set of connections, the network crosses the boundaries of bricks and mortar and seemingly connects different realities. The concept of embeddedness is peculiar to the network; it has been brought to the fore especially by economic sociology and recognises how every social action is "conditioned by the overall network of relationships (structural embeddedness) and not only by the resources conveyed (cognitive dimension) or by the dyadic relationship between the actors involved and the nature of these relationships (relational dimension)" (Iannone 2007, 42).

It is no coincidence that in the globalised world, nations and cities are characterised by "interdependent and interlocking relationships" (Willis and Aurigi 2018, 109), That is to say, the definition of interdependent, interconnected relationships means both "world cities"[8] and "global cities," two meanings that, although different, show how the economy and global connections inform the concept of the smart city. If at first, the definition of world city[9] meant urban growth and conurbations in city regions, it now focuses on political and commercial power, including transportation, banking and

[8] The concept of the world city is presented to the academic world by the work of two authors, Wolff and Friedmann. Both texts framed the growth of global economic networks as transformations in the geographical context of economic capitalism. A city in this sense can be understood as a spatial economic reality that can be divided into smaller economic regions for administrative purposes.

[9] For further information about the historical definitions of the world city, see also Peter Hall, 1971. *The World Cities* New York: McGraw-Hill and John Friedmann. 1986. "The World City Hypothesis." *Development and Change* 17 (1): 69-83.

financial transactions, as factors that distinguish it from other types of cities. More specifically, world cities can be defined as:

- Reference points for global capital in spatial organisation and the articulation of markets.
- Sites with expanding sectors connected to corporate headquarters, international finance, global transportation, communications and high-level business services.
- Great places for the concentration and accumulation of international capital.
- A landing point for many domestic or international migrants.

Therefore, drawing together the common points at the evolution of these definitions, it can be stated that world cities are centres of influence, within larger territories (regions and nations), in which the economic relationships that are articulated within them have implications for the global economy. The first goal of research on smart cities is to try to analyse how attention has shifted from recognising the importance of territorial states, the physical matrix of the city and the emergence of spatial inequality. In other words, "the modern world-system is defined by its networks and world cities are key nodes in such networks of power and dominance" (Taylor 2000, 20).

It should be recognised, however, that research on world cities, which has categorised and hierarchically arranged the world's metropolises and which, generally has been exposed to much criticism, has been accompanied by "a new hegemonic status in the field of urban studies" (Kim and Short 2008, 72): the one of global city. We owe the definition of this new kind of city to Saskia Sassen,[10] who traces globalisation as a new source of modifying paradigms in the urban context. The focus is on the centrality of the

[10] Saskia Sassen turns out to be the greatest theorist of the global city, and many of her books bring to attention how this concept, despite having been theorised for twenty years now, is still in vogue. Saskia Sassen. 2001. *The Global City: New York, London, Tokyo.* Princeton: Princeton University Press; Saskia Sassen. 2018. *Cities in a World Economy*. Thousand Oaks: SAGE Publications.

function of the global economy, focusing on the attraction that cities have due to productivity, which is connected to the development of technological knowledge. In her explanation of the emergence of global cities, the author indicates how the global dispersion of economic activities has favoured, thanks to the use of technologies for space reduction and deregulation measures, the creation of enormous demand for central management functions, including advanced business services, as well as accounting, advertising, advisory services, and financial and legal services. The common point of both definitions can therefore be traced to the presence of an economic matrix that pushes to decentralise the place of business in the cities, whilst centralising power. But how did this type of decentralised economy become one of the features of the smart city?

We can state that there is a close correlation between economic growth and urbanisation. However, this relationship might remain only as potential; if it is not properly powered, it cannot fully deploy its effects. It is the rise of capitalism and the growth of cities and numbers of citizens that delineate many aspects of smart cities.[11] What stands out is the accumulation of capital through urbanisation. This new capitalism shapes the urban landscape in a way that is complementary to the needs of accumulation since it "produces a physical and social landscape through the absorption of surplus

[11] Harvey refers to the urban context in which the socio-economic conditions were created that allowed capitalism to be the most determining element of the social dynamic within the city. "The analysis of the circulation of capital demonstrates how this produces surplus capital in the form of profit, together with relative surpluses of labor that are obtained by means of innovations in the sociotechnical conditions of production. Much of the history of capitalism can be written around this theme: production and absorption of surplus capital and labor. This tension between the need to produce and absorb surpluses, both of capital and of labor, underlies the capitalist dynamic. It is closely connected with the history of capitalist urbanization. Urbanization becomes the process through which the accumulation of capital develops. However, before the material basis for capitalist command over the state is created, it is necessary that the political power and authority of the state be structured in an advantageous way for the primitive accumulation and mobilization of surplus capital and labor." David Harvey. 1998. *L'esperienza urbana*. Milan: Il Saggiatore.

capital and labor by some kind of temporal and geographical shift of the surplus capital in the production of physical and social infrastructures" (Harvey 1998, 43).

The rapid growth of other new economic models, such as online shopping, has resulted in people being able to make economic transactions without physically going to shopping centres. The need to compress physical space in the ether has meant that there is a need for a new form of capitalism, based on information and communication technologies. Can we, therefore, say that the new forms of capitalism have created new types of cities? It would seem so, because the accumulation of capital, technological innovation and urbanisation creates relationships that have become the backbone of the economic model that characterises smart cities. The point is that a city is a specific place of accumulation of capital. If traditional capitalism is founded on the generation and circulation of capital, conversely, new capitalism, defined as cognitive and being the main characteristic of the smart city, can be seen as the intangible capital that has led to the development of the knowledge economy. The new workforce has established themselves within the intellectual capital and is the impetus behind new forms of virtual capitalism. Citizens who have scientific knowledge will also have power, similarly to how the ruling classes that appropriated wealth also came to hold a higher authority, simply by owning such riches.

This fundamental shift away from traditional capitalism has led to the transition "from the industrial economy, based on production, to the post-industrial economy based on knowledge" (Antonini 2006, 18). In other words, the passage from traditional capitalism based on the exploitation of material capital, to post-modern capitalism based, instead, on intangible capital, could also be described as human capital, knowledge capital or intellectual capital.[12] However, this has brought together the drift towards a hyper-rational and abstract logic that has informed new contemporary capitalism, defined today as

[12] As extensively researched by Andrè Gorz. 2003. *L'immateriale. Conoscenza, valore e capitale*. Turin: Bollati Boringhieri.

"flexible" (Antonini 2006). A new spirit of capitalism, therefore, has appeared.

The trigger for this capitalism was the explosion of digital democratisation or the world wide web phenomenon. The internet and the web have begun to occupy more space in the lives of almost all social actors. Their growing use has gone hand in hand with the invention, development and use of ICT, which was the real turning point of the intellectual evolution. The emergence of ICTs and their continuous expansion have made it possible to detect how the connection with the city dimension can be found in four different elements:

- The connection between physical and digital.
- Expansion of information and communication technologies.
- Implementation of infrastructures through technology.
- Creation of strong economic exchanges.

Specifically, the connection between physical and digital occurred for the first time in the transition from remote and rural areas to the technological and central areas of the city. The expansion of ICTs led to the creation and expansion of new city models and allowed, thanks to the speed of broadband, real-time global communication. ICTs then enabled governments to implement city infrastructure. The continuous improvement in this era of digital change made the creation of a network of strong economic exchanges possible in the new urban economic areas. Thus, the transition from the economy that characterised cities to the smart economy that characterised the smart city is due to information and communication technologies, or to the consolidation of the "Information Age" (Yates 2008), which turned the urban economy into information technology parks and knowledge hubs. The concept of a smart city is built on the possibility that ICTs improve the functioning of cities, raise their levels of competitiveness and efficiency, solve the problems of poverty and social deprivation and improve their finances. The rapid spread of this improved functionality is due to a great degree to the creation and spread of smartphones that have made cities become "high-speed communication hubs with strong modern information

and communication technologies' infrastructures that connect the city with cities all over the world in real-time" (Kumar 2017, 53). The creation of the network society (Castells 2009) has meant the intensity, complexity and global reach of this network between cities which are not only connected cables, or by the reach of the telephone lines, but by a dense network of contacts that creates a continuous flow of information.

It is, therefore, noted how the notion of a smart economy, connected to the smart city, came to the fore when solving problems relating to cities, such as sustainable development, efficient management of resources and participatory governance, became more pressing, so much so that the need was felt to focus on the development of this new form of technological economy. In this way, however, a paradox is created which sees the international urban dimension in conflict with the local one, and which is found in the deviant effects produced by this hyper-connection between global economic networks. Large and distant cities tend to be connected, to know everything about each other and exchange large quantities of capital, thus leaving out the regional dimension, favouring global rather than local needs. How, then, does the economic factor, which is, by definition, transversal to the three dimensions (local, regional and global), fit so well with the smart city? The answer comes from the theory of the "Growth Pole" (Misra 1971) which is defined as economic development that is not restricted to one region but concentrated in one or more centres. Supported by space-based incentives, industrial development in growth centres can lead to increased hiring and investment. The greater the concentration of resources in one point, the more the economy will turn, but it will not be concentrated only at that point. It should be recognised that many nations have used growth poles not only to increase their economic potential but also to allow surrounding areas to increase their economic yield. In this way, secondary growth poles have been created, smaller than the former, and which have the task of stimulating the surrounding areas in such a way that the influence of the economic thrust is also recorded in areas considered less relevant than the main industrialised ones.

The drivers of this change have been the satellite cities, in the fragmented urban economy, which have become part of a strategy of spatial polycentrism that has seen the smaller cities as subjects of deconcentration of the central urban areas. The economic vitality that informs these realities is due to the competition generated between the local, regional and central dimensions. The diamond pattern model of competitiveness (Misra, 1971) registers four different characteristics that determine the "national competitive advantage" as follows:

- Condition factors, to say resources, technologies and infrastructures.
- Demand conditions, represented by local requests rather than products and services.
- Related sustainment sectors, to say the creation of industrial clusters.
- A trinomial formed by solid strategy, structure and rivalry, that is, the conditions under which governments create companies, organise them, manage them and naturally put them in competition with each other.

Thus, after such considerations, we can say that hand in hand with economic dimensions, the smart city resourced by the smart economy "thinks locally, acts regionally and competes globally" (Vinod Kumar 2017, 13). In other words, how in reality it deals with the local needs of its infrastructures and citizens, acts at a regional level by promoting large-scale incentives and finds itself competing on a global scale due to the obsessions with ranking, leading cities to compete with each other for funding from international organisations. "Collaborative consumption, collaborative production and economy seem to be the new development paradigm" (Bartolomeo 2014, 49), aimed at counteracting the combative nature of ranking. Web and digital technologies enable collaborative services, amplify the community concept and rediscover trust, extending it globally. Although the concept of community continues to challenge precise definitions, these seem to emerge within the context of smartness, when social bonds are presented as supportive and cooperative. The virtual relationships typical of the contemporary age make it difficult

to conceptualise the community. On the other hand, the processes linked to individualism and economism that have increased due to the smart world have generated a need for the community as a social unit capable of providing security. By this, we mean how the community rediscovers the role played trust, whereby focusing on the share capital it is possible to rediscover the relationships that connect a society not governed by the logic of efficiency.

As we have seen, if production relates to the territory of the city, in the same way, the collaborative interaction, characterised by the new reticular shape, relies on the enhancement of territorial resources. "The network assumes a new and more meaningful centrality because today economic development, both local and global, certainly depends on the collaboration with which companies can efficiently combine the phases of production, but, even more, on their ability to enhance the relational, social and cultural fabric of the places of production" (Iannone 2007, 13). Hence the recognition of the qualities of collaborative systems ranging from the efficiency of the use of resources to flexibility and resilience.

The network of economic development is therefore born not only from a more fluid and less hierarchical reformulation of the relationship between the public sphere and civil society - and more marked accountability of the latter - but also in opposition to the rhetoric of governance that "underlines the fact that no system lives without government, without some iron cage, especially when it comes to operating on a large scale (in resources, in projects, in time)" (Donolo 2003, 38). It follows that we can use the term smart city when the community logics rediscover trust and economic collaboration, reflected in horizontal governance.

Politics, governance and technocracy: three organisational paradigms

As we saw in the previous paragraph, those who hold the knowledge also hold the power. It is based on this statement that we can understand the primary role that politics, and consequently the choices of governance, have had in the expression of the city in the

smart world. The question concerns the synergy between social structures and new technologies that have played a key role in modernization. We investigated how new technologies have changed the effectiveness of politics[13] and how this has favoured the rise of the smart world in the urban context. If, as we have seen, the smart city can be analysed using three ideal-typical definitions, i.e., as a city that uses smart technologies, as a city inhabited by smart people and as a smart collaboration, it is also necessary to analyse the extent to which changes in governance have given rise to changes in the urban context. In this context, governance will not be understood as the holding of political power, but where the relationship between the political sphere and the civil sphere becomes the language of political power. The governance under examination is dependent on the social capital of a given community and its changes, traced in the reticular forms of late modern societies (Iannone 2007, 71). Governance "calls into question social acceleration" (Iannone 2007, 82), but the transition is not automatic, because governance is only an appendage of the networked society. Indeed, reticularity is "not necessarily a connection, nor does the connection always translate into integration or integration into cohesion" (Iannone 2007, 83).

Building a smart city requires that politicians understand technological applications in relation to the choices of political governance which include the upstream processes and the downstream consequences of the creation, development and integration of information and communication technologies (Meijer and Bolivar 2015). ICT infrastructures are not, as one might think, neutral, but are often embedded in the so-called power relationships or geometries of power. In this sense, technological infrastructures are not understood as things, as a system or as an output of a process, but as a social and technological process that allows – or perhaps does not allow – types of action inside the city and is also perceived as different forms of control, power and exclusion (Willis and Aurigi 2018). Therefore, an

[13] As extensively researched by Albert Meijer and Manuel Pedro Rodriguez Bolivar. 2015. "Governing the Smart City: A Review of the Literature on Smart Urban Governance." *International Review of Administrative Sciences* 82 (2): 392-408.