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Smart cities and the promises of a digitalized (Post-COVID) world: Infrastructure, networks and urban dynamics

Cities are continuously changing. Symbol of a digitalized, sustainable and automated future, Smart Cities promise potential improvements in services thru monitoring numerous urban flows. Incorporating new technologies into urban space is considered both an instrument and a catalyst of their development. Based on the Internet of Things (IoT), Smart City models seem to become inevitable, due to technology evolution, progressive and permanent integration of connected objects within urban networks, and its ubiquity in various fields. These relatively new means assure interconnections between digital and physical entities, places and environments, allowing communication between physical and virtual assets.

Although Smart Cities have had different levels of success, imagination around this city model is spreading worldwide, highly contributing to a generalized enthusiasm around its applications. The city's "Smart" name brings together various topics regarding urban space, especially in terms of representation, infrastructure, social and spatial practices, mobility and data. Smart Cities often refer to generic terms used to promote competitiveness, increasing their effectiveness mainly towards collective imagination for an ideal connected and automated city, considering disparities in digitalization. Explanations regarding smart cities revolve around globalizing terminologies, participating in building an idealized image of an adaptive and resilient city. Also designated as an “intelligent” city, in reference to its automated systems, its ability to adapt and its aspiration to resilience, the distinction between “Smart” and “intelligent” is important to highlight in cities, as it participates in an idealization of technological cities. To separate the two concepts a semantic analysis through which it will be discussed that all cities are intelligent even in their uneven digitalization, is required. These representations of automation managed by algorithms seem to respond, to the possible

concretization of series of ideals (some of which more achievable than others), and on warnings about a possible switch to a controlled urban space.

Discourses around this model seem nowadays to vary between fervent defenders of digital sobriety and those aspiring to reach an ideal of optimum connectivity dreaming of "disruptive episodes". Technological solutionism as theorized by Evegny Morosov, applied to urban contexts represents the Smart City as planned according to Internet's networking logic. Defining the Smart City leads to describing it technically as being a city of systems of systems, interconnected and interdependent, promising, through its integration of digital technology and superposition of network layers, a possible improvement in everyday life and a measured use of everyday resources thus connecting, monitoring and managing various material and immaterial flows, including mobility.

It remains however important to note the drastic effects the health emergency situation due to the coronavirus pandemic has had on daily life, and still impacts urban dynamics in cities. It affected work patterns and behaviors, both at individual and collective levels, especially thru imposing spatial and temporal constraints on mobility.

A critical analysis of the Smart City concept and approaching this topic from the angle of mobility seems essential, in the scopes of this 61st ERSA Congress, to further examine, thru specific case studies its numerous influences on urban spaces. This contribution aims to suggest a conceptual approach of this booming city model and an empirical study hoping to analyze the distinction of what is really smart in a city oriented towards information and data, especially in a pandemic context. Disparities in the integration of digital and infrastructural networks in cities will be among discussed topics, while questioning the possible evolution of its urban dynamics and technological diversification at various scales. This research aims thru selected French cities and/or regions, to see how the smartness manifests itself especially through mobility, and its influence on behavior often in unevenly digitalized environments. The study reported herein aims to develop a city approach considering the new urban dynamics as mobility restrictions and new ways of life set in a COVID19 pandemic context.

Smart cities and mobility, between infrastructure and info-structure

While cities in the 19th century were mainly oriented towards infrastructure networks, those of the 21st are information based. While the former were oriented towards industrial productivity development and decentralization with the introduction of new energy sources in goods production and circulation, the latter focuses mainly on "the technology of production, knowledge, information processing and communication of symbols that generates productivity [...] always based on a knowledge level and on transformation"[1]. In other words, while the industrial revolution targeted economic growth through increased production, the informational revolution aims at technological development through research and knowledge accumulation.

Smart cities produce data that vary according to multiple criteria, depending on predefined algorithms designed to predicted citizen's needs. Hybrid between physical and virtual space, the diverse applications of urban services digitalization are visible through mobility practices. Beyond purely technical aspects, the Smart City is above all spatial, it extends following urban network topography, since it is above all a superposition of networks; the first being the road network. This city model is apparent thru a multitude of technologies (some more visible than others) that progressively and permanently invade public space: sensors, chips, cameras, sound signals, and traffic signs... The first social network is the city, and mobility makes its deployment possible by putting individuals in connection with each other. As a creator of urbanity, mobility is however not limited solely to the concept of movement and displacement but should be understood by taking into account the social and its spatial intrinsic. Hybridization between technology and urbanity is reflected in public space both in terms of practices and infrastructure, thus leading to a shift toward new paradigms taking into consideration its virtual dimension, turning now towards software and personalized services. There is a reconsideration of traditional relations of the private associated with individualism and of the public with collectiveness thanks to expansion of practices such as carpooling, car sharing or even thru the development of various applications modifying experiences of urban mobility.

[1] Manuel Castells, *La société en réseaux*, Paris, Fayard, 1998.

The MAAS logic (Mobility As A Service) is reflected through the development of opportunities providing a diversified mobility offer, made possible by data collection and processing through a series of geo-location applications (Google Maps, Google Street View) providing information relating to times, locations (shortest routes, virtual tours, etc.) availability (self-service bicycle and scooter rental) events (carpooling proposals) and others.

What is presented today as new and current is in reality a re-appropriation of existing processes that are constantly being used as an update (cartography is an example), via digital technologies that now bring an additional performance and optimization value in collected data processing, in terms of speed, quantity of data or accuracy (quality) in data analysis. Today, digital technology refers to sensors, detectors, Internet, Big Data and Open Data, telecommunications, geo-localization, etc. and pushes for a continuous renewal of technological innovation. Praised for its numerous assets and the generated information benefits, data are indeed presented as essential tools in many strategic fields simultaneously allowing efficiency, productivity gain, improvements in decision-making and communication. The objective is to transform collected data into information to improve it by making it more accessible and sometimes better understandable by developing data visualization mechanisms, by reducing time required to find information, and thru facilitating the use of IT tools. Real time data profusion created by consumers makes it possible to personalize many services via algorithms that analyze every user's needs, wishes and habits. Its main goal is to reinforce the event-based character of a city that seems made up of everything occurring with it including the latest technology innovations and infrastructure, including urban mobility.

Transition from infrastructure oriented to info-structure based mobility practices and the disparities and unequal access to mobility services caused by the "digital divide" in urban development actions aligned with a strategic thinking on city level will also be covered.

New urban dynamics in a Covid-19 pandemic context: mobility restriction and new ways of life in French cities.

In the fight against the spread of coronavirus in cities and dense urban spaces and following sanitary safety logic, numerous surveillance devices, assuring the follow up of restrictive measures, invest urban spaces and monitor population's mobility. Exemption travel certificates, tracking applications, facial recognition software, intelligent video surveillance, thermal cameras, and use of drones to enforce containment, and to ensure the respect of lockdown restrictions, mark the commissioning of ubiquitous technologies for surveillance purposes.

The smart and now " safe oriented " city, through its security promotion, and the surveillance (and sometimes control) of public space, seems to take advantage of Big Data to impose a "techno-police", an "algorithmic governance", based on prediction and individuals flow control. Although often projecting disjointed representations, the technical and technological city may echo connectivity ideals. The safe city with its excessive consumption of personal and intrusive data - leading to surveillance and control -, merges with the smart city, which can tip over into one of the main dystopian counterparts of the drifts of this city model.

The health situation has shaken up previous urban dynamics (both in terms of urban development and behavior) and led to a reconsideration of places in the digital age. Several urban transformations have emerged. Even if the COVID-19 pandemic did not necessarily lead to massive changes in cities demographic, an outflow from urban agglomerations to less densified areas is to be noted especially in Paris and Ile de France Region. The Parisian population urban exodus marked the first coronavirus wave, could be interpreted as a response to human health threats and could also only happen with large technological options, allowing people to connect through modern information and communication technology (without necessarily meeting in person). Behaviors and work have also undergone radical changes that are still being experienced today. The expansion of telecommuting, in response to physical distance obligations, has strongly modified the commuting that used to punctuate urban dynamics. In a world where life "as

we used to know it" is slowly coming back to its “normality”, the generalization of certain practices seem to be anchored in everyday life. It should also be noted in France that the evolution of the application for monitoring people infected by the virus from "Stop covid" to more inclusive and empowering expression "*Tous anti-covid*" is reminiscent of some of the numerous nudges trying to unconsciously change behaviors. To illustrate the possible panoptic and security drifts of ideals projected in smart cities, accentuated in times of a health crisis, the installation of sensors and cameras and the implementation of facial recognition devices experimented all around the world, particularly related to mobility (access to public transport, purchase of train tickets, to name few) can be shown as an examples.

The approach aiming to highlight new urban dynamics challenges in a Covid-19 pandemic context through analyzing mobility restriction and their impacts on work and behavior also question the possibility of and new ways of life in French cities.

Key words:

Data, digitalization, disparities, mobility, networks, Smart City, urban dynamics

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