Long Live the Smart, Sustainable and Creative City

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Introduction

The Zurich Centre for Creative Economies analyses the emergence and evolution, whether positive or critical, of the concept of the "smart city." This essay is accompanied by nine* case studies.

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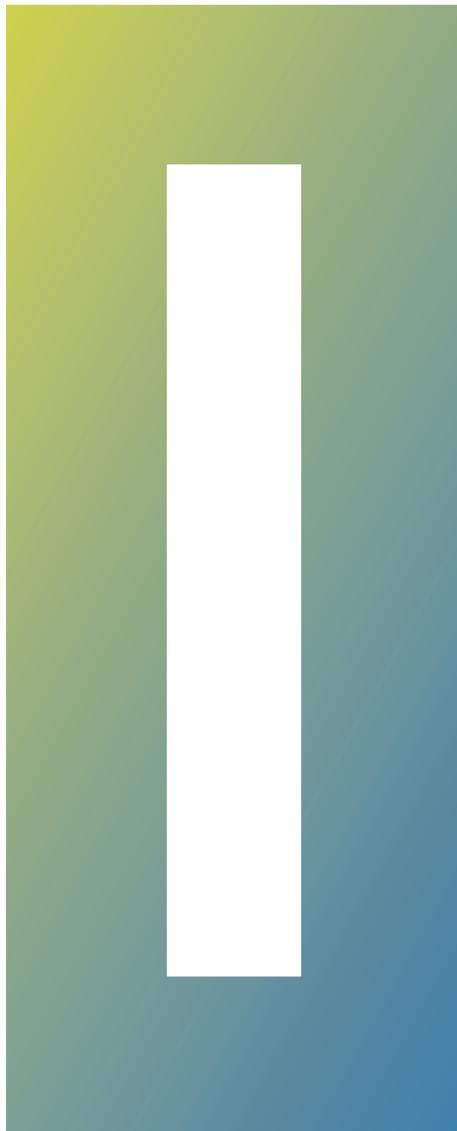
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General introduction

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Some consider the "smart city" – at times a concept, at others a buzzword – the model of future urban life, which is participatory, digital and ecological. Others, however, regard the smart city as a "corporate" idea that is made to serve an unbridled, "top-down" and managerial capitalist economy. For the former, the smart city solves all urban problems; for the latter, on the contrary, it signals the steady privatisation of public space and urban governance.

These two approaches to the smart city – on the one hand, "optimisation," whether economic, security-related or environmental, and on the other, citizen "participation" (in connection with "civic tech" or "gov tech") – appear intrinsically contradictory. But beyond this contradiction, and beyond the instrumentation effected by those promoting the digital city – multinationals or governments – this tension has existed ever since the term struck root.

The term "smart city," as is well known, first appeared in the mid-2000s – in the IBM environment[1], in a speech by President Bill Clinton[2] and in *Wired* magazine. In practice, though, it emerged earlier, as illustrated by the "Amsterdam Digital City" project launched in 1994 (Halegoua, 2020). At first, it also intersected with the debate on "sprawls" or "exurbias," that is, rampant urban growth, which required new forms of management (Garreau, 1992). Even if its origin remains unclear, and the concept even more so, the notion of the "smart city" may be said to have been popularised, at least initially, by IT firms and the corporate world, notably IBM and Cisco (Courmont, 2019). Either way, the concept should be conceived in the plural: "smart cities." All cities are now "smart," yet also different, as are the concepts that attempt to define them. Some now prefer to talk about "smart cities" and "digital cities," while expressions such as "connected city," "collaborative city" or "resilient city" are also frequent.

Whichever definition we take, the European Union's or that of the US Department of Transportation, or IBM's or Google's, we always think of the "smart city" in terms of the aggregated "city" or "information and communication technologies" (ICTs) (Halegoua, 2020). Broadly speaking, the smart city marks the advent of technologies in urban life. These create a "connected" city, which collects data to promote mobility, safety or the environment. This is the "networked city."

Two factors explain the success of the term "smart city." First, the technological context of our times, which saw Apple launch the iPhone in 2007, Airbnb develop from 2008, and Uber from 2009: in all three cases, the link between technology and the city became clearer. In 2008 came another turning point: the world's urban population exceeded the rural population for the first time ever. UN projections have since pointed in the same direction: around 70% of the world's population will be urban by 2050.[3] At the same time, the planet will have 43 mega-cities, each with a population of 10 million inhabitants. The "Global City" described by Saskia Sassen in 1991 is gradually becoming a reality and, above all, it is becoming prevalent (Sassen, 1991).

While "smart cities" vary greatly, and there is little consensus on what they really are, they all mobilise technologies, in various ways and to the different extents: cameras and sensors to collect data (sensors); software to process them; and Wi-Fi and clouds to transport and store them. From the outset, then, the initial domains of "smart cities" were transport, waste collection, water and energy consumption (particularly public lighting), medical or fire emergencies, and security (police, anit-terrorism). The aim throughout was to "optimise" these services in order to make them more economical or environmentally friendly, and where appropriate, to facilitate mobility.

The translation of urban life into data is therefore central, just as their automated processing lies at the heart of the smart city, since the aim is to provide "analysis," "prediction," "management" or "action." Thus, "big

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[1]   In 2008, IBM designed a global and industrial project aimed at optimising data systems called "Smarter Cities." In 2009, the company launched its "Smart Cities" project. But the term "smart city" seems to have been used at IBM for some years.

[2]   Bill Clinton mentioned the "smart city" in 2005 in conversations with the CEO of Cisco. However, the notion of the "Smart Growth of the USA" was conceived already in the late 1990s.

[3]   Source: United Nations; see https://news.un.org/fr/story/2018/05/1014202

data" and, more recently, "artificial intelligence," "machine learning" and "deep learning" are also central to the "smart city" (Mayer-Schönberger, 2013; Pieraccini, 2021).

Ultimately, whatever the approach, whether technical, communicational or managerial, the aim is to make the city more "intelligent," either through greater optimisation or, on the contrary, by making city governance more complex. And yet, it isn't always being clear whether this serves to improve the lives of inhabitants, to facilitate control, to enhance public services or to enable public saving.

1. A "corporate" concept, revived by governments

From the outset, multinational technology companies pursued the idea of the "smart city" to provide mayors and local officials with turnkey urban development models. Example include IBM's famous Centro das Operações do Rio (Singer, 2012; Martel, 2014; Case study 1: Gufflet), as well as projects by Cisco, General Electric, Oracle, Siemens, Vinci, Accenture and of course Microsoft and Google. This entrepreneurial trend has been termed an "urban intelligence industrial complex," especially as some of these companies belonged to an industrial lobby known as the "Smart Cities Council" (Halegoua, 2020).

To begin with, the model of the "corporate smart city" predominated, with its jargon, assumptions and commercial solutions. More recently, however, the notion of the "smart city" has been reappropriated, at least to some extent, by public policies or citizen networks and even by architects.[4] Their shared objective is to enable urban residents to regain control over their city, and thus to recreate "citizen engagement," "quality of life," diversity and "empowerment" (Halegoua, 2020). Thus, the governance of the smart city is central, as is the relationship between public and private. Who are the "shareholders"? Who

controls the "control room"? These questions are crucial. We also need to distinguish two principal models: the "smart city" in the proper sense, which is by nature a new city – and involves building a new and "smart" agglomeration (known as "smart-from-the-start" cities); and, on the other hand, the "smarter city," which is far more common, and involves making an existing city "smarter" (referred to as a "retrofitted city," even if the term is not very satisfactory).

While the first model is the most promising at the theoretical and experimental level, the second is of course most widespread. New cities have been built "from scratch" from an entirely or partially "smart" perspective. I have visited some of these cities, including Skolkovo in Russia or Konza City in Kenya (and more recently The Gramercy District near Dulles airport in Washington, D.C.). But this model is rare.

On the other hand, "smarter cities" are innumerable: one might even think that all cities in the world have become "smarter" – based on a model developed especially in cities or neighbourhoods that I have also visited, such as Toronto, Recife, Songdo (in Incheon, South Korea), Dubai's Media and Internet Cities, Kansas City, Singapore's One-North district, Barcelona or New York (Martel, 2014; Courmont, 2019; Courmont, 2021; Halegoua, 2020). In this article, for clarity's sake, I use the term "smart city" to mean both "smarter cities" and entirely "smart" cities.

In these new cities and "smarter" neighbourhoods, we need to distinguish different levels of "intelligence" (the criteria being the "extent" and "depth" of change) and different sub-models (the criterion being the "nature" of change). Global data enable classification, that is, compiling an index that takes into account, among others, the percentage of households with access to fibre and high-speed internet or the number of people working in the "creative class."

This explains why quantitative evaluations, which abound, vary considerably: the many existing classifications and indexes depend on the respective evaluation criteria or the number of selected cities.

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[4]   The ETH Zurich has created a "Future Cities" programme at its Department of Architecture. It has also joined the "Future Cities Lab" network (which involves over more than 1'000 researchers from the participating universities: National University Singapore, Nanyang Technological University Singapore, EPFL Lausanne, and ETH Zurich)

The IBM model

IBM's model centred on interconnection, on the idea that a city's "actors" are connected and connectable. IBM wanted to organise this connection and to provide the technologies to operate it.

The IBM "Smarter Cities" project has been closely examined by several geographers (Söderström, 2014). They concluded, quite critically, that its model of the "smart city" enabled the company to redefine the city according to corporate criteria, and thereby to construct "smartness" indices corresponding to its solutions. Further, so these studies, IBM was neither pursuing the public good nor seeking to make the city more liveable or more ecological. The primary objective, instead, was to align cities with IBM technologies.

This analysis, sometimes caricatured as critical, has since been debunked, even if the technological "solutionism" promoted by IBM, and the companies inspired by this approach, deserve to be discussed or questioned (Morozov, 2013; Case study 9: Oderbolz).

The Google model

More recently, the Google model has espoused the idea of IBM connectivity, albeit in a more collaborative spirit. Given the complexity of the architectures used and of the diverse solutions connected to various territories, not to mention cumbersome development and governance problems, most companies involved in developed the "smart city" work through collaborations. Google and IBM, for example, are so interconnected that one specialist told me: "The IBM model is now a Google solution with an IBM label; the Google model is an IBM solution with a Google label." Similarly, Microsoft and Accenture work together, the former being based in software development, the latter in consultancy, solution interaction and customer service.

We can therefore distinguish several major fields of action: consultancy and strategy; technology (software remains the most complex and the most expensive field); interaction and service; and operations. Most of the involved multinationals position themselves primarily in one of these sectors.

Google, a major "smart city" actor since the mid-2010s, launched an even bolder project: the "Sidewalk Labs," launched in 2015. Tested and implemented in Toronto and Columbus (Ohio), this was a full-scale urban experiment, an urban innovation laboratory if ever there was one. The "Sidewalk Labs" were based on a comprehensive vision to change the city based on a new "urban design" and "cutting-edge technologies," as Google put

it. This extensive plan for "ubiquitous connectivity" was supported by a management project (Coord), a transportation plan (Replica), a traffic management system linked to Google Map (Flow), a community health system (Cityblock) and, finally, technological infrastructures (SIP).

All these dimensions, not to mention the revitalisation of an underused waterfront, made the project a genuine "Google City." It was tested with Sidewalk and Flow in Columbus, Ohio and Toronto, before being gradually phased out. The abandoning of the "Sidewalk Labs" in 2020, Google's urban flagship project, remains very significant: local opposition prevented the project from continuing, largely because it ignored citizen expectations and failed to safeguard their data (Priol, 2020; Case study 1: Gufflet).

The Cisco model

Besides IBM and Google, Cisco also actively engages in developing "smart cities." I have followed its projects in India, Songdo, Kansas City, Chicago and Barcelona. According to company information, 120 "smart cities" are now piloted by Cisco and its "smart city lab."

Like IBM, Cisco is also in the "connection" business. Its intelligent solutions, including an original matrix designed specifically for cities, enable connecting sensors, ensuring their processing and, on this basis, initiating concrete action. Cisco first developed systems for auditing water and electricity use, or urban traffic, which eventually and inevitably lead to in-house solutions. Cisco even provides an international ranking of the smartest cities, which is, of course, based on the same criteria (Halegoua, 2020). Offering diagnosis, a solution and evaluation at the same time seems problematic, to say the least.

Other models

Unlike IBM or Cisco, Accenture does not sell "products" and, unlike Google, does not offer "solutions." It instead builds operational infrastructures "as a service." Its business model involves clients paying for the service provided (Accenture is paid "by the pizza" sold at Pizza Hut and "by the tyre" at Michelin). To respond to customer demand, and to ensure full user or client satisfaction, Accenture employs several hundred thousand staff, especially in India. Thus, the "smart city" involves not only selling turnkey consultancy or solutions but also concrete operations. [5]

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[5]   See https://www.accenture.com/us-en/services/public-service/cities-and-infrastructure and
https://www.accenture.com/us-en/insights/strategy/smart-cities

Following the rise of IT multinationals (IBM, Google, Cisco, Accenture), traditional city actors have tried to regain the advantage in a field they were slow to enter. Accordingly, the "smart city" has gradually reverted to its original model: less "smart" and more "city." Various companies, including Schneider Electrics, Vinci, Engie, Veolia and Suez, have taken up this concept and developed their own solutions.

Finally, besides digital multinationals and urban actors, whose investment in smart cities now reaches significant levels, there are also countless local actors. These start-ups contribute to reflecting on, experimenting with or implementing new urban and smart projects. I have visited over a hundred such actors, from Rio de Janeiro (Center for Digital Inclusion, Viva Favela) to Nairobi (mapkibera.org), from Tallinn in Estonia (Smart City Center of Excellence/FinEst Twins, Start Up Estonia) [6] to Zurich (Nomoko). [7] This study includes nine case studies that demonstrate the diversity of such actors and their propositions.

2. Diverse situations and cities

The model of the "smart city" promoted by multinationals has enjoyed lasting success because it suggested from the start that it would save cities money, and later that it would even generate revenue (e.g. by selling the data collected or that their "modernity" would attract business and tourists). Initially, the "analog" dimension was marginalised, since "digital" was the ubiquitous mantra. The civic dimension was also marginalised in this model. Gradually, however, the central role of data and companies in the story of smart cities has prompted recurrent criticism, both in economic and governance terms, but also with regard to the use and ownership of the collected data (Greenfield, 2013). The failure of Toronto's "Sidewalk Labs" put paid to this model. We don't live in a digital city but in a real city, with cars and roads!

Beyond the "corporate" options discussed above, we need to consider the models chosen by cities, whether "smart" or "smarter." I focus on five cities (all of which I have visited): Konza City (Kenya), Skolkovo (Russia), Rawabi (Palestine), Tallinn (Estonia) and Porto Digital in Recife (Brazil).

a) New cities

Skolkovo, [8] Konza City [9] and Rawabi are "top-down" projects, that is, decided at the highest level of government (by the then Russian Prime Minister Dimitri Medvedev in the case of Skolkovo; by the Kenyan government in that of Konza City; by the Palestinian authority in Ramallah in that of Rawabi, with significant funding from the Gulf states). The cities were created from scratch in non-urban areas: Konza City and Rawabi in the desert; Skolkovo in a rural area with low temperatures. Each of their components was designed to be "smart": transport ("intelligent rail," "smart roads," etc.), carpooling, electricity, water management ("water treatment"), waste collection, parking optimisation ("smart parking"), [10] air quality, broadband access and public safety (video surveillance, anti-terrorism, anti-social behaviour, "mass notifications").

Although these projects and the viability of these smart cities have yet to be studied in-depth, it is evident that they have not been very successful. Skolkovo was recently rebranded, not as a "city" but as an innovation centre, and is struggling to attract start-ups and researchers. Konza City, 65 km from the capital Nairobi, is still under development, ten years after its launch; the city has been renamed "Konza Technopolis"; it has

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[6]   On Tallinn, see Nathan Heller, "The Digital Republic," The New Yorker, 18 December 2017. See also case study 3 below.

[7]   This Swiss data visualisation start-up develops new 3D tools. https://nomoko.world/

[8]   Many articles have been written on Skolkovo; including Andrew Kramer, "Innovation, by Order of the Kremlin," The New York Times, 10 April 2010; Sophia Kishkovsky, "Russia's Answer to Harvard Business School: A Break with Tradition," New York Times, 3 October 2010 ; "Can Russia create a new Silicon Valley," The Economist, 14 July 2012.

[9]   See David Smith and Toby Shapshak, "Digital Africa Lights Up with Money, Maps and Markets," The Guardian, 31 October 2012 and "The Next Frontier," The Economist, 16 February 2013. See also "Improving the Lives of Slum Dwellers Through Unnovative uses of ICT," ITU News, October 2012; Povertymatters Blog, "E-Readers Kindle Enthusiasm for Learning Among Children in Kenya," The Guardian, 2012. On "MPesa" service, see Alex Perry, "Silicon Savanna: Mobile Phones Transform Africa," Time, 30 June 2011.

[10]   Car parks are said to be "smart" when, as in some cases, their rates vary according to demand, thus increasing the revenues of cities and intermediaries (Cisco has been at the forefront of this development; see Zuboff, 2019, chapter 7).

scaled back its ambitions to being merely a technological centre and is considerably behind schedule. Rawabi, once hailed as a unique digital city, has become a luxury resort for the Gulf elite and has lost much of its "smart" nature (Martel, 2014).[11]

b) Hybrid models

Another model, that of the hybrid city, seems more significant: Porto Digital. This is not a city as such, but a district of Recife (Brazil). When this major nineteenth-century commercial port fell into disuse, the city and region of Recife decided to revitalise the site by transforming it into a digital hub (hence the new name Porto Digital). Being rooted in a proper city (and covered a territory with a history well known to local inhabitants), and pursued through dynamic public-private partnerships, this project seems to have survived the test of time well. Even if Recife has not become the commercial capital it once was, Porto Digital is clearly a regional "smart city" and has attracted most of the large tech multinationals (Microsoft, Google, etc.). The district boasts cultural dynamism, ethnic communities and a considerable number of cafés and restaurants. This hybrid smart city seems to be alive and thriving.

The same conclusion may be drawn from investigating Tallinn, the small capital of small Estonia. Less geographically concentrated than in Recife, Tallinn's "smart city" encompasses the entire city. The number of start-ups per capita is one of the highest in Europe, with this spectacular economic development being encouraged by the government. The creation of a national cloud, a digital ID card and the possibility of conducting all administrative business electronically have enabled developing a digital-friendly environment (Case study 3: Marcel-Millet). This model is mixed, like that of the Israeli "start-up nation": urban and national, supported by the government, and featuring a strong military-industrial and "soft power" dimension (Martel, 2014).[12] We have studied these two models in depth. Our case studies consider various other ambitious projects: the "22@ District" in Barcelona; the "economic district" of Buenos Aires; "Chilicon Valey" and "Start-Up Chile" in Santiago de Chile (Case study 2: Herrera); the revitalisation of "Comuna 13" in Medellin in Colombia (Case study 1: Gufflet); "Smart Nation" in Singapore (Case study 1: Gufflet) or Finland (Case study 1: Gufflet).

Some projects in the Arab world also deserve attention. For example, the new city of Neom in Saudi Arabia: intended to cover 26,000 km2 (i.e. 250 times the surface area of Paris) and commissioned by Crown Prince Mohammed ben Salmane, this "top-down" project is being piloted in close partnership with the Japanese company SoftBank at an estimated cost of $500 billion. Neom is interesting because, for Saudia Arabia, it involves contemplating a post-oil economy and converting to the technologies of the future, by being digital, creative and "sustainable" at the same time. Or at least this is the project initiators' narrative, whose reality and effects will only become measurable in the coming years (Case study 4: Ponzini).

Dubai's digital city, the King Abdullah Economic City near Jeddah, or the Masdar City projects (whose master plan was designed by architect Norman Foster) in the United Arab Emirates, share the same ambition, albeit on a smaller scale (Molotch and Ponzini , 2019; Case study 4: Ponzini). These cities will run on solar energy, cars will be "autonomous," water and waste will be recycled. Instead of a mayor, some of these cities will have a CEO, and a board of directors instead of a city council! These "space ships in the desert," as they have been ironically called, indicate a shift from the "smart city" to the "eco-city."

c) The model of digitally based urban regeneration

Although somewhat beyond the scope of this study, let me briefly mention the countless digital projects in slums, ghettos, townships and other favelas. Diverse and imaginative, and sometimes very large-scale, these "smart neighbourhoods" resemble genuine "smart cities," as I have seen in Bangalore, Kibera, Soweto, Rio de Janeiro, in Chicago's "South Side" or Los Angeles' Watts district (Martel, 2014). Map Kibera in Nairobi, for example, is a valuable geolocation tool that works with phones that are not yet "smart": it can be used to identify water points, sanitised public toilets, schools and churches, and Internet cafés. MPeisa is an electronic wallet and the first step towards banking for people who have neither a bank account nor a smart phone (transactions

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[11]   See also Martel, "Rawabi, la colonie palestinienne qui embarrasse Israël," Slate, 6 January 2016.

[12]   See also Marie de Vergès, "Tsahal, l'école de la Start-up," Le Monde, 11 February 2014 ; Dan Senor and Saul Singer, "Start-Up Nation, The Story of Israel's Economic Miracle," Twelve, 2009; Danna Harman, "The Technion: Israel's Hard Drive," New York Times, 12 April 2013; Shlomo Maital, "Needed: Goliaths instead of Davids," The Jerusalem Report, 12 March 2015.

are effected via text messages, which I tested when paying for local taxis). Countless other initiatives for "smart" tools and neighbourhoods exist in American black ghettos or Brazilian favelas. While representing different and quirky models of "smart cities," they provide a good understanding of the dynamics at work in terms of interactions with local populations.

3. Platforms and surveillance

a) Empowerment and data reappropriation: Towards a "smart citizen"?

After a certain enthusiasm in the 2010s, smart cities are frequently criticised, for good and bad reasons. The main opposition springs from concerns over data processing: surveillance ethics and citizens' rights are subject to increasing debate (Priol, 2020; Knee, 2021).

Among others, criticism has focused on three key actors in the smart city of the 2020s: Airbnb,[13] Uber and Waze (the latter was bought by Google in 2013). At stake is the "datafication" of the city.[14]

Researchers, yet also elected officials, are now insisting on the importance of better aligning necessary urban digitalisation with citizens' private lives (see, for instance, the transparency and accountability project of Rahm Emanuel, the former mayor of Chicago).

This debate continues an older one: that about technologies, including those developed by IBM, Cisco or Google, which excluded the populations concerned from the debate or posed the problem of "digital literacy" (Greenfield, 2013; Halegoua, 2020).

These legitimate concerns have led to certain adjustments. These include involving citizens in decisions or encouraging participation, sometimes with a proper budget, as the proliferation of "participatory

budgets" illustrates. It is about "co-creating" the city and enabling everyone's "engagement" and "empowerment." Considering the "smart city," or complementing this idea, has brought forth that of the "smart citizen": the debate about "data" has gradually shifted to one about "humans" (Hemment, 2013; Goldsmith, 2014; Zandbergen, 2017).

The concept of the "social city" has been devised in parallel to these debates, not merely to criticise the "smart city" but to deepen the concept by recognising the importance of data and by rethinking the "smart city" in terms of it serving its citizens (Sassen, 2018; Halegoua, 2020).

The question of the "commons" and the city as a "commons" have at last begun contributing to the debate on the future of "smart cities."[15]

The idea is to place "user-inhabitants" at the centre of projects and to give them a meaningful voice. Self-governance, direct and participatory management, and the citizen city lie at the heart of these approaches, which are neither "top-down" nor "bottom-up." The "commons" also make it possible to overcome the opposition, so central to the debate on digital cities, between the state and the market and to promote the idea of a "common city" (Corsu, 2021).

b) China's widespread surveillance

The recent development of effective mass facial recognition technologies, particularly in China, has opened up a new line of criticism. While multinationals were initially alone in being criticised for commodifying data, governments have meanwhile also come under scrutiny. Considering the full-blown model of the "corporate" smart city, that of a 100% "government" smart city has emerged from China (Case study 6: Su) and is subject to radical criticism (Martel, 2014).

China, the focus of most of the current opposition, serves as an international deterrent because it is a model of "digital neo-totalitarianism," as desired by its recent leaders Hu Jintao[16] and especially Xi Jinping.

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[13]   On Airbnb, see Thomas Aguilera, Francesca Artioli and Claire Colomb, "Les villes contre Airbnb? Locations meublées de courte durée, plateformes numériques et gouvernance urbaine," Courmont, 2019.

[14]   On the city being confronted with platforms or "platform urbanism," see the fascinating "Platform Austria" project, curated by Peter Mörtenböck and Helge Mooshammer at the 2021 Venice Architecture Biennale (whose subject was "How will we live together?").

[15]   Some specialists have also shown that a large proportion of the data collected is useless or unusable for the common good. This creates what consultant Damiano Cerrone, who co-founded the SPIN Unit in Helsinki, has called the "smart city paradox"; see https://www.damianocerrone.info.

[16]   As regards official discourses: Hu Jintao's political report to the 18th National Congress established "soft power" and "socialist cultural power" as key goals for Chinese communist party. For an official perspective, as developed in government circles, see Guo JIANYU, ed., China's Cultural Power Strategy (2012). See also Zhang XUECHENG, "Accelerating Our Pace in Building a Cultural Strong Nation," People's Daily, 26 November 2012.

Still little analysed, this system of widespread surveillance is frightening: the machinery for rating individuals according to their digital data, the use of augmented cameras and facial recognition amount to a system of control whose sophistication and scale are absolutely unprecedented.[17]

Under the pretext of making the Chinese environment safer and with no state regulation protecting individual rights (as in Europe and North America), China is implementing state surveillance to an extent that even George Orwell could never have imagined in his worst nightmares.[18]

The "safe city" is becoming the "control city." The "control room," so typical of the first "smart city" projects, such as in Rio de Janeiro, is becoming the city itself in present-day China (Charon, 2021; Cabestan, 2021; Donnet, 2021; Case study 1: Gufflet).[19]

c) Egypt's new capital

Egypt's "new capital" is another "smart" and "safe" city project under construction, both ambitious and more clearly delimited. It involves creating a new city that should become the new capital of Egypt. This pharaonic project was commissioned by Marshal Abdel Fattah al-Sissi, the country's president, who is expected to move there, along with Egypt's official bodies and embassies, in a few years.

I have visited this city, which is still being built in the middle of the desert, east of Cairo, halfway between today's capital and the Suez Canal: the project is unprecedented, in terms of size, ambition and security. Brand new – and empty – twelve-lane motorways stretch for a hundred kilometres, already silted up; car parks filled with hundreds of concrete mixers; high-voltage power lines in the middle of the dunes; houses built quickly for workers, reminiscent of Shenzhen (with hundreds of mobile homes); an airport (Capital Airport) is under construction; a mosque and a cathedral have already sprung up. To say that the area is militarised would be an understatement. There are checkpoints and police controls everywhere: armed policemen are posted at regular intervals, monitoring traffic day and night.[20] Central to this mega-project are its digital dimension and "control room," to which considerable resources have been dedicated.

In the past, various cities have been created from scratch by politicians, not without a certain megalomania: Washington, DC; Brasilia; Dubai. In Egypt, though, the "ego" city has reached unprecedented levels.

4. The future of "smart cities"

Given these worrying developments and security-driven visions, another version of the "smart city," both modern and more optimistic, is also conceivable. Our research upholds this positive vision, which focuses more on environmental issues, creation and innovation, chiefly through AI. The territorial dimension, that is, the localised and even "geolocalised" city (Martel, 2014), must also be considered, including its regional or even local network dimensions (Case study 7: Schiller; Case study 8: Lavaud).

a) Artificial intelligence

Since the late 2010s, AI applications have made considerable progress. Researchers are now convinced that we are entering a new industrial revolution, one as important as those of the steam engine, electricity or the computer and the Internet. What is happening: after being static and limited by its programming, the

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[17]   For a good overview of the internet in China, see Guobin Yang's The Power of the Internet in China: Citizen Activism Online (Colombia University Press, 2009); see also Pierre Haski, Internet et la Chine (Seuil, 2008) (both studies need updating). For data on the internet in China, I rely mainly on the official figures published by the International Telecommunications Union in Geneva (ITU). Others figures come from discussions with executives at Baidu, Sohu, Tencent, Alibaba, Youku, etc.

[18]   On censorship, see "A Giant Cage," Special report on China and the Internet, The Economist, 6 April 2013; Xiao Qiang's blog, China Digital Times, provides inside information about working with censors in China (Xiao Qiang is a dissident exile at Berkeley, US; he publishes regular transcripts of propaganda directives under the heading "Ministry of Truth").

[19]   See Jean-Pierre Cabestan, Demain la Chine: guerre ou paix? (Gallimard, 2021); Pierre-Antoine Donnet, Chine, le grand prédateur (éd. de l'Aube, 2021); see especially the long, 646-page report by Paul Charon and Jean-Baptiste Jeangène Vilmer, Les opérations d'influence chinoises: un moment machiavélien (IRSEM, 2021).

[20]   On "New capital," see Peter Hessler, "The Shadow General," The New Yorker, 2 January 2017; Hélène Sallon, "Les rêves géants du president Sissi," Le Monde, 15 October 2015; Hélène Sallon, "Égypte: "Sissi City," un mirage en construction," Le Monde, 30 June 2019.

"machine" is learning – heralding a revolution whose consequences are entirely unimaginable. The spectacular developments in AI in recent years are already influencing the evolution of the "smart city" and therefore enable imagining a more decentralised version. This would no longer require a large "master control room," since all solutions can already learn to work autonomously. At the same time, and perhaps even more so with AI than with the software developed in the 2010s, we need to remember that, to quote the anthropologist Shannon Mattern, who also specialises in smart cities, "a city is not a computer" (Mattern, 2017).

Considering the "Chinese model," where facial recognition and AI can lead to unlimited citizen control, another approach is needed. While here is not the place to describe the great transformation ahead, let me nevertheless suggest that artificial intelligence should mark a new stage in the "smart city." It might even become truly "intelligent," as soon as the machine acquires sight, hearing and touch (Alpaydin, 2016; Lee, 2018; Le Cun, 2019; Lee, 2021). Alongside these ongoing developments, privacy and ethical issues will become increasingly important (Coeckelbergh, 2020).

Like digital technology previously, AI is neither good nor bad per se. It all depends on how such solutions are programmed and used. If supported by civic logic, AI can have the best possible outcomes; if used in the context of comprehensive Chinese or Egyptian surveillance, it can lead to the worst.

b) A "smart and sustainable city"

Let's consider yet another dimension. Since the 2010s, the smart city has become "green." It is now frequently referred to as an "eco-city" or "sustainable city" (Saiu, 2017; Halegoua, 2020). The proliferation of sensors assessing air quality, water purity or noise volumes enables making the city "smarter" while serving the ecological cause at the same time. In Paris, for example, mayor Anne Hidalgo's urban programmes systematically include an ecological dimension (Missika, 2019). At the same time, certifications in this field are multiplying. They include "LEED," which is used to evaluate the environmental performance of housing and buildings. [21]

The issue of sustainable development is now so central to the debate on the city that it is no longer possible to talk about the smart city without immediately

adding the epithet "sustainable." Gradually, the term "smart city" is even being replaced by that of the "smart and sustainable city" (Halegoua, 2020).

These ongoing developments also affect the city's cultural dimension and how artists fit in (KEA, 2019; Martel, 2020). Thus, the "sustainable" and "creative" dimensions of the smart city are now merging, perhaps even heralding new future combinations.

Very inspiringly, Félix Guattari early on defined "three ecological registers: the environment, social relations and human subjectivity." He thus called for a triple and "authentic political, social and cultural revolution," insisting, as regards the latter, on the need to "forge new paradigms [...] of ethical and aesthetic inspiration." Further, these three paradigm shifts must be conceived and carried out "from the same perspective" (Guattari, 1989).

Either in the same vein, or by pursuing another line of investigation, various authors have defended or simply suggested the need to articulate matters between art and the environment. This may done in at least three ways: the first, post-Guattarian one is philosophical and involves creating new paradigms and new artistic theories such that art can develop in harmony with the environments it inhabits, including non-human ones (Latour, 2015; Latour, 2017). The second is aesthetic and concerns the now very substantial field of art and artists who take the environment as their direct or indirect object. They range from Land Art to environmental art collectives (e.g. "Parti poétique," "Coal" or "Thanks for nothing"), which have emerged or developed in parallel to COP 21 (2015 United Nations Climate Conference). The third, more political approach, situated at the intersection of art and engagement, concerns the ecological considerations of artists and cultural institutions, which include rejecting the use of temporary decorations, printed exhibition catalogues or disposable picture rails. This environmental concern is already reflected in the stated desire to favour ecological artistic structures, to renew reflection on the conservation of works (Lerner, 2016) or to appoint "ecological referents" in artistic institutions (e.g. at London's Tate Modern, which defines itself as a "more environmentally friendly museum").

These debates are also reaching the digital arts (Martel, 2020). The question about the environmental costs of digital technology is becoming increasingly important due to the energy-intensive nature of networks and clouds, as well as storage centres, not to mention the use of rare metals or programmed obsolescence, even if this has prompted contradictory studies (Flipo,

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[21]   LEED was created by the US Green Building Council in 1998.

2013). These examples and developments suggest that ecology is becoming central to culture: a new articulation between digital, cultural and ecological transitions is thus emerging (Portney, 2015; Vidalenc; 2019). Ultimately, this debates take place in the city, the site of artistic activity.

c) A "smart, sustainable and creative city" (2S2C)

Our research at the ZCCE (Zurich Centre for Creative Economies) seeks to add a new dimension to these ongoing trends: that of culture and creativity. It is not simply about emphasising the role of artists in the city – a role which still deserves to be measured and analysed – but also of considering that artists can enable the smart city to recover its citizen dimension and public good, which corporations and governments may have been tempted to neglect (Case study 9: Oderbolz).

The artistic and cultural dimension of cities is now better researched than previously.[22] The creative economy is one of the fastest growing sectors internationally: global exports of cultural goods and services soared from $200 billion in 2002 to almost $600 billion in 2014. This production is also predominantly urban, as much economic literature attests: large cities attract artists while the creative class in turn feeds a vibrant creative economy. London, for example, accounts for about 40% of the UK's creative economy jobs, while Seoul accounts for 54% of South Korea's total creative economy. Cities have even been hailed as "the epicentre of the creative economy" (Florida, 2002; Cooke, 2008; Martel, 2010; Jones, 2015; World Bank, 2021).

These facts and figures enable hypothesising that culture – and in particular the CCIs (cultural and creative industries) – drives the creative economy: it represents important sources of employment and income, contributes to economic development and tourism, fosters innovation, enables better social cohesion and urban revitalisation and, finally, contributes to a better quality of life (World Bank, 2021).

This dimension has often been underestimated in studies on "smart cities," as if the creative dimension of

cities needs to be separated from their digital or ecological dimensions. On the contrary, at the ZCCE we believe that culture and CCIs lie at the heart of the future debates on the city. By emphasising this dimension, cities can draw on the potential of culture to make cities even better.

According to studies by the World Bank and UNESCO, in some large cities (e.g. Tokyo, London, Seoul, Los Angeles, Milan, Rome, Zurich, Austin, Madrid, Paris, Buenos Aires, Guangzhou or Barcelona) culture accounts for a considerable percentage of employment – between 9% and 13% (World Bank, 2021).

As a 2021 World Bank study shows, the complex and positive relationship between "cultural dynamism" and "economic dynamism" can be explained in particular by culture's specific "assets" (presence of artists, creative capital, etc.), by its "catalytic" effects (increasing skills, singularisation of a city, its identity and "uniqueness," innovation, increasing social ties, diversity, inclusion, etc.) and, lastly, by its outcomes (social, spatial and economic benefits). Sometimes, as with the "Berlin" model, artists' collectives impact the dynamism of certain neighbourhoods.[23]

Moreover, artistic and creative occupations are mobile.[24] Artists are more mobile than the rest of the population: they move from city to city or state to state in the United States, where this phenomenon has been well studied (Markusen, 2006; Markusen, 2018), and sometimes even beyond, from one country to another (Florida, 2005). This also seems to hold true in Europe (KEA, 2019). Second, artists work very flexibly. While this phenomenon is not new (Menger, 1983; Menger, 2003), it has become more pronounced with the the "gig economy" pervading the artistic sector. Recent research in several countries shows that artists are now frequently self-employed, in start-ups or as freelancers. One explanation is the need to manage multiple employment contracts, so as to ensure a certain social security, or because of fiscal considerations (Scherdin, 2011; Woronkowicz, 2019).

The proliferation of self-employment among artists is well documented and appears disproportionate to other professional categories: 33% of American artists are self-employed, four times more than in the rest of

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[22]   Richard Florida was an early theorist and advocate of "creative cities:" his The Rise of the Creative Class (2002) was a great success, particularly with American mayors. Although some of his analyses were criticised, Florida demonstrated the decisive role of artists in the economic development of cities. Taking the major notion of "social capital" from Robert Putnam, Florida upheld that of "creative capital" (Putnam, 2001; Florida, 2002; Florida, 2005; Jones, 2015).

[23]   What I call "The Berlin Model" is related to "co-ops," "artist collectives" and "cooperatives." (For a definition of the model, see Martel, 2018 and 2020).

[24]   I have discussed this elsewhere (Martel, 2020) and merely reiterate the main points here.

the population; 65% of writers, 57% of visual artists, 41% of musicians, 37% of actors, 36% of performing artists, 32% of designers and 28% of architects are self-employed (Markusen, 2020). Thus, artists – and "slash artists," as I have called them elsewhere because they work in diverse parallel sectors (e.g. photography / design / visual arts) (Martel, 2018) – symbolise this "gig economy" or "art entrepreneurship" (Woronkowicz, 2018; Woronkowicz, 2020). According to some studies, these particularities go hand in hand with increased impoverishment (Abbing, 2002), the need for rapid success (before the fateful age of 30, sometimes ironically termed "the artist's death by 30"), yet sometimes also by flourishing (Johnson, 2015).

However, we still lack studies on "outsourcing" in the artistic sector: do artists tend to move of their own accord and even go into exile to work as Richard Florida has argued (Florida, 2005); or can artistic professions be easily outsourced, as in game development and even in cinema (Martel, 2014)? Conversely, it is likely that some artistic professions are hardly "outsourced," as in theatre and the performing arts, for language or aesthetic reasons.[25]

At the ZCCE, we therefore find it important to emphasise the cultural and creative dimension when thinking about the future of smart cities, because artists are central to their development, identity and "territory." Thus we speak of "smart and creative cities" when these cities promote culture and the creative economy, which in turn contribute to socio-economic development. This view enables divorcing the "smart city" from its initial and strictly "corporate" vision, and thus also provides new perspectives (Case study 9: Oderbolz).

For what is often missing from the "corporate" model of the future city is life. The "smart city" is artificial: it lacks exchanges, neighbourhood associations, cooperatives, community organisations, grassroots movements and all of those anarchistic and non-profit forms that bring a neighbourhood or a city to life (Case study 2: Herrera). It lacks hippies, punks and hipsters!

This "urban happiness," "extra soul" and even "aura" can be provided, at least in part, by artists. Undre certain conditions, art and creativity may even drive collective collaborations, synergies and exchanges. These forces can empower citizens by activating them, thus making cities truly creative and innovative (Case study 1: Gufflet). Opposite the models of the "smart city" promoted by either the market (i.e. "corporate smart city") or by government ("gov.tech" and "big government") stand artists: they criticise the former and are wary of the latter; they defend "public goods" by their sheer presence, which explains their importance for the "smart city."

Art, artists and cultural industries also contribute another vital dimension: diversity. Richard Florida has also highlighted the importance of this "diversity," which he calls "tolerance," in his concept of the "3Ts," which he considers essential for creativity to flourish: technology, talent and tolerance (Florida, 2002). Bohemian neighbourhoods, multiculturalism or the number of gays matter according to Florida.[26] This approach, however, can be modified by pointing to two forms of diversity, one more positive, the other more negative. The first form – "creative diversity" – has long enabled cities such as Hong Kong, Miami, Los Angeles, New York, London, Paris and even Marseille or Cairo to develop; the second is artificial and compartmentalised, as in Beijing, Dubai or Havana. This explains why the former are (or have been) creative capitals while the latter are not (Martel, 2010).

Finally, we should not underestimate the interaction between culture, research and universities in this virtuous model (Etzkowitz, 2008). The major role of universities in the dynamics of innovation has been analysed, for example, in Silicon Valley or around Route 128 (Saxenian, 1994; Smith, 1990) and more widely in the American cultural model (Martel, 2006; Martel, 2010; Martel, 2014). The smart city can also become a field of research and creation for artists (Case study 9: Oderbolz).

Some studies have shown that the "creative" dimension has most often been sacrificed in "smart from the start cities," whereas it is more prevalent in "smarter" cities (Case study 8: Lavaud). In some exceptions, the creative dimension has also been ignored in digital city projects, such as in Lebanon (Case study 5: Saad).

Whatever the formula, the creative dimension of the smart city ought to be better accounted for in the future. This will enable culture not only to create jobs and make the city "liveable," but above all to give it an identity and uniqueness.

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[25]   Note the paradox: while the "creative class" can hardly be outsourced, it is very volatile and always on the move (Jones, 2002; Florida, 2002 ; Martel, 2014).

[26]   Florida supports this idea with several indexes: "The Mosaic Index" (or "Melting Pot Index"), "The Gay Index" and "The Bohemian Index."

Conclusion: A Smart, Sustainable and Creative City (2S2C)

Today, it is widely agreed that citizens need to be restored to the "smart city," that is, assigned their rightful place. Second, we need to emphasise the necessarily "territorialised" nature of the city, that is, its territory is specific and singular.

Contrary to what some inventors of the "corporate" model of the digital city may have thought, territory is essential. Citizens are attached to the territory in which they live: they live somewhere! This is the major distinction made by Bruno Latour in his book Où atterrir? (2017) – between "more" and "less" globalisation; and between those wishing to eradicate local differences and identities, those exploiting the world instead of understanding it and those "on the ground," seeking to continue living "somewhere" (Latour, 2017; Case study 8: Lavaud).

The failure of Toronto's "Sidewalk Labs" is part of this framework: Google conjured up a single, rational model, a typical matrix for its digital city, which it claimed could be replicated everywhere – not without making it a communication tool in the process (Case study 8: Lavaud). Reality is different: those who, like usat the ZCCE, have investigated Mumbai and São Paulo, Boston and Nairobi, and over a hundred cities across the world, are struck first of all by the diversity of cities and their lack of rationality. Chaos often dominates. Several years after the implementation of IBM's "control room" in Rio de Janeiro, its traffic still doesn't flow more freely... (Case study 1: Gufflet).

The "smart city" should therefore focus on cultivating "a sense of place" because, despite being digital, sustainable and creative, it is rooted in a territory (Martel, 2014). Geography and forms of proximity are essential.

Carlos Moreno was the first to identify this need for proximity and "community" in the digital city (Moreno, 2020; Whittle, 2020). Inspired by the Danish idea of the "five-minute city," conceived for Copenhagen's "Nordhavn" district (Cities 100, 2017), Moreno devised the concept of the "quarter-hour city": the six essential functions of urban life – living, working, shopping, healthcare, education, and leisure – should be accessible to everyone within a fifteen-minute distance. Based on the idea that "density is the virtue of the city; distance its vice," Moreno sought to promote a structural rapprochement of work and residential locations in order to create a "city of short distances." With this neo-Le Corbusian concept, he imagined a new "liveable city," a "city of proximity,"

or a "polycentric city" (i.e. multipolar city), in which the digital would play a key role. The "quarter-hour city" has exerted a certain influence in recent years, especially among so-called "C40 Cities" or the "Cities 100" group. Above all, Covid-19 and the resulting extensive teleworking (Glaeser, 2021), combined with the rise of "green mobility," have accelerated the attention given to this idea between 2019 and 2022. Moreno is campaigning for a "calmed city" and defends the new "micro-mobilities."

This concept of the "quarter-hour city" has been variously criticised: for being urban and "bobo," (bourgeois-bohemian), that is, not well suited to peripheral urban areas or rural areas; for encouraging an incantatory "de-mobility" only affordable for the wealthy classes; for contributing to "gentrifying" cities and above all to a radical "separatism," a ghettoisation, by creating separate districts. More recently, and in response to some of this criticism, Moreno has refined his idea by adapting it to peripheral and, in part, to non-urban areas, around the idea of the "half-hour territory" (Moreno, 2020).

Switzerland also offers a good counterexample. In a country without any "global cities" (Zurich has only 420,000 inhabitants and Geneva barely 200,000), the idea of a "smart city" is inevitably considered differently than in Shanghai, São Paulo or Mexico City. Multi-urban or non-urban models of the "smart city" are also worth imagining or analysing (Case study 7: Schiller). In these, digital technology will be decentralised and networked instead of centralised around a "control room."

What makes a city "unique"? The fact that it is "smart"? The fact that it is "safe"? The fact that it has a "control room"? No, none of this! What really matters is quality of life, innovation, creativity and, perhaps most importantly, a sense of place. Artists can help us achieve this.

This seems to be the direction in which the future smart city should develop. Let me call it the Smart, Sustainable and Creative City (2S2C). In the end, we return, as always, to Marshall McLuhan's famous and prescient formula of the "global village." More than the uniform and cloned digital city, this global village must be our compass. "Global," to be sure, yet also a "village": that is to say, unique, with its identity and its culture, so that we can imagine the Smart, Sustainable and Creative City of tomorrow.

This article is based on field surveys conducted over several years in over a hundred cities, including New York, Los Angeles, Washington, Kansas City, Boston (United States), Barcelona (Spain), Dubai Digital City (United Arab Emirates), Konza City (Kenya), New Capital (Egypt), Rawabi (Palestine), Recife (Brazil), Skolkovo (Russia), Toronto (Canada), Singapore, etc.

Bibliography

Hans Abbing, Why Are Artists Poor? The Exceptionnal Economy of the Arts, Amsterdam University Press, 2002.

Ricardo Afonso, Smart Cities: A Comprehensive Systematic Literature Review (mimeo), 2012.

Vito Albino, Umberto Berardi and Rosa Maria Dangelico, "Smart cities: Definitions, Dimensions, Performance, and Initiatives," Journal of Urban Technology 22, 1, 2015.

Ethem Alpaydin, Machine Learning, The MIT Press, 2016.

Michela Barbot, "Ville et polycentricité," in Martine Corsu, Fabienne Orsi and Judith Rochfeld, Dictionnaire des biens communs, PUF, 2nd ed., 2021.

Jean-Pierre Cabestan, Demain la Chine: guerre ou paix? Gallimard, 2021.

Dominique Cardon, Culture numérique, Les Presses de Sciences Po, 2019.

Paul Charon, Jean-Baptiste Jeangène Vilmer, Les opérations d'influence chinoises: un moment machiavélien, IRSEM, 2021.

Cities 100, 100 solutions for climate action in cities, Report, 2017 and 2020 (Project on the "Five-minute City" in Copenhagen's "Nordhavn" district).

Mark Coeckelbergh, AI Ethics, MIT Press, 2020.

Peter Cooke and Luciana Lazzeretti, Creative Cities, Cultural Clusters and Local Economic Development, Elgar, 2008.

Martine Corsu, Fabienne Orsi and Judith Rochfeld, Dictionnaire des biens communs, PUF, 2nd ed., 2021 (see the articles on "Communs," "Tiers lieux," "Ubérisation" and "Ville et polycentricité").

Antoine Courmont, Quand la donnée arrive en ville: Open Data et gouvernance urbaine, Presses Universitaires de Grenoble, 2021.

Antoine Courmont, Patrick Le Galès, Gouverner la ville numérique, PUF, 2019.

Boris Cyrulnik, dir., Smart City, Une autre lecture de la ville, éd. Ovadia, 2019.

Jean Daniélou, Smart City, Origine et concepts, PUCA (mimeographed), 2014.

Chantal Deckmyn, Lire la ville, Manuel pour une hospitalité de l'espace public, La Découverte, 2020.

Pierre-Antoine Donnet, Chine, le grand prédateur, Éditions de l'Aube, 2021.

Henry Etzkowitz, The Triple Helix, Routlege, 2008.

Fabrice Flipo, Michelle Dobré and Marion Michot, La Face cachée du numérique: l'impact environnemental des nouvelles technologies, L'Échappée, 2013.

*Richard Florida, The Rise of the Creative Class: And How It's Transforming Work, Leisure, Community and Everyday Life, Basic Books, 2002,
— The Flight of the Creative Class: The New Global Competition for Talent, HarperBusiness, 2005.*

Richard Florida, Charlotta Mellander and Patrick Adler, "Creativity in the city," in Candace Jones, Mark Lorenzen and Jonathan Sapsed, eds., The Oxford Handbook of Creative Industries, Oxford University Press, 2015.

Nicole Foster, Carl Grodach and James Murdoch III, "Neighborhood Diversity, Economic Health and the Role of the Arts," Journal of Urban Affairs, 38, 5 (2016).

Joel Garreau, Edge City, Life on the New Frontier, Anchor Books, 1992.

Edward Glaeser, David Cutler, Survival of the city, Living and Thriving in an Age of Isolation, Penguin, 2021.

Stephen Goldsmith, Susan Crawford, The Responsive City: Engaging Communities through Data-Smart Governance, John Wiley and Sons, 2014.

Adam Greenfield, Nurri Kim, Against the Smart City, Do projects/1.3 edition, 2013.

Félix Guattari, Les Trois Écologies, Galilée, 1989.

Germaine Halegoua, Smart Cities, The MIT Press, 2020.

Nathan Heller, "The Digital Republic," The New Yorker, 18 December 2017 (on the Estonian model).

Drew Hemment, Anthony Townsend, dir., Smart Citizens, FutureEverything Publications, 2013.

John Howkins, The Creative Economy: How People Make Money from Ideas, Penguin, 2002 (reed. 2013).

Jane Jacobs, The Death and Life of Great American Cities, Vintage, 1961.

Steven Johnson, Everything Bad is Good for You, Penguin Books, 2005.
— "The Creative Apocalypse that wasn't," New York Times, 19 August 2015 (based on data from the US Department of Labor and the Occupational Employment Statistics and Economic Census; the data have been confirmed by studies of the National Endowment for the Arts).

Candace Jones, Mark Lorenzen and Jonathan Sapsed, eds., The Oxford Handbook of Creative Industries, Oxford University Press, 2015. (See "Creativity in the city," by Richard Florida, Charlotta Mellander and Patrick Adler, op. cit.).

Andrew Karvonen, Federico Cugurullo and Federico Caprotti, eds., Inside Smart Cities: Place, Politics and Urban Innovation, Routlege, 2019.

KEA & PPMI, Research for CULT Committee, Culture and creative sectors in the European Union, European Parliament, Policy Department for Structural and Cohesion Policies, 2019.

Jonathan Knee, The Platform Delusion, Who Wins and Who Loses in the Age of Tech Titans, Portfolio, 2021.

Rem Koolhaas, ed., Coutryside, A report, Guggenheim/ Taschen, 2020.

Bruno Latour, Face à Gaïa, La Découverte, 2015.
— Où atterrir ?, La Découverte, 2017.

Henri Lefebvre, Le droit à la ville, Anthropos, 1968.

Yan Le Cun, Quand la machine apprend, La révolution des neurones artificiels et de l'apprentissage profond, Odile Jacob, 2019.

Kai-Fu Lee, AI, Superpowers. China, Silicon Valley and the New World Order, Houghton Mifflin Harcourt, 2018.
— AI 2041, Ten Visions for our Future, Currency, 2021 (with Chen Qiufan).

Ben Lerner, "The Custodians, How the Whitney is transforming the art of museum conservation," The New Yorker, 11 January 2016.

Shlomo Maital, "Needed: Goliaths instead of Davids," The Jerusalem Report, 12 March 2015.

Ann Markusen, "Artists Embedded: Sector, Employment Status, Occupation, Industry, Employer Type, Place," 2020, in Hartmut Wickert and Frédéric Martel, eds., Embedded Artists, Artists Outside the Art World: The World in Quest of Artists, op. cit.
— "Creative Placemaking: A Reflection on a 21st Century American Arts Policy Initiative," in Courage Cara and Anita McKeown, eds., Creative Placemaking and Beyond, Routledge, 2018.

Ann Markusen and Anne Gadwa Nicodemus, "Creative Placemaking," Mayors' Institute on City Design, National Endowment for the Arts, October 2010 (see here).

Ann Markusen, Sam Gilmore, Amanda Johnson, Titus Levi and Andrea Martinez, "Crossover: How Artists Build Careers across Commercial, Nonprofit and Community Work. Minneapolis," Project on Regional and Industrial Economics, University of Minnesota, 2006

Frédéric Martel, De la culture en Amérique, Gallimard, 2006.
— Mainstream, Enquête sur la guerre globale de la culture et des médias, Flammarion, 2010.
— Smart, Enquête sur les internets, Stock, 2014 (see chapters 5, "Smart city," and 6 "Revitalisation urbaine").
— "Positive Economy, Towards New Business Models for Artists,", pp. 5–25, in Christoph Weckerle, ed. 3rd Creative Economies Report, 2018, art. cit.
— "State of the arts. Cultural policies: Mapping a field in reinvention," Creative Economies (site), ZHdK, 2020.

Viktor Mayer-Schönberger and Kenneth Cukier, Big Data, A Revolution That Will Transform How We Live, Work and Think, ed. John Murray, 2013.

Shannon Mattern, "A City Is Not a Computer," Places Journal, 7 February 2017.

Pierre-Michel Menger, Paradoxe du musicien, Flammarion, 1983
— Portrait de l'artiste en travailleur: Métamorphoses du capitalisme, La République des Idées/Le Seuil, 2003
— Le Travail créateur. S'accomplir dans l'incertain, Gallimard/Seuil, 2014.

Jean-Louis Missika, "Le Nouvel Urbanisme parisien," Terra Nova, 18 September 2019.

Harvey Molotch and Davide Ponzini, The New Arab Urban, Gulf Cities of Wealth, Ambition and Distress, New York University Press, 2019.

Carlos Moreno, Droit de cité, De la "ville-monde" à la "ville du quart d'heure," L'Observatoire, 2020.

Evgeny Morozov, To Save Everything, Click Here: The Folly of Technological Solutionism, Public Affairs, 2013.

Antoine Picon, Smart Cities: théorie et critique d'un idéal auto-réalisateur, éd. B2, 2018.

Roberto Pieraccini, AI Assistants, The MIT Press, 2021.

Kent E. Portney, Sustainability, The MIT Press, 2015.

Jacques Priol, Ne laissez pas Google gérer nos villes!, L'aube, 2020 (focuses on "Google City" and its "Sidewalk Labs" de Toronto).

Robert Putnam, Bowling Alone: The Collapse and Revival of American Community, Touchstone, 2001 (the arguments of this book were published in 1995 in "Bowling Alone: America's Declining Social Capital").

Valeria Saiu, "The Three Pitfalls of Sustainable City: A Conceptual Framework for Evaluating the Theory-Practice Gap," Sustainability 9, 12, 2017.

Amitabh Satyam and Igor Calzada, The Smart City Transformations, The Revolution of the 21st Century, Bloomsbury, 2017.

Saskia Sassen, The Global City, Princeton University Press, 1991 (rev. ed. 2001).
– Cities in a World Economy, Sage, 5th ed., 2018.

AnnaLee Saxenian, Regional Advantage: Culture and competition in Silicon Valley and Route 128, Harvard University Press, 1994.

Michael Scherdin and Ivo Zander, eds., Art entrepreneurship, Edward Elgar Publishing, 2011.

Natasha Singer, "I.B.M. Takes Smarter Cities Concept to Rio de Janeiro," New York Times, 3 March 2012 (on the arrival of IBM in Rio de Janeiro).

B. L. R, Smith, American Science policy since World War II, Brookings Institution Press, 1990.

Ola Söderström, Till Paasche and Francisco Klauser, "Smart Cities as Corporate Storytelling," City 18, 3 (2014).

Anthony Townsend, Smart Cities, Big Data, Civic Hackers, and the Quest for a New Utopia, Norton, 2013.

Eric Vidalenc, Pour une écologie numérique, Les petits matins, 2019.

Natalie Whittle, "Welcome to the 15-minute city," Financial Times, 17 July 2020.

World Bank/Unesco, Cites Culture Creativity, Leveraging culture and creativity for sustainable urban development and inclusive growth, 2021 (online).

Joanna Woronkowicz and Douglas Noonan, "Why Goes Freelance? The Determinants of Self-Employment for Artists," Entrepreneurship Theory and Practice, Vol 43 (4), 2019.

Joanna Woronkowicz, "The Embedded Artist Worker: Shifting Perspectives on Artists in the Labor Force," 2020, in Hartmut Wickert and Frédéric Martel, eds., Embedded Artists, Artists Outside the Art World: The World in Quest of Artists, op. cit.

Joanna Woronkowicz, Carroll Joynes, Peter Frumkin, Anastasia Kolendo, Bruce Seaman, Robert Gertner and Norman Bradburn, Set in Stone: Building America's New Generation of Arts, Cultural Policy Center at University of Chicago, 2012.

Dorien Zandbergen, "We are Sensemakers: The Anti-Politics of Smart City Co-Creation," Public Culture 29, 3, September 2017.

Shoshana Zuboff, The Age of Surveillance Capitalism, Public Affairs, 2019.

Online resources

MIT: https://senseable.mit.edu/ (the site of the MIT specialised laboratory, which also includes an indispensable database: https://senseabledb.mit.edu/)

Sidewalk Labs (Google): https://www.sidewalklabs.com/

La Fabrique de la cité: https://www.lafabriquedelacite. com/projets/smart-cities/

See the "Cities are back in town" programme, Sciences-Po Paris: https://www.sciencespo.fr/ecole-urbaine/fr/pro-gramme-cities-are-back-town.html

"Smart City": One Concept, A Thousand Cities

Dimitri Kremp & Benoît Gufflet

Dimitri Kremp & Benoît Gufflet, Across The Blocks

**"Across The Blocks" is a learning expedition created by two French students to conduct field studies on different "smart cities" around the world. During the year 2020, Dimitri and Benoît explored seven cities labeled as "smart" and spread across three different continents. In each city, they analyzed the municipality's digital strategy, evaluated specific data platforms, and compared the degree of citizen integration to the city's digital transformation. In total, they met over 100 experts from private companies, public sector and academia, and analyzed more than 50 city-driven digital initiatives.
To learn more about the project: www.acrosstheblocks.com**

March 2021

Contents

"Smart City": One Concept, A Thousand Cities

Dimitri Kremp & Benoît Gufflet

The first and core part of our report comprises a case by case analysis of the seven "Smart Cities" which we studied. What makes each of these cities "smart"? What are the key city-driven projects and initiatives put forward as part of municipalities' "smart" strategies? Which public policies and sectors are specifically targeted by these strategies? What similarities and differences can be identified between city strategies? We address these questions to show that all cities adopt the concept of the "smart city" differently, based on their own specific context and challenges.
The second part of our report underlines how cities' efforts to become "smarter" go beyond simply using data and digital technologies. Drawing on field examples, we show that focusing on creativity and renewing collaboration between actors can also helps cities learn to become more attractive, innovative and "smart."

Definition

"Smart city" can be defined as the use of data and digital technologies to make cities more efficient and to improve citizens' quality of life. This concept, which was popularized at the end of the 2000s by major tech companies such as Cisco and IBM, is now commonly used internationally. It serves to rank "smart cities" and to evaluate their digital programs. Such cities have also been adopting the concept in their development strategies and communication campaigns. They use it as a marketing asset to increase their economic attractiveness. However, although they might share a common label, world-class cities that present themselves as "smart" are still vastly different, in terms of technological advancement, economic attractiveness, population, current and past challenges, etc. Having stayed in (and thoroughly studied) seven of these "smart cities" – Rio de Janeiro, Medellin, Toronto, Singapore, Stockholm, Tallinn and Helsinki – we analyze how these cities have used and interpreted the concept of the "smart city."

PART 1 – CASE STUDIES

1st Stop: Rio de Janeiro (Jan 2020)

<u>Context and Challenges</u>
Rio de Janeiro is a unique and constantly evolving city. In the early 2010s, before the 2016 Olympic Games, it underwent significant urban transformations, many of which involved technology. These changes had two objectives: to transform the city in order to host international events such as the Olympics; and to improve the city's response to emergency situations such as floods and landslides, which recently caused heavy casualties. After launching a series of innovative projects (e.g. in collaboration with IBM), Rio de Janeiro was awarded the prestigious *Best Smart City Award*[1] at the 2013 *World Smart City Expo* in Barcelona.

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[1] "Smart City Expo World Congress chooses Rio de Janeiro as the best smart city of 2013." Fira de Barcelona. (2013, November 21). https://www.firabarcelona.com/en/press-release/uncate-gorized/smart-city-expo-world-congress-chooses-rio-de-janeiro-as-the-best-smart-city-of-2013/

Rio's "smart" strategy: a resilient city
In recent years, Rio has tried to leverage technology to become more resilient. Confronted with heavy flooding, major traffic jams, and security issues, the municipality wanted to better predict, anticipate and adapt to emergency situations. In 2016, in partnership with the C40 Cities network, Rio elaborated a strategic plan to implement large-scale resilience projects (water treatment, urban lighting, flood risks, etc.).

One flagship project: Rio's Centro de Operações
At the heart of this resilience strategy lies the Centro de Operações (COR), a sophisticated monitoring platform that allows the city's critical data to be visualized. Collecting more than 200 layers of data in real-time, this giant "control room" was created with the help of IBM to optimize urban services (traffic management, emergency responses to accidents, etc.). But such a centralized model of urban monitoring is not easy to manage. The COR has shown deficiencies in the use of its data, as only 15% of the data it collects is used to improve urban services. Described as a "crucial issue" by its director, Alexandre Calderman, coordinating the COR's 30 agencies also causes problems, as some remain reluctant to change their working habits.

One of the COR's main objectives was also to enable citizens to adapt and optimize their behaviors in case of an emergency. To cope with the risk of flooding, the most exposed favelas were equipped with speakers, connected in real time to the COR and to residents' phones. The objective of this alarm system was twofold: to warn people in case of heavy rains, and to urge them to move to safe areas. However, due to a lack of trust in public authorities, the vast majority of favela residents did not react to the warnings, and the casualties caused by the landslides ultimately remained unchanged.

Although it has proven useful to transmit information to city dwellers via its social networks, particularly in the event of a crisis, the COR's centralized model remains very expensive for the city. And fails to radically transform the way it works.

Success Factors and Room for Improvement
Rio's objective to become resilient using technology has not been achieved so far. Even if sophisticated digital tools were deployed, neither citizens nor public agents could adopt them efficiently. According to Cristina Mendonça, who designed Rio's resilience strategy, before investing in technology, it is important to "raise awareness"[2] among inhabitants. Through long-term education, city dwellers can become more acquainted with their city's challenges, and more mindful of the solutions that exist to face them. Above all, a "smart city" must be built on trust.

2nd Stop: Medellin (Feb 2020)
Context and Challenges
From the most violent city in the world to the world capital of innovation. In less than 25 years, Medellin was able to transform its international image. Presented as the most innovative city in the world in 2013 by the *Wall Street Journal*,[3] Medellin was also chosen as the smartest city of the world in 2019 by *Newsweek*.[4] These rankings echo the swift metamorphosis that Colombia's economic capital has undergone, leaving behind the armed conflicts that marked the city's history between the 1970s and the end of the 2000s. Due to its strategic location at a crossing point for drug trafficking, Medellin used to be a battleground for paramilitary and narco-traffickers. Today, even though strong inequalities remain, integrated urban programs have proven that a smart collaboration between urban actors can transform cities for the better.

Medellin's "smart" strategy: an innovative city
Since the 2000s, Medellin has been developing urbanist Alejandro Echeverri's innovative concept of social urbanism. Its aim is "to give the prettiest to the poorest" through integrated urban plans. Their deployment follows three axes:

— Transport and mobility: With an electric tram, two aerial metro lines, and six Metrocables connecting the city center to the mountainous outskirts and poor areas, Medellin offers an integrated transport system which reshapes the experience of public transport to strengthen social mix.

[2]   See further: https://www.acrosstheblocks.com/newsletterstratgie-smart/rio

[3]   "Wall Street Journal and Citi Announce Medellín Wins 'City of the Year' Global Competition." Citi (2013, March 1). https://www.citigroup.com/citi/news/2013/130301a.htm

[4]   Freedman, D. H. "How Medellín, Colombia, Became the World's Smartest City." Newsweek (2019, November 18). https://www.newsweek.com/2019/11/22/medellin-colombia-worlds-smartest-city-1471521.html

— Social policy and education: Through its PUIs (Integrated Urban Plans), Medellin has been building schools and libraries in specific urban areas, with the aim of promoting social and cultural renewal. The best example is Parque Explora, an exhibition and research center built in 2008 in the north of the city. It used to be one of the poorest parts of Medellin, and has now become a key tourist destination.

— Innovation and digital transformation: With over 150 public Wi-Fi areas, 48 centers dedicated to internet education, and the innovation center Ruta N (which hosts the World Economic Forum's research program on Artificial Intelligence since 2019), Medellin has been developing an effective strategy to increase the role of digital actors within its economy, and to become the pure player of innovation in South America.

One flagship project: The revitalization of Comuna 13
One of the symbols of Medellin's transition is the transformation of Comuna 13. This neighborhood, which was one of the city's most dangerous areas less than 20 years ago (with more than four people being killed every week in 2001) has now become one of its most visited landmarks. Although it still faces major challenges in terms of inequality and violence, the revitalization of Comuna 13 has changed the lives of its residents by attracting tourists. Two assets have played a role in this transition:

— The Comuna's urban escalators. Built in 2012, these 1300 meters long escalators are used to transport around 1500 people per day to the top of the Comuna and its seven hills. Not only did this innovative mobility solution offer comfort to the residents living along this new transport line, but it also became a tourist attraction on its own, creating new economic opportunities for the area.

— The Comuna's local street art. As graffiti became a way for local artists to express themselves on sensitive political topics, they also represent one of the greatest attractions of the area. Today, numerous guided tours explore the neighborhood through an artistic lens.

However, the transformation of the Comuna is still fragile. Violence, drug trafficking, and poverty remain key issues, and the revitalization process, which relies mainly on importing economic activity from tourism, does not tackle the heart of the problem. It simply contributes to moving illegal activities to other parts of the neighborhood. [5] To go beyond these cosmetic solutions, ambitious social policies must be launched to lastingly improve residents' lives.

Success Factors and Room for Improvement
Medellin's successes can be explained by the strong culture of collaboration between private and public actors, academics, and residents that has emerged since the beginning of the 2000s as a way to implement social diversity in the city. However, these achievements must be seen as the very first steps of a broader transition, as the city is still shaken by inequalities. The key question is whether Medellin will be able to take full advantage of this positive trend, so as to continue reinventing itself and become an innovative city.

3rd Stop: Toronto (March 2020)
Context and Challenges
Toronto is a booming city. Canada's economic capital has been experiencing massive immigration since 2010, with 70,000 people moving there every year. This influx was linked (at least before the Covid-19 crisis) with a strong economic activity. Toronto faces the challenge of absorbing such rapid growth, which requires a quick adaptation of housing supplies, energy systems and mobility networks. In 2017, attention was drawn to the small wasteland of Quayside, when Sidewalk Labs, a Google sister company, was chosen to use this space to build a new neighborhood from scratch. Using technology and innovative solutions, Sidewalk Labs' ambition was to rethink the way cities are designed and operated. However, with the opposition of a large part of the population and suspicion over the use of personal data, the project was abandoned in May 2020.

Toronto's "smart" strategy: a post-Google city
The Sidewalk Labs episode embodied the confrontation of traditional urban planning with the tech-oriented approach of new private players. This emerged as an

[5]   See further: https://www.acrosstheblocks.com/ newsletteranalyse-quartier/medellin

opportunity for the City of Toronto to better regulate digital initiatives and elaborate a new strategy. In 2018, the city set up a program called "Connected Communities," aiming to create a model to evaluate digital projects initiated by private companies or public entities. Thus, Toronto is striving to become "smart" not by systematically attracting tech companies and by supporting digital projects, but rather by overseeing and regulating the deployment of technology in the urban space.

One flagship project: The Digital Infrastructure Plan
The "Connected Communities" program aims to develop a Digital Infrastructure Plan jointly with local inhabitants. Still under construction, this plan will put Toronto at the forefront of municipalities learning to better regulate digital initiatives. Encompassing a "set of regulations and policies to guide decision making on proposals such as those developed by Sidewalk Labs," [6] it aims to shape both data collection and the use of digital tools within the city in the coming years.

Success Factors and Room for Improvement
"Connected Communities" and similar programs give a voice to city dwellers and set out a common and shared vision for digital projects at the city level. With this initiative, Toronto intends to remedy its past mistakes: after being criticized for failing to oversee the Sidewalk Labs proposal, the city authorities are endeavoring to involve residents in developing a solid regulatory framework for digital initiatives. Here, the remaining challenges for Toronto will be to keep people involved and interested in urban projects, and to make the complexities of real estate development and technological processes accessible to everyone.

4th Stop: Singapore (April 2020)
Context and Challenges
Singapore tops most of the renowned "Smart City" rankings (e.g. 2020 IMD Smart City Index). [7] Its successful digital transformation can be explained by looking specifically at the city's historic and geographic contexts. Independent since 1965, Singapore is a city-state located

at a crossing point between the Indian Ocean and the China Sea. As it became a global economic hub, the government had to develop effective and ambitious planning strategies to make the most of a constrained area of 64 islands. The emergence of digital innovations came as an opportunity for Singapore to become a regional leader and differentiate itself from other global cities.

Singapore "smart" strategy: a smart nation
Singapore is not trying to become a "smart city," but a "smart nation." Rather than simply optimizing generic urban processes like transportation, waste management, and energy systems, the city-state is pursuing a larger ambition. It intends to deploy tech in every aspect of the residents' lives, to create a "digital economy," a "digital government," and a "digital society." Since initiating its "smart nation" strategy in 2014, Singapore has launched various "smart" projects (e.g. a digital identity program, e-payment in public transports, or e-health services such as the Moments of Life app). Behind all of these initiatives lies the GovTech agency, in charge of the operational implementation of the "Smart Nation" strategy.

One flagship project: Safe Distance @ Parks
During the Covid-19 crisis, the GovTech agency proved its capacity to quickly deploy digital solutions. In just a few weeks, the public authority was able to coordinate the development of a series of digital tools helping to follow and prevent the spread of the virus. Many of these solutions, like a WhatsApp channel to monitor the number of Covid cases daily, did not require sophisticated technologies. One of the smartest solutions was a simple online digital portal: Safe Distance @ Parks. A digital map showcasing the frequentation rate of every city. Easy to use, it aims at making people adapt their behavior by nudging them to avoid overcrowded parks. Such a fast development of new solutions in times of crisis demonstrates how its "smart nation" strategy has put Singapore at the forefront of both digital nations and connected cities.

Success Factors and Room for improvement
Singapore's singularity as a city-state offers a unique economic, cultural, and political environment enabling a fast-forward transition into the digital era. These advantages, which have helped the Asian Tiger become a safe haven for digital companies, also make it a model hard to replicate. Global cities around the world do not have the same powers and prerogatives as the city-state,

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[6]   For an extensive presentation of the Digital Infrastructure Plan of Toronto, go to: https://s.cotsurvey.chkmkt.com/lib/48827/files/1552.pdf

[7]   "Singapore, Helsinki and Zurich triumph in global smart city index." IMD (2020). https://www.imd.org/smart-city-observatory/smart-city-index/

while other countries are often much larger and harder to transform than this small, confined territory. The political model and culture of Singapore also explain the efficiency of the government in implementing new digital solutions – which could sometimes face resistance from the population in other parts of the world. To be truly accomplished as a "smart nation," Singapore must demonstrate how its solutions and governance mechanisms can be adapted to other political and cultural contexts.

5th Stop: Stockholm (Oct 2020)
<u>Context and Challenges</u>
Stockholm has long enjoyed a reputation for sustainability. In the late 1990s, the city began constructing Hammarby Sjöstad, a green district that has since attracted over 140,000 visitors. And in 2019, Stockholm was elected *World's Best Smart City* in Barcelona thanks to its GrowSmarter program. This European initiative was launched in 2015 in Stockholm, Barcelona, and Cologne, and aimed at testing 12 technological solutions in urban spaces to assess their potential to reduce carbon emissions. In Stockholm, the selected Årsta district became a living testbed for energy and digital innovations. With this experiment, Stockholm showed that becoming "smarter" could remain aligned with the pursuit of sustainability objectives.

<u>Stockholm's "smart" strategy: a sustainable city</u>
After this first testbed, in 2017 the city adopted a EUR 19 million strategy – "Smart & Connected" Stockholm – to implement new digital projects. Based on suggestions from diverse stakeholders (residents, city officials, academics, businesses and online consultations), the city outlined several principles that digital policies should follow, especially concerning data protection and the adaptability of solutions to technological developments. The program, which ended in 2020, marks one of Stockholm's key steps towards an ambitious "Vision 2040" strategy for climate neutrality.

<u>Flagship projects: Smart Traffic Lights, Intelligent Lightings & the Stockholm Royal Seaport</u>
The "Smart & Connected" strategy encompasses four projects led by the IT department of the municipality: the conception of an IoT platform, the creation of a data-sharing system, the installation of smart traffic lights, and the deployment of intelligent street-lighting systems. In reality, these projects take time to cope with heavy

regulations, and the technologies they rely on sometimes require constant maintenance operations. As a result, in October, three months before the end of the program, only a few smart traffic lights and a hundred intelligent street lamps had been installed.

Stockholm's quest for durability is also physically embodied by one of its flagship neighborhoods, the Stockholm Royal Seaport. Located north-east of the city center, it has become the new green showcase of the Swedish capital. Initiated in 2000, and scheduled to host 60,000 inhabitants in 2030, this ambitious sustainable district mobilizes 55 developers and intends to reduce its carbon footprint by 60% compared to the city's average. To achieve this, Stockholm initially relied on Smart Grids,[8] digital devices made to optimize local energy exchanges and shave consumption peaks. But besides an experimental research project conducted in 2017 by an association of several private companies (ABB, Fortum, Ericsson, etc.), Smart Grid technologies were not deployed on a larger scale. To become "smart," Stockholm chooses not to advance too fast, but step by step with technology.

<u>Success Factors and Room for Improvement</u>
Stockholm's strategy is not perfect: only a few of its digital projects are successful, and the city is still struggling to leverage technology to meet the climate objectives it has set itself. But it does manage to use both its tech ecosystem and innovation culture to test new ideas. More than the use of immature solutions, the key for Stockholm to achieve its sustainability goals rather lies in establishing practical and efficient collaboration mechanisms between different actors. For Christina Salmhofer, the Sustainability Strategist of the Royal Seaport, the main challenge of the project is to improve coordination between developers and to limit the loss of knowledge that occurs along the construction process, yielding less efficient buildings.[9] Rather than being digital, Stockholm's sustainable city remains above all collaborative.

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[8] "Smart Grid in The Stockholm Royal Seaport will integrate the entire electricity supply system – from refrigerator to harbour." Swedish Energy Agency (2015, March 17). <u>https://www.energimyndigheten.se/en/news/2010/smart-grid-in-the-stockholm-royal-seaport-will- integrate-the-entire-electricity-supply-system--from-refrigerator-to-harbour/</u>

[9] See further: <u>https://www.acrosstheblocks.com/newsletteranalyse-quartier/stockholm</u>

6th Stop: Tallinn (November 2020)

Context and Challenges

Proud to be mentioned as the "Most Advanced Digital Society in the World" by Wired,[10] Estonia is a model both in terms of appropriating digital technologies and digitalizing public services. This "digital society" hinges on the widespread use of three types of digital solutions:

— The e-Identity system, which allows Estonians to use all digitized government services with a single number and electronic signature.

— The X-Road decentralized data exchange platform, which enables smooth and secure information exchange between different administrations.

— Numerous e-Services: The Estonian government has developed many digital services widely used by the population, like online tax declaration, or online voting.

Three types of factors can explain the magnitude of this digital transformation:

— Historical and geographical factors: Created in 1991 with the fall of the USSR, Estonia is a small and young state. It has been able to integrate the requirements of a digital society while growing.

— A sociological and educational factor: Estonia quickly understood the value of digital education, making the country a world reference for digital studies.

— An economic factor: Estonia has successfully marketed its technological achievement and digital culture by creating the brand e-Estonia.

Tallinn's "smart" strategy: the capital city of e-Estonia

Tallinn does not have a "Smart City" strategy. No specific document outlines the city's vision and objectives in terms of digital policies. The city rather focuses on specific projects included in the city's 2035 Development Strategy. Although each initiative can be launched by a specific department, they are all gathered on the TallInnovation Platform, highlighting the city's capacity to transform. As the capital of Estonia – a country that has already positioned itself very strongly on the digital front – Tallinn does not need its own "smart city" strategy. The municipality's digital initiatives are thus largely integrated into the digitalization projects of e-Estonia. For example, the X-road data management platform finds many use cases in Tallinn, as city departments integrate the system to exchange data securely with residents. Tallinn's projects take advantage of the country's strong digital infrastructure and therefore fall within the national e-Estonia strategy.

Flagship projects: Long-term initiatives & Proof of Concept

Tallinn mainly conducts experimental projects, often in partnership with the University of Taltech. We can distinguish two types of projects:

— Long-term projects are strategic issues through which Tallinn wants to create value and differentiate itself. This was the case with the city's mobile parking system (implemented 20 years ago) and is now happening with the digitalization of municipal services and processes – a field in which Tallinn has been highly successful. During the first wave of Covid-19, many city services and departments went 100% virtual, including the city council itself, which was able to maintain its activities using online voting.

— Tallinn also relies on Proof of Concepts, small-scale demonstrators showing the effectiveness of solutions from the private sector. This is the case with the Smart Streets project, with the installation of an intelligent lighting system along Kalaranna Street, or the experiment of a Smart Pedestrian Crosswalk in the Ülemiste City district. Tallinn also works with the startup Thinnect, which has deployed 850 sensors across the city to monitor traffic and air pollution. In each case, the goal is to allow private actors to test their solutions in real life.

Success Factors and Room for improvement

Tallinn manages to leverage the dynamism and specificities of a small but strongly connected tech ecosystem. From university to startups and public agencies, all actors know each other and are used to working

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[10]   See the e-Estonia website: https://e-estonia.com/

together. For instance, Bolt, the Estonian competitor of Uber, prides itself on its good relationship with the city council, which is the result of more than six years of cooperation.

One of Tallinn's major challenges is to find the right positioning in relations to its inhabitants. To encourage citizen participation in urban life, the city has set up a participatory budget, with 1.1% of its resources available to fulfill residents' projects. But on the other hand, Tallinn does not want to ask too much from its occupants. Toomas Türk, the city's Chief Innovation Officer, therefore describes a model of "invisible smart city": rather than developing too many new services, not all of which can be used, the city must work "behind the scenes," with existing providers, to ensure an enhanced urban experience for its dwellers. Tallinn's goal is to facilitate everyone's lives without overwhelming anyone.

7th Stop: Helsinki (Dec 2020)

Context and Challenges
Helsinki tops the "Smart City" rankings. In 2020, it came second in the IMD Smart City Index,[11] which focuses on city dwellers' perceptions of digital applications and rewards the "smartest" cities. Helsinki's achievements should be considered in light of three national success factors:

— A high quality of life (and thus highly satisfied inhabitants). For the third consecutive year in 2020, Finland topped the United Nations World Happiness Report.[12]

— A high level of trust in governmental choices and policies.

— A positive perception of technology, which originates in the 90s and the bloom of Nokia.

Helsinki's "smart" strategy: a functional city
Residents are key to Helsinki's "smart" strategy. This involves focusing on everyday habits to improve daily life. This is the core idea of the 2017–2021 city strategy, which intends to make Helsinki "the most functional city

in the world." This strategy is part of a larger scale multi-level governance model:

— The Helsinki Smart Region strategy encourages digital innovation and citizen participation for the whole Helsinki region.

— The Six City Strategy is a national joint program between Finland's six largest cities aimed at co-developing digital tools.

— The FinEst Twins collaboration aims to create a cross-border innovation corridor between Helsinki and Tallinn, with joint digital initiatives.

Flagship projects: Forum Virium & Kalasatama
Helsinki's human-centered strategy is embodied by Forum Virium. This public company plays a major role in the city's innovation process and enables both start-ups and large companies to test their projects directly in local communities. Following its "agile piloting" method, Forum Virium identifies inhabitants' needs and selects entrepreneurs able to provide concrete solutions. This results in deploying rapid, inexpensive, and innovative pilot projects in urban environments. The goal is not to make the solutions work perfectly on a large scale, but rather to collectively test different answers to urban issues. To succeed, these pilots rely on a strong mobilization of city dwellers, companies, and urban stakeholders.

These pilots are often deployed in the district of Kalasatama. Since 2013, this former fishing port has become an innovation showcase for Helsinki. Located 20 minutes east of the city center, it houses 8,000 inhabitants in modern housings. In 2030, once completed, it will cover 175 hectares and accommodate 25,000 people. What sets Kalasatama apart is a strong and consistent involvement of residents in neighborhood life and a closely knit local community: Over a third of residents have already participated in a pilot project or a workshop on Kalasatama's future. But this human approach still has its limits. Some of the new developments totally disregard old informal sites, and while it is pleasant for its inhabitants, Kalasatama still lacks life. There are only four restaurants and bars for 8,000 inhabitants, and relatively few green spaces.

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[11]   Singapore, Helsinki and Zurich triumph in global smart city index, IMD (2020). https://www.imd.org/smart-city-observatory/smart-city-index/

[12]   World Happiness Report 2020: https://happiness-report.s3.amazonaws.com/2020/WHR20.pdf

Success Factors and Room for improvement

Helsinki serves as a model of the "human smart city," where residents actively participate in urban transformation. Yet there is still room for improvement, as not all citizens are equally integrated into these participation processes. Forum Virium workshops only involve a minority of people from specific neighborhoods (Kalasatama and Jaktasaari), who are already aware of the role they can play. Helsinki's challenge is to engage the others.

PART 2 – BEYOND TECHNOLOGY: COLLABORATION AND ART

Rio de Janeiro, Medellin, Toronto, Singapore, Stockholm, Tallinn, Helsinki. All of these cities share the common characteristic of being identified as outstanding "smart cities": Such cities use data to become more efficient by optimizing their urban systems and to improve their residents' quality of life. In practice, however, they are not able to use data as effectively as desired. They are still learning, testing new solutions, and trying out new approaches to create an innovative urban environment. Their various strategies, flagships projects, successes and challenges reveal that promoting innovation within a city cannot rely on sensors to collect data and create state-of-the-art digital solutions. Rather, both successful and failed projects explored on the ground demonstrated that two factors other than technology are also key to transforming cities: collaboration and creativity.

When trying to reshuffle the cards of urban planning, the first and real success factor is the system of collaboration. The examples of Medellin and Stockholm demonstrate this. As mentioned, Medellin illustrates the concept of social urbanism. Developed by Alejandro Echeverri, this new approach to urban planning relied on renewed collaboration between public and private actors, academia (more specifically, Urbam, Medellin's EAFIT University urban research center), and citizens. This multi-governance approach, which played a major role in projects like the scientific hub and exhibit center Parque Explora, has proven that a collaborative culture must be cultivated in order to truly promote innovation. This in fact is the main idea behind the creation of the Ruta N innovation center: attracting different types of actors (large companies, startups, researchers, etc.) into one place to work together, create and build from new ideas. Thus, it is not technology per se that has been helping Medellin become an attractive and innovative city, but rather the bodies and cultures which shape collaboration.

Similarly, Stockholm's strategy to become more sustainable has proven that technology will only be a tool, used by a pool of different actors, who must work together effectively. The Stockholm Royal Seaport flagship initiative is a striking example. Often presented as an innovative district thanks to a research project on Smart Grids conducted in some of the newly built residences in 2017, the real innovation and key success driver, which will keep on playing a central role in the creation of this ambitious sustainable district, is effective collaboration. In reality, highly developed technologies like Smart Grids did not offer sufficient positive results, as most people who participated in the program did not truly adopt the solution to follow their energy consumption and change their behavior accordingly. Instead, in order to reach its sustainability goals, the municipality has been working with architects, developers and construction workers, to help them collaborate all along the construction process and to ensure that information and good practices are shared. Positioning itself as a mediator, the city also evaluates key energy consumption results to monitor each project within the neighborhood. With this in mind, a Green Space Index was created to force developers to create and imagine ambitious and innovative green areas throughout public spaces. Again, this demonstrates that before technology, a collaborative governance must be the backbone of a sustainable, innovative, or "smart" city.

Based on observing the role of collaboration, this field study has also illumined the necessity of promoting collaboration between urban planning and art and creativity. Indeed, the key to innovation is creativity. Data sciences and engineering can be useful tools but without creative initiatives and a cultural environment, they cannot fully transform cities. Thus, the role of art in designing a city which can attract key actors to drive its transition (companies, talents, residents, tourists, etc.) must not be underestimated. As explained, the example of Medellin's Comuna 13's swift revitalization and pacification with the use of street art as a means for residents to express themselves, but also to attract tourists

and reconnect this remote neighborhood to the rest of the city, proves that art can be an effective catalyst. This does not apply only to remote and disadvantaged urban areas. For instance, Singapore has been using art as a tool to compete against other global cities and attract large digital companies. This explains why companies such as Cisco or Google have established their Singaporean offices merely a few hundred meters from Gillman Barracks: a contemporary art cluster promoting international artists. More than just a tool to attract economic actors, art can also be a way to make cities' transformations more visible.

For most people, digital or technological transformations remain largely intangible. The essence of data is virtual. Hence, art has become an effective and creative way of revealing digital transformations, which would otherwise remain invisible. This is the objective of Singapore's Super Trees, which showcase the city-state's vision for the use of technologies: creating a new experience of nature and becoming more sustainable through innovation. Art, then, can be used to engage citizens in the city's transformation. Singapore offers an additional example with its 2219: Futures Imagined exhibit at that ArtScience Museum. Visited during this field study in April 2020, at the height of the Covid-19 crisis, this exhibit displayed Singapore's vision and strategy to adapt to a dystopia where the climate crisis forces cities to find alternative and underground lifestyles for their populations. In the specific context of the pandemic, the exhibition showed that art plays a part in foreshadowing the future of cities. Across the world, other creative and artistic programs are seeking to engage people with these interrogations. Rio de Janeiro's Museu do Amanhã (Museum of Tomorrow) offers another example as it uses digital experiences to make its visitors aware of environmental issues and to elicit epiphanies on the role every citizen can play in making cities more sustainable. Art and creativity are thus key drivers for making people active actors and for enabling them to contribute to creating innovative cities.

Studying these seven cities demonstrates that in becoming "smart," cities do not simply focus on technologies. They also strive to imagine collaborative schemes, in order to promote long-lasting solutions and to support creative and artistic programs to make their transformation attractive, visible, and inspiring.

CONCLUSION

In the first part of this report, we showed how the concept of the "smart city" is used differently in the explored cities. First, the objectives targeted by smart public policies vary significantly from one city to another. In Rio de Janeiro, becoming a "smart city" means making the city more resilient to climate risks, which can be achieved through a centralized operation center (Rio's Centro de Operações).

In contrast, Medellin's "smart" strategy emphasizes economic attractiveness and collaborative innovation (Ruta N Cluster). Orienting the "smart city" towards both private companies and city dwellers also changes depending on the city. Whereas Singapore's strategy aims at turning the city into a safe haven for tech companies (Smart Nation strategy), cities like Toronto are trying to better regulate the use of data by private actors, and to educate their citizens on digital issues (Connected Communities Program). Other cities like Helsinki rather focus on facilitating their residents' daily life through a functional approach (Forum Virium's Agile Piloting method). Finally, the scale and governance of "smart city" programs also differ among cities. While Stockholm's "smart" strategy is limited to the metropolitan area of the Swedish capital (Smart & Connected Program), Tallinn's "smart" initiatives are often linked with nation-wide digitalization projects (e-Estonia).

In the second part, our case by case approach showed that the most critical efforts of cities to become smarter often go beyond the technological sphere: apart from being digital, our field experience also shows that "smart cities" are collaborative and creative. Collaboration between different actors is one of the key success factors of many of the urban projects we studied (Stockholm Royal Seaport, Medellin's Social Urbanism). In the same way, in the context of increased competition between cities and territories, "smart cities" must be creative to attract companies and talents, and often leverage art as a urban catalyst to revitalize neighborhoods (Comuna 13 Medellin, Gillman Barracks in Singapore), to make transformations more visible (Super Trees in Singapore), or to engage citizens in a different way (Expo 2219 Singapore, Rio's Museu do Amanhã).

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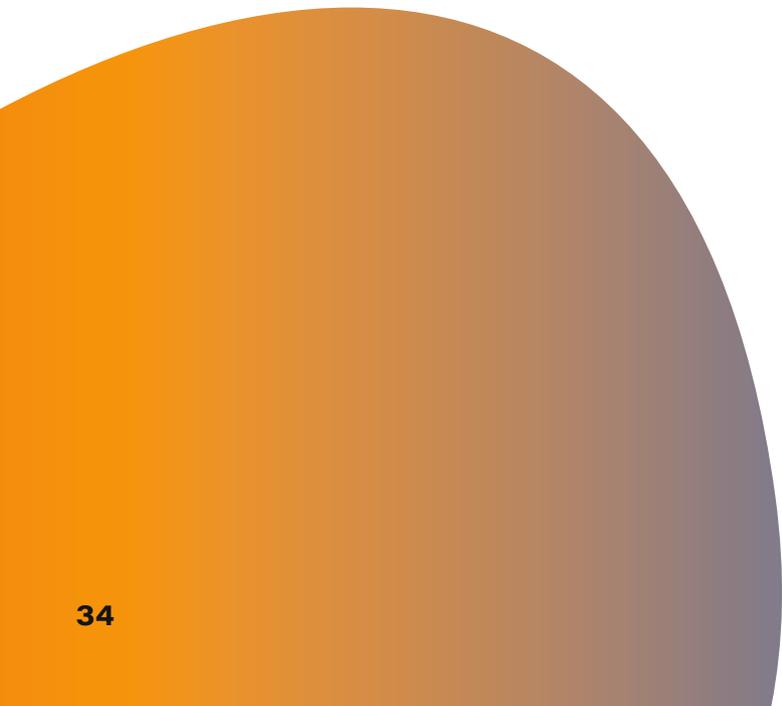
Notes on Ibero-American Smart Cities:
Cases from Barcelona, Buenos Aires and Santiago
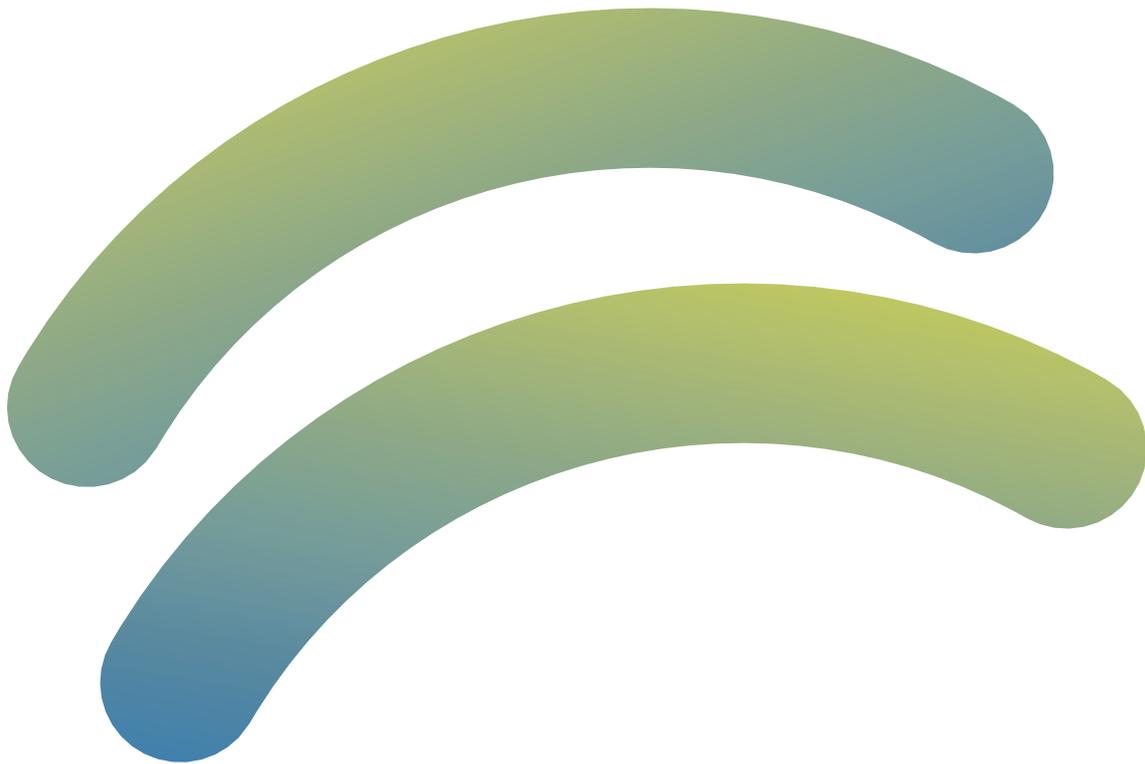
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It is difficult to determine whether a common framework or model exists for defining smart cities in the Ibero-American region.[1] Nevertheless, there is some common ground that helps explain how creativity and culture-led regeneration policies have changed cities in the last few decades.

Since the 1980s and 90s, Spain and most Latin American countries have undergone democratization after years of dictatorial regimes. Not only have institutions embraced democracy, but a free civil society has re-emerged, as well as culture and cities.

Overall, the transition to democracy initiated several countercultural movements: the *movida madrileña* (the Madrid scene), the emergence of the myth of Barcelona as an open, diverse city after Franco's death; the rebirth of Buenos Aires' underground theatre in the 1980s; or Santiago's punk scene during the declining Pinochet regime.

In parallel, a process of municipalization or transfer of competences to local governments began in most of these countries.

Exchanges between Spain and Latin America have intensified at the political-institutional level (national and local governments), as well as economically (large corporations) and culturally. This has influenced the design of city development models. Barcelona has set an example for several cities, frequently, however, without the necessary translation to particular circumstances and contexts.[2]

There is an obvious disparity between the cultural and economic development of cities in Latin America compared to Spain or Portugal. In particular, this concerns inequality, poverty and segregation, access to culture, and the resources available for implementing public policies.

Apart from Barcelona, the case of Bilbao also stands out in Spain. Bilbao exemplifies urban transformation and cultural revitalization based on a flagship cultural institution, the Guggenheim museum, , designed by Frank Gehry in 1997. This is known as "the Bilbao effect." Although not well received by the cultural community at first, the Guggenheim was soon recognized for its tremendous impact on the creative sector and on the international image of the city after years of violence in the Basque Country.

Just like Barcelona, Bilbao managed to transform an industrial past into a present based on creative economies, through a megaproject (the 1994 Olympics in Barcelona, the Guggenheim in Bilbao) that symbolically kickstarted transformation. But this model has also led to notable failures, such as Valencia. Its megaproject Ciutat de les Arts i les Ciències (City of Arts and Sciences), a cultural complex designed by renowned architect Santiago Calatrava, was marked by corruption and citizen resistance, at a time when the city was turning its back on community-based projects.

In Latin America, many cities have adopted a more citizen-based approach as a result of social inequalities and the relevance of grassroots organizations. The most prominent is the internationally recognized case of Medellín (Colombia), based on technological but mainly social innovation. Yet there are also examples of revitalizing industrial areas through creative projects, in which the private sector has playing an important role. There is a certain consensus on the failed attempt of Rio de Janeiro to revitalize its port district and to create a global city brand after the 2016 Olympics, just as Barcelona did. The imprint of Barcelona is also evident in the creative districts' policy of Buenos Aires. For its part, Santiago aims to become smart through its own model, among others, by importing foreign talent to create an innovation ecosystem based on startups.

Barcelona

Barcelona is widely recognized for developing its own model (the so-called "Barcelona Model") of urban and economic transformation based on the creative industries. One distinguishing feature is how two different and complementary perspective have coexisted: a top-down model, usually defined as neoliberal, driven by a local government and supported by corporations since the 1980s; and a bottom-up model, pushed by the associative sector with a long tradition in Catalonia, usually contesting the mainstream model, and also promoted by the city council in recent years.

The 'Barcelona Model'

Much has been written on the Barcelona Model. It has been described either as a prototype worth imitating and transferring to other cities or its effects have been criticized.

Generally, this modernization plan rests on transforming the city's economy into a "knowledge economy," on physical renovation through a new urbanistic plan, and on local governance and devising a city brand recognized worldwide.[3]

The foundational milestone was the Barcelona 1992 Olympic Games. The Olympic project involved the urban renovation of degraded areas, the construction of large avant-garde buildings designed by renowned architects and the inauguration of a "creative city" strategy centered on culture.[4]

At first, international projection was central to municipal strategy. Branding not only allowed the city to present itself as competitive abroad and to attract foreign investment. It also enabled exporting a proven successful model.[5]

Although referred to as a single model, the Barcelona Model falls into four stage, each involving a different approach.

First, in the early 80s, the first democratically elected local governments led by socialist mayors shifted from an authoritarian vision to a more inclusive municipal one with an emphasis on cultural policies (through increased funding and new cultural institutions), social participation and the urban renewal of the most marginalized neighborhoods and the periphery.

A second period focused on building an international city brand by organizing a megaevent, the 1992 Olympic Games. Vast public and private resources were invested in large-scale transformations and infrastructure to position Barcelona as a modern, innovative and creative city.

Since the mid-90s, the city council has undergone a neoliberal turn: the concepts of "smart city," "knowledge economy" and "entrepreneurship" began to dominate the narrative around the city. Large international corporations were invited to participate in the transformation:

Culture and the knowledge economy started to play a prominent role in the city's urban policies with the private sector playing a key role in funding cultural flagship projects after the Olympics. The city's Second Strategic Plan in 1994 recognized culture for the first time as an important factor in advancing the city internationally. Culture was redefined institutionally in its widest sense to encompass symbolic production, social dialogue and citizens' participation. Cultural infrastructures were considered crucial to attracting conferences, festivals and urban tourism, and emphasis was given to the promotion of cultural agents such as cultural and civic associations and the cultural industries, as well as to private sponsors for the city's cultural activities managed by public administrations.

[...] it was only in the third Barcelona Strategic Plan, approved in 1999, that culture was given a specific function in Barcelona's development, namely launching Barcelona as a knowledge economy. [...]

Culture has become deeply intertwined with the city's economy, as the City Council aims to develop its cultural industries and its position in the cultural economy [...].

Within the last decade Barcelona has been very successful in linking up its place sensibilities, marshalled around a creative Mediterranean culture, innovation and design, to become a city increasingly known for its cutting-edge cultural industries, whether in design, architecture or music.[6]

Tensions between this neoliberal model of development (based on private entrepreneurship) and existing grassroots initiatives reached a turning point during the 2008 financial crisis. The anti-austerity social campaigns – the

15-M or Indignados movement – turned cultural policies into disputed territory. Social activists, artists and academics highlighed the need to move from the neoliberal city model to a "commons" model.[7] A new local political party, Barcelona en Comú ("Barcelona in Common"), was created around these issues and took over the city council in 2015. Ada Colau, a housing rights activist, has since served as mayor.

This new approach to the Barcelona Model, however, has not replaced the previous one: they coexist and often complement each other. This might be considered a new sensibility. Seen critically, some sectors believe that the current government has been unable to reverse the logic of the creative city due to the lack of power and real alternatives.[8]

Barcelona Smart City

The concept of the "smart city" started being used by the municipal government in the early 2000s. Following other international experiences, the perspective was technical and ICT-oriented. To begin with, this vision focused on promoting entrepreneurial strategies towards a knowledge economy, typically based on public-private partnerships rather than on social participation.[9]

The city council began cooperating with new actors to define a smart city strategy, including large corporations like Cisco, IBM, Philips, SAP, Schneider and GDF Suez, research centers, local and international universities, business schools and multilateral organizations such as the World Bank, UN-Habitat and the European Commission.

In the words of Josep-Ramon Ferrer, former director of Barcelona Smart City and IT Program and Deputy CIO for the Barcelona City Council (2012-15)[10]:

We had this intuition in Barcelona, some years ago. We understood that Internet and new technologies were a unique and incredible opportunity to transform the city and to rethink every single aspect of it: logistics, energy, education, healthcare, infrastructure, city management, public space, housing, security, mobility, etc. in a holistic approach.[11]

In Barcelona Smart City's 22 programs, elaborated during Ferrer's tenure, culture and creativity only appear once, at the end of the list, under the category "Leisure and Culture."

Antoni Vives, deputy mayor of Urbanism, Housing, ICT and Innovation for Barcelona City Council and head of the smart city strategy (2011-15),[12] stated:

There are three main levers on which the ICT strategy of Mayor Xavier Trias' team rests on to develop this [smart city] strategy. First, being the Mobile World Capital [...], Barcelona will have the opportunity to become a world showcase for this nuclear ICT sector, as it is a clear attraction factor for the mobile industry.

Second, the leadership that the city intends to achieve in the smart cities development. The agreements closed with companies like Cisco, Telefónica, Schneider, Abertis, or Indra outline an ecosystem of public-private collaboration from which Barcelona can obtain de facto another technological capital status [a theoretical 'Smart City World Capital'] in a sector that should create great economic activity throughout the world during the next decade.

And last but not least, the City Council can take advantage of its extensive and successful experience in the application of ICT to administrative management and the relations with citizens. In the new world of the Cloud, the 2.0 apps and social media, the city council can and must lead e-Administration projects that create a virtuous circle around mobility and smart cities.[13]

In 2012, Barcelona City Council published its first ICT strategy.[14]

According to the municipal advocates of the smart city strategy, Barcelona not only seeks to position itself as an international reference for smart city development but also as a laboratory and showcase for technologies applicable to any city in the world, hand in hand with private corporations.[15] Latin America, indeed, has been one of its main markets.

The initial smart city project openly ignored artists and creative workers. It overlooked an ecosystem of alternative digital innovation practices that were being carried out in parallel and made Barcelona one of the most innovative cities in the world. But the new political movement that reached the city council in 2015, emerging from the social protest after the 2008 crisis, came

to power with a critical vision of the smart city agenda that Barcelona was carrying out.

Mayor Ada Colau (2015–today), from Barcelona en Comú, said about the Barcelona Smart City program days before winning the election: "We take anglicisms and it seems like we're doing a great policy, but we don't buy it anymore. […] The 'smartest city' is the one that knows how to take advantage of its neighbors. Barcelona has always been an international benchmark for creativity and culture."[16]

According to deputy mayor Gerardo Pisarello (2015–2019), "it is essential to rescue the concept of the smart city from its purely marketing or commercial use. […] We cannot conceive a city as smart if it is not, at the same time and above all, just and democratic."[17] Moreover: "One of the greatest challenges for the new municipalism is to redefine the meaning of so-called smart cities. […] The political smart city agenda cannot be purely technocratic or be the prisoner of a few giants […]. On the contrary, in a democratic city, technology should serve to digitally empower citizens […]. This has a name: the conquest of technological, digital sovereignty for the common good."[18]

The 2017–2020 Barcelona Digital City Plan (*Pla Barcelona Ciutat Digital*),[19] developed by the new local government, is less radical than what the city managers stated, yet still includes a reoriented smart policy. The goal, it says, is not "stepping down" from the achievements of the previous administration when it comes to positioning Barcelona as a smart city. Rather, the aims are to broaden the scope, to include other agents (cooperatives, developers, social activists), to reduce the dependence on tech giants and to promote bottom-up projects.[20]

In its first assessment of the plan, the city council focused on the existing programs. These were oriented towards a more circular, inclusive and collaborative economic model such as the creation of an urban innovation laboratory, support for new digital creators (including makers), developing a Fab City movement (fab labs) and promoting a "true" sharing economy. The report acknowledged that while a top-down approach still existed, the city was aspiring to a bottom-up approach based on citizen co-creation. The objective was to promote the transition to a non-neoliberal smart city.[21]

In parallel, Barcelona has recently begun strengthening public-private partnerships to consolidate itself as an international smart city and digital hub. The city hosts annual international events such as the Mobile World Congress and the Smart City Expo World Congress, with the support of the local authorities, as well as initiatives such as the Mobile World Capital, Barcelona Tech City, the i2CAT and the Centre of Innovation for Data tech and Artificial Intelligence (CIDAI).

Other public initiatives include the as yet unconsolidated Smart Catalonia, the country-level smart strategy which aims to turn Catalonia into a "smart country" with tech-based urban and rural initiatives across the territory.

The 22@ district

Since the 1992 Olympics, various cultural clusters have emerged in Barcelona's dilapidated areas and former industrial neighborhoods, as a rule accompanied by the renovation and improvement of public spaces.[22] One of the most relevant clusters is the old and central neighborhood of El Raval, historically associated with crime, prostitution, immigration, and poverty, but which has managed to transform its image of degradation and social exclusion into a lively cultural and touristic area. Public intervention included an urban renewal project and the installation of major cultural institutions such as the Museu d'Art Contemporani de Barcelona (MACBA) and the Centre de Cultura Contemporània de Barcelona (CCCB), designed by renowned architects like Richard Meier (MACBA), and university campuses. Additionally, designers' and architects' studios, art galleries, publishing houses, theaters and restaurants began to settle in the area. In parallel to this more mainstream scene, a network of community spaces and organizations, artists and audiences has developed from the underground and has shaped a rich artistic scene. The previous social composition, however, has not changed substantially: immigration, diversity and interculturality remain the hallmarks of the neighborhood.[23]

Other prominent cultural clusters include the Parc Barcelona Media (inside the 22@ district, dedicated to audiovisual production and research) and the Disseny Hub Barcelona, home to the Museu del Disseny and professional associations, surrounded by design schools and two major cultural centers, the Teatre Nacional de Catalunya and L'Auditori.

The 22@ district is Barcelona's most ambitious urban rehabilitation project. It occupies 200 hectares of the Poblenou neighborhood, close to the seafront, which was the industrial heart of Barcelona between the end of the 19th and the mid-20th centuries. It was proudly called the "Manchester català," the industrial engine of Spain and Southern Europe.

In the 1970s, the factories were displaced to the city outskirts and the infrastructure became urban wasteland, destroying the economic structure of the mostly working class families living there.

The 22@ Plan[24] involved requalifying industrial land to retain productiviy through knowledge-intensive ventures. The central premise of the 22@ Plan was to move from industrial utilization to mainly ICT and creativity-related activities. The project encouraged the establishment of universities and research centers, tech and creative companies, private and public housing projects, green areas and public equipment and facilities. The three objectives expressed by the administration were the urban, economic, and social revitalization of the Poblenou.

According to the promoters of the 22@, the district is "one of the first districts of urban innovation in the world" and based on the Silicon Valley model,[25] although it is hard to find common denominators.

The 22@ can be divided into sub-clusters according to their activities, such as media and design, ICT, energy and biotechnology. For instance, the media and design subcluster includes audiovisual production companies (Mediapro), publishing houses, performing arts and events companies (La Fura dels Baus, Grup Focus), marketing and communications agencies, research centers (Fundació Barcelona Media – Centre d'Innovació), architecture and design studios, fab labs, hackerspaces and other community centers. The area also hosts corporate headquarters and I+D centers. It is considered one of the largest concentrations of digital companies in Europe and the largest in Spain.

In twenty years, at least 1,379 knowledge-intensive service companies and 132 mid- and high-tech plants have been established in the district. Together, they employ 47,400 workers and produce a gross value added of €2,638 MM. Considering its expanded area of influence, these figures are doubled.[26][27]

'Salvem Can Ricart', let's save the neighborhood

Since the implementation of 22@, the project has attracted much criticism, mainly from grassroots organizations and artists, who argued that it would destroy the neighborhood and failed to account for community interests. The artists maintained that 22@ ruined the artistic and cultural fabric of the area.

A decade before 22@, some artists began to settle and produce in the Poblenou, attracted by the large and disused low-cost industrial buildings. Artists were beginning to group into workshops, work cooperatives and associations, and the neighborhood gradually evolved into one of the city's hubs for cultural production. Some of the spaces created before 22@ still exist (e.g. Can Ricart, La Escocesa, and Palo Alto, all in old factories) while others had to close.

22@ immediately increased land prices. Several factories and warehouses were sold and demolished, and rents began to rise. The resulting evictions meant that many artists were left without space to work and live, and were forced to move to other areas.

Little by little, mainstream creative activities and large corporations began replacing existing spaces for creation and socialization. Soon, the innovative, underground character began to be lost, along with the social dynamism and emotional ties with the neighborhood. Urban renovation meant that streets started to look neater, similar to any business district in the world, something that for many neighbors meant a loss of identity and "authenticity." As with many other projects across the world, the paradox is that the new innovation district began losing what made it attractive, creative and innovative.[28]

The lack of citizen participation and, particularly, of artists, sparked various conflicts. A paradigmatic case was Can Ricart.

Can Ricart is a 19th century industrial building that, in 2004, was about to be demolished in favor of a real estate project. The building was occupied by companies and artist collectives.

Imminent demolition brought residents together under the platform Salvem Can Ricart (Save Can Ricart). The association carried out a series of protests and actions that forced the city council to intervene and enter into dialogue with all parties. Finally, the council suspended the demolition, expropriated the factory and began negotiating with the citizen platform to finally allocate the building to artistic facilities.[29]

One of the main beneficiary organizations is Hangar, an artistic production and research center that was inaugurated in a sector of Can Ricart in 1997, founded by the Associació d'Artistes Visuals de Catalunya (AAVC). After several years of precariousness and legal uncertainty, with the expropriation of the building, the city council granted them the use of the space and integrated them into the Fàbriques de Creació (creation factories) network in 2017, thus safeguarding their autonomous management.

The Fàbriques de Creació is a municipal program based on the transformation of old unused industrial buildings into new artistic spaces located throughout the city. The city council still owns the building, but grants the right of use and other benefits to artistic organizations.[30][31] Within the 22@ district, La Escocesa had a similar experience and today is an "open factory for analog creation", specialized in low-tech artistic production.

As this experience proved, the city council and the 22@ developers could no longer ignore the artists and community organization of the neighborhood even if this was not part of the original plan. Can Ricart marked the turning point and some things have since changed.

In recent years, together with historical spaces such as Can Ricart, La Escocesa and Palo Alto, the Poblenou district has attracted numerous alternative spaces and collectives. The return of artists is an ongoing process and the results remain unknown.[32] The rectifications of the city council after the pressure of the artists and the social movements could be considered a success story.

The Barcelona case reveals the existence of creative milieus without direct local government intervention. Nevertheless, as happened in New York and Paris, it is an unexpected result of the international success of Barcelona. But in this case it is not the real estate sector that, profiting from the economic value of the cultural milieu, is destroying the material and symbolic basis for cultural production. The creative cluster of Poblenou simply could not be developed enough to enable this process to take place. It is the planning of 'knowledge city' by the local government that is transforming the future of creative production in the neighbourhood. Paradoxically, this paradigm recognizes culture and creativity as important tools for its development. What has happened? The 22@ project is the result of an entrepreneurial urbanism that focuses on technological strategies, the attraction of global command centres and the creation of an innovative environment for small and medium-sized companies, including the cultural industries. However, the development of the 22@ district lacks proper integration within the urban area and, during its development, productive and artistic activities have been ignored.

For this reason, the urban regeneration process has led to the departure of many artists and has generated criticisms and tensions between those who remain, and, for some, it has meant a process of institutionalization as a survival strategy. Nevertheless, the new approaches of the creative city and its influence on policy agendas have made the creation and fostering of creative milieus a central issue. As a result, cultural production in Poblenou has had a more favourable framework of opportunities to aid its survival. In this new scenario, tensions have arisen relating to the institutionalization of some workshops and the utilitarian orientation of their cultural activity towards the market.

The maintenance of independent creative spaces and artistic innovation is a challenge that still has not been met by the urban renewal policies. Nevertheless, the innovative approach based on 'creation factories' by the Barcelona City Council seems to be an attempt to combine the autonomy needed by artists with the policy action needed to improve the creative milieus. Despite this, it has taken place after the destruction of the pre-existing creative environment in Poblenou.[33]

The 'alternative' model

The recent change of perspective of Barcelona city council – a "non-neoliberal," commons paradigm – rests on a centuries-old tradition in Barcelona and Catalonia. Anarchism, cooperativism, grassroots movements and other forms of collective organizations have carried great political and social weight in the city. Self-management, private initiative and the rejection of or suspicion towards excessively top-down public policies have been a source of pride throughout history. Whether they came from the Spanish central government or the local administrations, community organizations and political movements have been involved in the cultural and urban policies, have contested them and occasionally have even managed to change them, as 22@ showed.

In parallel to the development of the Barcelona Model and the smart city policy, Manuel Castells describes how, by 2011, Barcelona was already "one of the most socially innovative urban environments in

the world"[34] – among others, thanks to the associative movement and its alternative economic practices.[35]

In this context, two phenomena combined in Barcelona in the creative field: "On the one hand, the movement of free culture and digital Commons, where Barcelona has been a node of digital innovation since the beginning of the Internet. On the other hand, the development of the social and solidarity economy of the city, which accounts for 8% of its GDP."[36]

Activist and academic Gómez Fontanills has drawn a timeline of digital activism experiences since the early 2000s.[37] These have taken the form of "collaborative ecosystems" or a "commons ecosystem" with a strong emphasis on solidarity economy, free knowledge/free software and the hacker movement.

Creation spaces range from hackerspaces to fab labs (FabLab BCN, Hangar, Ateneus de Fabricació). Digital activists are also promoting digital isnclusion and education from projects taking place in different neighborhoods. The video art activist community Telenoika experiments with digital audiovisual technologies. The Mobile Social Congress, organized by SETEM Catalunya since 2016, discusses the social and environmental impact of the tech industry at an annual meeting in parallel to the market-oriented Mobile World Congress. The technological sovereignty and free software movement regularly organizes its own congress (Congrés de Sobirania Tecnològica)[38]. These are just a few examples of a long list of social initiatives in the digital field.

La Comunificadora

To boost such initiatives of the "commons ecosystem," the city council has established a program called La Comunificadora through Barcelona Activa, its economic development agency. La Comunificadora supports projects based on free software, free culture, open-source design, open-source hardware, open data (dataCommons) and the Open-Source Circular Economy.
La Comunificadora is framed by the principles of the collaborative economy, and takes advantage of the scalability of internet-based collaboration. Based on hacker culture, it offers spaces for cooperation and production among equals. In short, this public program supports a "third economic model."[39] Focused more on the needs of creative workers, and on the quality of the jobs created, it inspired by the experience of workers and cultural cooperatives.

Can Batlló

The repurposing of factories and industrial areas for cultural activities began in the 2000s, often supported by the city council through the Fàbriques de Creació network. Relevant cases include the already mentioned Can Ricart (Hangar) or La Escocesa, but there are dozens of other examples (e.g. Nau Ivanow, Nau Bostik, and Fabra i Coats).

One of the most emblematic cases is that of Can Batlló, a huge 19th-century industrial center located in the working-class district of Sants. An important network of cooperatives, mutual aid organizations and *ateneus culturals* (cultural athenaeums) proliferated around this factory until the fall of the Second Spanish Republic (1931-39).

From the beginning of the Spanish transition to democracy, the neighborhood began reinvigorating the tradition of community organization. Since 1976, a group of neighbors has being demanding the public use of the Can Batlló complex, which faced demolition. The group began expanding and organizing, and in 2009 it created the platform *Can Batlló és pel barri* (Can Batlló belongs to the neighborhood) to stop a private real estate development project on the site.

Social pressure and mobilization, as well as the occupation of part of the factory, provoked the intervention of the city council. Two years later, it authorized the use of 1,500 m2 of one of the industrial buildings for cultural and social activities. Soon afterward, the occupied space was renovated[40] and grew in size and activity.

Currently, Can Batlló is managed autonomously and has an auditorium, meeting rooms, a library, various workshops and exhibition rooms. In addition, green spaces and an urban garden are being opened.[41] A decade later, Can Batlló has become one of the most vital creative spaces in Barcelona.

Xarxa d'Ateneus de Fabricació

Since 2013, the city has developed a network of public spaces dedicated to digital manufacturing. The Ateneus de Fabricació (manufacturing athenaeums) are similar to fab labs. They are aimed at professional users or students, or at anyone with a project or idea needing tools and knowledge to develop it.

The network extends across different parts of the city and each athenaeum is dedicated to a specific area or user profile: maker culture, design, sustainability, employability and entrepreneurship (currently there are five in operation but the council aspires to have at least one in each of the ten districts).

Users have access to 3D printers, laser cutting and other digital production technologies. Every space is staffed by technologists and social organizers to facilitate the proper use of tools and to foster community dynamics. The athenaeums promote the execution of small projects with a social return and an impact beyond users. They promote sharing the generated knowledge with the rest of the community. The program slogan is "We materialize ideas, we co-create our environment" (*Materialitzem idees, cocreem el nostre entorn*). Access is unrestricted and spaces are available free of charge. In return, users share their experiences, knowledge and skills:

> *Fab Labs are open to everyone and the "price" paid to use them is known as contraprestació [a non-cash payment], a system of social reinvestment for the support received in the lab in terms of time, talent, involvement, and participation to benefit the community. All without any money changing hands.*
>
> *Hence, the Fab Lab service is public and free of charge. It is, however, based on a collaborative economic model where what is uppermost is not ownership but use, and to be able to use the Fab Lab services there are a series of contraprestacions that the user must provide to the community.*
>
> *Some of the contraprestacions that have been given up to now [...] are the commitment to support somebody else's project, training or an open activity aimed at the local area or the general public, material resources for the lab itself or for the projects developed there, and research materials, to name just a few.*[42]

Buenos Aires

The city of Buenos Aires has pioneered cultural production in Latin America since the early 20th century. From its publishing industry to the cinema, and now rivaling major theater cities for its extensive scene. In recent years, the city has undergone a shift in terms of cultural policy, towards a global model in which creativity and artists are considered a tool for city branding, economic development and the promotion of international tourism.

After seven years of military dictatorship (1976–1983), the city initiated a thoroughgoing democratization process – which significantly impacted culture. It also implemented a series of constitutional reforms that granted more autonomy to the local government. Both processes also occurred in most Latin American[43] and Spanish cities.

In the creative field, there was a boom of cultural activities (concerts, street performances and interventions, clubbing and an emerging underground culture) and the creation of new public and private cultural centers. Some cultural industries with a longstanding tradition in Buenos Aires also revived, such as publishing, theater and cinema.

In the 1990s, Argentina's government performed a neoliberal turn that was reflected in local cultural policies. The orientation of the federal administration and the newly created autonomous city government went from a "culture for all" or a "culture everywhere" premise to a market-oriented support to certain cultural industries at the expense of others.

The great economic and political crisis of 2001–2002 resulted in budget cuts that seriously affected the subsidized cultural sector, while private initiatives also suffered from the general economic situation. Amid social and political protests and mobilization, many non-commercial, self-managed cultural experiences emerged. Concepts like solidarity, political involvement and social change undergirded these post-crisis grassroots initiatives, characterized by strong territorial embedding.

In response to the dramatic economic situation, the local government initiated a city branding policy associated with culture, creativity, diversity and tolerance: "Buenos Aires, Cultural Capital of Latin America." The Strategic Plan for Culture (Plan Estratégico de Cultura) devised large-scale cultural events such as the Buenos Aires Festival Internacional de Cine Independiente (BAFICI) and Festival Internacional de Buenos Aires (FIBA, on performing arts), both enjoying great regional and international resonance.

The rise of a new political party, which took over the city council in 2007, extended the creative city narrative as a means of attracting private investment.[44] Buenos Aires sought to compete in the big league of creative cities, yet with fewer resources than in the global North. .

> *The idea of cities for sale has never been more appropriate in relation to Buenos Aires than under Macri's administration, in view of the business logic it has applied to urban cultural planning, giving priority to symbolic*

and artistic productions that are market-friendly and profitable […].[45]

The main policy in this period involved promoting creative clusters or "creative districts" to spatially organize creative activities and to regenerate some of the deteriorated and impoverished former industrial areas. This plan followed some international experiences, explicitly the model of Barcelona's 22@ district, after intensive political exchange between the two cities.[46] But the plan did not take into account the contextual differences, the pain points and criticism of this imported model.[47]

Creative Districts

The goal of Buenos Aires' creative districts, now officially called Economic Districts, is to strategically develop the creative economies, and thereby to improve their competitiveness and productivity. The districts are part of a long-term urban plan – the 1998 Plan Urbano Ambiental (Urban Environmental Plan)[48] to balance the unequal growth of the northern and southern areas.

The southern neighborhoods are historically degraded and concentrate the most vulnerable population, with less access to infrastructure and culture, and economically disenfranchised due to deindustrialization. This contrasts with the more consolidated northern neighborhoods, inhabited mostly by the middle and upper classes.

In practice, the creative districts are geographically demarcated areas in which the city generates incentives such as tax exemptions for creative companies and real estate developers and invests in public infrastructure and equipment, security and environmental measures.

The premise is that establishing creative companies and workers in territories with deteriorated economies will create the necessary synergies to increase the economic and social value of the neighborhoods.

Francisco Cabrera, former Economic Development Minister of the City Government of Buenos Aires (2007-15), in charge of designing the districts' policy, explains:

One of the main elements to position a city is to build a brand […] that allows it to compete with other cities, no longer for investment or tourism, but for attracting talent. What is now called the 'creative class.' […] when it comes to policies that support a distinguishing city brand for Buenos Aires, we agreed on a strategy: to promote

knowledge-intensive value-added industries. The creative, talented industries: technology, audiovisual, art, and design. […] We not only promote industries that concentrate creativity and talent […] but we also decided to create a community around them. And that's how the Buenos Aires' districts were born. […] The districts are a formula for success that rests on the Buenos Aires brand values: talent and creativity. They position Buenos Aires not just because they attract investment, but because they make Buenos Aires an attractive city to develop yourself and to live in, and they seduce this 'creative class' for which the world competes.[49]

The narrative is well known[50]: city branding, creative class, knowledge economy, creative ecosystems.[51] Until now, four creative districts have been developed: the Technology, Arts, Design and Audiovisual districts (only the latter is not located in the south).

Established in 2008, and inspired by Barcelona's 22@, the Technology District became the first planned creative district. It is located in Parque Patricios, a neighborhood with an industrial past and a predominantly working-class immigrant population, with a strong community organization, collective housing and some cooperatives. All these social structures began to erode in the 1970s when factories started to leave the area.

This new 328-hectare district benefits ICT businesses and several companies have already moved their offices there,[52] in addition to three private university centers. However, neither the actual configuration of a "digital ecosystem" nor the benefits for the agglomeration beyond fiscal incentives for ICT companies are as yet clear.[53]

The most immediate impact has been on the built environment and the revaluation of land (and to a lesser extent, housing). However, it has not yet been studied if there is a relevant population change, that is, if the neighborhood has managed to become a place that is attractive enough for creative workers to live in. One of the flagship projects is not tech-related but involves constructing a new city hall (the Centro Cívico), designed by Norman Foster.

In 2012, the city government presented the Arts District with similar objectives and incentives to those of the Technology District. [54] Upon the announcement, the project faced immediate resistance from neighborhood associations and many artists.

The Arts District is located in La Boca, a southern neighborhood previously home to the port and where European immigrants arrived a century ago. Throughout the 20th century, numerous artists also settled there. The artists participated in community life and formed avant-garde artistic groups that achieved local and international relevance, like the Grupo La Boca, highly influenced by Italian migration and the aesthetic representation of the neighborhood.

The artists have stayed in La Boca until now and share the neighborhood with a traditional working-class, an emerging middle class, recent Latin American migrants, residents of new informal settlements and tour operators. The latter because the neighborhood has become one of the city's most frequented tourist spots. Two imaginaries about La Boca coexist: that of a poor and dangerous neighborhood, and that of an attraction for mass tourists pursuing a romantic vision of tango, football and street art.[55]

The Arts District also includes a flagship project: the Usina del Arte (Arts Factory), an immense power station converted into a public cultural center.[56] Artists and neighbors opposed the Arts District project for several reasons: there was no social participation at the design stage (it was excessively top-down); the project served to promote real estate speculation without protective measures for current residents; independent artists or community organizations would not benefit from tax exemptions (because they hardly pay the kind of taxes included); only large market-oriented cultural and leisure establishments for tourists and residents of other neighborhoods would benefit (touristification); artists would end up being expelled because they would not be able to afford higher housing prices (gentrification). In conclusion, the opponents argued that the project would break existing social ties and that the existing creative cluster would eventually lose its attraction.[57] Despite the enormous efforts of the local government to attract the neighborhood's artists, they have continued to resist the project. The Arts District, in short, is being developed without the participation of a significant group of artists[58]

The Design District was planned around the Centro Metropolitano de Diseño (CMD), a design center developed by the city council in 1999 in an old fish market in Barracas, adjacent to the two other creative districts and also with an industrial tradition. The CMD was created to promote the design as a strategic industry. It was part of an international campaign to position Buenos Aires as a "city of design" (it was the first city to be declared by UNESCO as a Design City within the Creative Cities Network, followed by Berlin, Montreal, Bilbao, Shanghai and others).

The CMD operates as an incubator for small firms, independent professionals and micro-entrepreneurs (IncuBAte program). It also provides training, advice and technical consultancy, hosts design events, schools and a fab lab (*Laboratorio Tecnológico*), and promotes research and publications (*Instituto Metropolitano de Diseño e Innovación*). It also aims to improve the global competitiveness and export capacity of the local design industry (Oficina de Moda) and to "promote the development of entrepreneurship to enhance the innovative ecosystem."[59]

Notwithstanding efforts to push the district beyond the CMD, only 36 design companies have been registered there[60] while most of the activities take place within the CMD. The main problem is that most of the projects that have participated in CMD incubation programs have subsequently moved to other districts, ones more consolidated and closer to consumers. Some urban changes are visible, especially infrastructure and real estate developments, thanks to public investment and tax benefits, but they have little connection with creative activities.

The Audiovisual District is not located in the southern part of the city but in an area that already had a large number of audiovisual companies, TV, film and advertising producers, television stations and schools. It is, without a doubt, the most consolidated cluster but it has developed mainly by private initiative.

Audiovisual companies began converging in the 1990s in a sector of the Palermo neighborhood that, real estate agencies called (not without irony) "Palermo Hollywood." In a few years, the audiovisual industry was consolidated. Proximity has promoted collaboration between companies as well as informal spaces for interaction between creators and industry professionals.

The district became attractive not only for audiovisual companies but also for creative workers. It also attracted many other creative activities such as design studios, fashion stores, book shops, music venues, clubs, etc.

While these production and consumption dynamics were already in place, the city government decided to create the Audiovisual District to promote the existing cluster and boost real estate development in the district's periphery where renewal and gentrification had not yet been happened.

The unofficial creative clusters

Independently of the creative districts established by the local government, other creative clusters have emerged without direct public intervention but generated instead by artists and entrepreneurs. The following cases illustrate two types of bottom-up experiences: a more commercial, market-oriented cluster and an alternative, non-mainstream hub.

Palermo's fashion design cluster

Away from the Design District of Barracas, a fashion design cluster composed of small businesses and shops, design studios and schools has developed for over two decades in the Palermo neighborhood.

In the 1980s, and in the early 1990s, the *diseño de autor* (original fashion design) was very experimental and barely commercial and took up spaces associated with youth and underground culture (nightclubs, gay scene, and artistic spaces). But in the following years, professionalization and consolidation brought forth a more conventional and commercial circuit.

In the 1990s, Argentina's neoliberal economic policy destroyed many productive sectors and the fashion design and manufacturing industry was particularly affected. At the same time, the first generations of fashion designers were graduating from the University of Buenos Aires. The disappearance of jobs meant that this highly educated group of designers began developing alternative, self-managed practices. To survive as professionals, they also became small entrepreneurs, with few resources and needing to take over the entire design and manufacturing process. They designed, produced and marketed their own brands.

In the 2000s, some designers began settling in part of the Palermo neighborhood, partnering with each other to afford rentals. This area was already beginning to be recognized as a creative cluster, mainly by the audiovisual industry. In this way, two creative sectors coincided and complemented each other:

This provided something fundamental for the designers who came to the neighborhood to install their stores: circulation and customers [...] who not only had the economic resources to consume these products but also shared the cultural and symbolic codes to 'understand what this is about', that is to say, to decode or read the design work as it is. [...]

These production processes contribute to the agglomeration of producers and create a kind of favorable 'atmosphere' to the circulation of their products. The agglomeration increases the dynamism and productivity of the system, its creativity. Social relationships overlap with spatial relationships and allow creative fields to be shaped.[61]

IMPA La Fábrica Ciudad Cultural

As mentioned, the repurposing of disused factories as cultural spaces is a global trend that has also occurred in Buenos Aires. But the case of IMPA is a singular one because the industrial activity and the artistic use of the space coexist in a model based on cooperation and solidarity.

The Argentine crisis of 2001–2002 made this experience possible. The great economic recession meant that many companies went bankrupt, with owners not only closing but also abandoning factories. In response to losing their jobs, former employees took over factories and started running them as worker cooperatives. Such *fábricas recuperadas* (recovered factories) multiplied during the toughest years of the crisis under the motto: *'Ocupar, resistir, producir'* (Occupy, resist, produce).[62]

The first factory to be taken over was IMPA, a packaging plant, after its former owners had "drained" the company, increased its debt and laid off dozens of employees. In 1998, the workers occupied the plant and started producing again, now as a new cooperative.[63] Soon after, the cooperative decided to create their own Soon after, the cooperative decided to create its own cultural center: IMPA La Fábrica Ciudad Cultural. Over the years, IMPA has become a vibrant and dynamic creative hub.[64] It is self-managed and self-funded, without direct control by the cooperative.

IMPA La Fábrica offers workshops, art exhibitions, music and theater performances and festivals open to the community. In addition, it has its own radio (Radio Semilla), a TV station and "audiovisual group of political action" (Barricada TV), a design cooperative, a "popular high-school" (a self-managed school for adults and adolescents following a collaborative learning approach) and a health center.

The cultural center remains closely related to the factory's production, its principles of solidarity, self-management and horizontality, and its methods of occupation and appropriation of the space and the means of production.

Apart from giving us clues about the governance of the cultural sector and the complex relationship between state and civil society, they [cultural spaces such as the IMPA] reflect the decay and abandonment produced by the failure of manufacturing economies, as well as global economic shifts towards post-industrialisation. Furthermore, they allow us to observe how at the grassroots level that void is filled by spontaneous, bottom-up experiences that resort to creativity to generate jobs and workspaces. Some cases of planned creative hubs, in contrast, might reveal a type of fast-food policy where quick, easy and already processed recipes are sought to revitalise neighbourhoods by invoking culture as a panacea, that is, a universal magic cure to all urban illnesses.

In the Latin American context, the institutional field of the creative economy is developing rapidly. Creative hubs [...] have been at the centre of public policy initiatives aimed at local economic development through an agglomeration of creative activities, tax incentives and targeted training, particularly in deprived city areas. At the same time, grassroots creative hubs have existed for long, without using the 'creative hub' label, as self-managed (autogestionados) or community-run cultural centres, with collaborative learning, informal networks and shared spaces for cultural production. Despite the central importance of the creative economy for the region, its contribution to employment and national economies remains, to a large extent, invisible to official measurements and the general public."[65]

Santiago

Chile's capital has approached the concept of the smart city mainly from a techno-scientific perspective. Most of the initiatives classified as smart by the local government and the corporations have been based on technological applications aimed at improving the efficiency of the city in terms of mobility, waste and water management, security, natural disasters, etc.

While Santiago usually "leads most international rankings as the city that has made the most progress" in the direction of smart city applications in Latin America,[66] such smart initiatives have had only limited reach, real impact and public investment:

[...] the most salient characteristic of Santiago's SC trend when compared to other cities around the world is its limited scope, essentially as a result of high levels of inequality and precarious city-wide infrastructure and material conditions. [...]

Temporary initiatives (mostly based on tactical urbanism) presented as Smart projects in Santiago are the authorities' way of creatively promoting smartness in a space of scarcity by means of low-budget action, global aesthetics, and high public impact that contribute to the construction of a local Smart narrative that we consider to be an urban placebo. [...]

While some SC interventions are portrayed as addressing key social problems, such as inequality, along with their most visible urban expressions, such as socio-economic segregation, crime or perceived crime, and urban decay, they are not in fact intended to solve these problems in any way. Rather, they seek to alleviate the perception of symptoms on the part of urban inhabitants by emulating the effects of a 'world-class city' narrative through reproduction of the aesthetics associated with global SC narratives at a local level."[67]

As noted, these initiatives are not equally distributed, not to mention the income bias in favor of the richest areas. Inequality is one of Santiago's main problems in terms of citizen access to infrastructure, culture, green spaces and services.[68]

Several large corporations have initiated smart city projects with solutions. Already tested in other cities, these projects involve little public intervention and largely exclude citizen participation.[69] In general, the local authorities only supports or finances projects through public-private partnerships, such as Sé Santiago a metropolitan smart city program. [70]

While the smart city agenda has had limited impact in public policies, in recent years the administration has focused its efforts on creating a startup ecosystem mainly based in Santiago through an original program called Start-Up Chile. This public initiative seeks to develop the next "Latin American Silicon Valley" or "Chilecon Valley," as the venture was informally called. Over the years, it has become a benchmark for many other cities. At the same time, a series of bottom-up creative clusters have emerged in recent decades with a high degree of autonomy in the absence of public support and despite precariousness and instability.

Start-Up Chile

Start-Up Chile iis the first public business accelerator in the world, created in 2010 and financed by the Chilean economic development agency CORFO. The primary objective of the program is to create a local innovation ecosystem, to become the biggest regional tech hub and a relevant player on a global scale. In brief, "to change the nation's culture towards entrepreneurship and to position Chile as the hub of innovation for Latin America."[71]

Although it is a national program, its activity is centralized in Santiago and the greatest impact occurs there. The original program was created on the premise that if foreign creative talent was imported, it would contribute to Chile's international insertion and promote local talent through a spillover effect. In the first year, only foreign startups were able to participate. This has since changed.

Since 2015, after the initial phase, Start-Up Chile has focused on startups interested in using Chile as a platform to scale in Latin America. It has given greater importance to promoting companies that want to settle in the country and hire local labor and suppliers, and also to improve the participants' gender ratio. It currently has two other subprograms apart from the main acceleration one: a pre-acceleration for early-stage startups and a "scale" one for the expansion of innovative businesses. The primary focus is on tech-based startups, innovation, scalability and impact, regardless of nationality and industry.[72] Horacio Melo, former Executive Director of Start-Up Chile (2011-14), explains:

By bringing entrepreneurs to Chile from all over the world, Start-Up Chile not only makes Chile better connected to the rest of the world, it also contributes to a [local] *cultural change that creates more openness toward entrepreneurship.*

[...] The premise of Start-Up Chile is simple: Chileans should invest in talented people no matter where they come from. The program should look at their projects and capabilities first, passports second.

[...] we seek two categories of impact. First, we seek to make Chile a country that promotes an entrepreneurship, not only by bringing in more entrepreneurs but also by creating a much better-developed ecosystem of supporting institutions – including venture capital firms and angel investors. Second, we aim to select at least one project that, in the medium term, grows into a billion-dollar company. [...] However, the greatest interest is in encouraging entrepreneurs to start their projects in Chile because they see this as an opportunity to create value in the country in the long term. [...]

This is a public policy that goes against the normal arrangement in which public spending is supposed to return direct benefits to taxpayers. Instead, this policy seeks to create a long-term impact on the national economy and the Chilean business ecosystem, precisely by not investing directly only in Chileans but in a group of talented people regardless of their country of origin.

[...] Start-Up Chile understands that the individual entrepreneur is best equipped to recognize opportunities and will go where those opportunities are.[73]

The three fixed-term programs offer startups equity-free funding (from USD 6,500 dollars for the pre-acceleration program to 100,000 dollars for consolidated startups in expansion stage), a one-year working visa, free coworking space in downtown Santiago, tech support and business services, a training program, local and global experts advise, exposure to an investor network and access to community events.[74]

From the outset, Start-Up Chile has been supported by global tech and entrepreneurship gurus and has sought to internationalize Chile. According to the "official version":

Start-Up Chile was born in 2010 from the ideas of two people: a Chilean, Nicolas Shea, who was living in the United States and

finishing his master's at Stanford University, and Vivek Wadhwa, an Indian academic and technology entrepreneur who lives in Silicon Valley. They believed that the best way to go to the next level in innovation and entrepreneurship in Chile was through immigration. Their idea: to bring foreign entrepreneurs to launch their start-ups in Chile, and in so doing to increase the country's access to worldwide business networks."[75][76]

Vivek Wadhwa apparently had a great influence on the design stage.[77] He even defined Start-Up Chile as "the most ambitious" program to attract skilled entrepreneurs:

Why would Chile do this? Because they're betting that if they get enough smart, talented people there, three things will happen: first, many of the entrepreneurs going there will fall in love with the country and decide to stay; second, they will enrich the local ecosystem by teaching local entrepreneurs about global markets; and third, their tech community will develop stronger links to the world. Who knows, a couple of start-ups may also hit home runs. After all, isn't this how Silicon Valley left tech centers like Boston in the dust and became the world's tech leader?

Chile's strategy of attracting skilled immigrants makes a lot of sense when you consider that it costs practically nothing compared with the billions that regions invest in creating industry clusters. The fact is that smart people, when given the education and means to innovate, make the magic happen.[78]

Even if the program has not yet put Chile on the world map of innovation and entrepreneurship, it is certainly well-positioned, especially for a small country that is not used to attracting a lot of international attention. The Economist christened it "Chilecon Valley," while other publications have highlighted that "there now exists a robust and growing culture of entrepreneurship where once there was nothing" or that it is "changing Latin America."[79]

Internationalally, Start-Up Chile is one of the most ambitious and well-endowed 100% public accelerator programs, and many other governments have launched similar initiatives. Start-Up Brasil has followed this model, as well as Rising Up in Spain, with a much more limited scope and results.[80] In total, the Start-Up Chile model has "influenced the creation of 50 entrepreneurship programs across the world."[81]

Internationalization has been, without a doubt, one of the greatest successes of Start-Up Chile, while the economic results are more difficult to measure. In any case, it should be taken into account that the program's main challenge was to "change the innovative culture" in the long term first and not to generate an immediate economic impact. According to a study carried out by Start-Up Chile, 56.4% of active startups still have operations in Chile (50% are foreign entrepreneurs).[82] Over 2,000 startups (72.6% are foreign companies[83]) and 5,000 entrepreneurs have benefited from the program, including one "unicorn" (currently valued at over USD 1 billion) and 29 "ponies" (at over USD 10 million).

Santiago's creative clusters

Unlike Barcelona or Buenos Aires, Santiago has not had an active policy to promote creative districts or clusters as a means of urban rehabilitation. In this case, urban renewal has been a consequence of municipal policies of liberalization of land use, tax incentives for new constructions, and greater investment in public infrastructure to promote private real estate developments, something that some authors define as "neoliberal urbanism."[84] On the contrary, in recent decades a series of clusters has emerged spontaneously around creative activities as a result of private initiative.[85]

This is the case of Bellas Artes and Lastarria, two adjacent neighborhoods in downtown Santiago. Until the 1930s, this area was the epicenter of Santiago's cultural life, between the National Museum of Fine Arts and the National Library a few blocks away, with great public infrastructure and modern architecture. It initially attracted the cultural and political elite and, later, a generation of avant-garde artists (including Alejandro Jodorowsky's studio) who socialized in cafes, theaters and galleries. The military dictatorship (1973-1990) abruptly interrupted cultural life and the neighborhood entered a period of decline. Studios and cultural spaces closed, and artists abandoned the area (many went into exile).

In the 1990s and 2000s, with the return to democracy, a new generation began revitalizing the artistic past of Bellas Artes-Lastarria and settled there: artists, neo-bohemians, and part of the professional creative

elite. It also attracted the gay community and became progressive and diverse.

While becoming "fashionable" and a magnet for artists, it also turned into an unplanned creative cluster, with fashion design stores, architecture and design studios, ateliers, art galleries, bookstores, music venues, cinemas, avant-garde cuisine, coworking spots and new cultural spaces of great relevance for the city. Among them are the Museo de Artes Visuales (MAVI) and the Centro Gabriela Mistral (GAM), the largest metropolitan center for contemporary arts (opened in 2010). As Christian Matus states:

> All these transformations reconfigure Lastarria / Bellas Artes into a new urban centrality, with its own economic dynamics, as it concentrates and agglomerates in its territory a cluster of services linked to the symbolic economy. This provides new residents and users of the neighborhood with distinctive goods and spaces for consumption.[86]

Similar creative clusters have been established in other areas by private initiative. Barrio Italia was a neighborhood characterized by a mix of residences and garages, small factories and industrial warehouses. In the 1980s, artists began using the industrial spaces. Two decades later, Barrio Italia has been consolidated as a creative cluster. The artists' studios were joined by designers, shops, art galleries and gastronomic venues, and a commercial circuit where local production is consumed.[87] Barrio Italia also brought forth an innovation hub that has grown very rapidly and is expanding to other parts of the city. iF (originally, Ideas Factory) was founded in 2014 by a group of experienced entrepreneurs and cultural managers. It is a collective space for experimentation where individuals, social organizations, innovation projects, thematic incubators, small businesses, startups, investment funds and universities work together and make up an ecosystem of creative services, co-creation and outreach.[88]

Today, iF runs a makerspace (Stgo MakerSpace), a theater, an academy, a digital lab, a coworking space, an innovation consultancy for large corporations and startups, and more. The business model consists of space rental, subscriptions, events production, and creative business consulting. iF is expanding to other parts of the city and Chile: seven more spaces have opened in recent years.

The business model consists of space rental, subscriptions, events production, and creative business consulting. And now iF is expanding to other parts of the city and Chile with seven more spaces opened in recent years.

The indie music scene

Another independent creative cluster that has consolidated in Santiago with barely any public support is the experimental music or indie music scene. Neither located in any specific area of the city nor representing a geographical concentration of artists or spaces, it is rather a virtual network of creators and audiences.

Santiago's indie music scene emerged in the post-dictatorship and consolidated in the 2000s. It has developed into one of the city's most recognized cultural industries due to its quality and creative power – despite precarious conditions and due to its underground character. It has developed almost invisibly and autonomously from official cultural policies.

Given their precarious situation, its agents perform several roles simultaneously: they are musicians in their own bands and contribute to others: as producers, distributors (mainly on streaming and social media platforms), cultural managers, promoters and, of course, audiences. Their DIY practices and entrepreneurial spirit are tactical: it is the only way to survive.[89][90]

This unlocalized, anti-hegemonic scene breaks with various premises of the typical clusters, especially with the supposed benefits of territorial agglomeration. Santiago's indie scene exists as an interpersonal network distributed across the city. Although its music venues, rehearsal spaces, record stores and meeting places are not established in any specific location, the scene still functions as a cluster:

> [...] it does not comply with any of the spatial assumptions of cluster theory. The experimental music scene occupies a space but this is not delimited or fixed, and it is not urbanistically defined, as it would be expected from a creative cluster. On the contrary, there is a productive ecology that occupies a multiple, changing, extended, virtual and contingent spatiality. But this [...] does not prevent the experimental music scene from achieving stability and, even more, the typical performance of a cluster. [...] Faced with a hostile environment and highly precarious conditions, the key to

survival is not to fixate [to a territory], but to adapt momentarily to the specificities of each situation or event.

　　[…] This approach to the geography of clusters in general, and creative clusters in particular, is especially useful in developing cities where the urban characteristics of the cluster theory – applicable only to very specific cases in Europe and North America – are not found.[91]

Endnotes

1   The term "Ibero-America" refers to all Spanish and Portuguese-speaking countries in the Americas. As a rule, it includes Spain and Portugal. The Organization of Ibero-American States includes Catalan-speaking Andorra and Equatorial Guinea.

2   Although several studies have compared Latin American and Spanish cities (especially Barcelona), only a few have treated Ibero-America as a cultural and political space. Particularly worth mentioning is Arturo Rodríguez Morató & Matías I. Zarlenga (2018) Culture-led urban regeneration policies in the Ibero-American space, International Journal of Cultural Policy, 24:5, 628–646. According to Rodríguez Morató & Zarlenga, *"[...] it should be noted that the complete transposition of the Iberian models to Latin America is nearly impossible, to the extent that in Latin America, due to the lower resources available to administrations, the emulation of strategies consisting of the creation of cultural flagships or the organisation of cultural mega-events has been unaffordable or counter-productive. Rio de Janeiro, which tried to erect a Guggenheim Museum, like Bilbao, between 1999 and 2005 and which later organised the Olympic Games, like Barcelona, in 2016, is proof of this because it did not reach its first goal and the results of his second bet were almost catastrophic. [...] the common starting specificities between the Iberian Peninsula and Latin America, and the intense exchange flows between them have determined the appearance of similar institutional mechanisms and the application of similar principles and tools in both areas. [...] Factors such as those just mentioned favour a certain similarity in the approaches to cultural regeneration policies throughout the Ibero-American area. Of course, this does not translate into a specific Ibero-American approach. But [...] there are some common features in the approaches of these policies across the whole area. The aforementioned tendency to adopt hybrid approaches, which combine the cultural and social, is one of them; and this can be related to the relatively weak autonomy of the cultural sphere within the area. Finally, the most distinctive feature could be the concern for participation and inclusion, very present in the Iberian examples analysed, notably in Barcelona, but also in Latin America [...]. This can be linked to the democratising character that culture-led urban regeneration policies have tended to have in Ibero-America [...]."*

3   Joaquim Rius schematizes the Barcelona Model as follows: *"Among the elements typically attributed to the Barcelona Model it is common to emphasize (a) the use of large events and culture as symbolic-material strategies to transform the city, (b) the introduction of the logic of strategic planning, (c) governance and co-operation among different levels of government and public-private partnerships in generating urban projects of public interest, (d) the leading role of technicians (architects, planners, cultural managers) in the development of the urban project and (e) the development of mechanisms for citizen participation and the broad public consensus elicited by the model. Consequently, one can speak of the Barcelona Model of urban renewal as a model of municipal leadership and social democratic inspiration in opposition to the spectacular and privatised urbanism of North America."*
     In: Joaquim Rius, Gil-Manuel Hernàndez i Martí & Francisco Torres (2016) Urban Development and Cultural Policy "White Elephants": Barcelona and Valencia, European Planning Studies, 24:1, 61–75.

4   *Cultural planning is a central piece of the Barcelona Model [...]: Barcelona is a city with considerable cultural heritage and activity that this urban development model managed to preserve and promote. Local elites, well aware of this situation, have made culture a central element in the redefinition of the strategies for the future of the city. And the local government has opted to convert the cultural and knowledge sectors, in addition to tourism, into vectors for the development of the local economy.*
     In summary, the identifying features of the 'Barcelona Model' of cultural policy are: the entrepreneurial strategy, the governance leadership, the private sector participation, and the agency in cultural policy. All this seems to place the model in line with the 'creative city'. However, the municipal government has always defended that its strategy sought its own model, a balance between international impact and local dynamics, the development of cultural industries and the development of cultural participation.
     In: Ma. Victoria Sánchez Belando, Joaquim Rius & Matías I. Zarlenga (2012) ¿Ciudad creativa y ciudad sostenible?: Un análisis crítico del "modelo Barcelona" de políticas culturales, Revista Crítica de Ciências Sociais, 99.

5   María Victoria Sánchez Belando (2015) Las Políticas culturales de proximidad en el paradigma de la ciudad creativa: el caso del programa de centros cívicos en la ciudad de Barcelona, Política y Sociedad, 52:1, 125-152.

6   Mónida Degen & Marisol García (2012) The Transformation of the 'Barcelona Model': An Analysis of Culture, Urban Regeneration and Governance, International Journal of Urban and Regional Research, 36, 1022-1038.

7   On the commons model and cultural policies:
     A particularly influential current in Spain, but also internationally, has tended to reconceptualize cultural policy as a tool of anti-hegemonic political antagonism that would allow the construction of a common space, neither private nor public, in which social movements would gain control of cultural institutions [...]. This commons paradigm [...] is an alternative to the neoliberal-oriented paradigm of cultural policies [...]. Social movements originated in the 15-M and the new politics attribute, in general, a central role or significant importance to cultural and symbolic aspects, along with the existence of cultural intermediaries in the broad sense.
     In: Joaquim Rius and Veronica Gisbert (2018) ¿Por qué las políticas culturales locales no cambian? Constricciones del modelo urbano, inercia en la gestión y batallas culturales en los «gobiernos del cambio» en Madrid y Barcelona (2015-2018), Revista Española de Ciencia Política, 47, 93-122.

8   For an in-depth analysis of political inertia and why cultural policies have not experienced a real change in recent years in Spain, see: Joaquim Rius and Veronica Gisbert (2018) ¿Por qué las políticas culturales locales no cambian? Constricciones del modelo urbano, inercia en la gestión y batallas culturales en los «gobiernos del cambio» en Madrid y Barcelona (2015-2018), Revista Española de Ciencia Política, 47, 93-122.

9   *"Long before the ascent of the smart city agenda, the city of Barcelona was a widely acknowledged referent for global urbanism. From the early 1990s onwards, the so-called 'Barcelona Model' encapsulated the supposed virtues of top-down strategic urban planning; the ability of city planners to adapt urban policy according to changes in the wider landscape of interurban competition and dominant understandings of urban growth; and citizen-focused urban policies (…). In the 2000s, however, the Barcelona Model underwent a transformation. In the context of the global fascination with the 'knowledge-based economy', and with the determinants of urban competitiveness in an ever more 'digital age', successive local governments pursued more entrepreneurial strategies in which the interests of global corporations, financiers and real estate developers seemed very clearly to eclipse those of the city's residents. This trajectory only seemed to be complete after 2011, when – in the context of a profound and protracted economic and social crisis – the city's municipal government committed itself to making Barcelona the world's leading smart city (…)."*

In: Greig Charnock, Hug March & Ramón Ribera-Fumaz (2019) From smart to rebel city? Worlding, provincialising and the Barcelona Model, Urban Studies, 58:3, 581-600.

10   After leaving the city council, Ferrer became a private consultant on smart city strategies for different local governments around the world and has also worked for multinational ICT corporations.

11   Josep-Ramon Ferrer (2017) Barcelona's Smart City vision: an opportunity for transformation, Field Actions Science Reports, Special Issue 16, 70-75.

12   Vives is currently CEO of a smart city consultancy firm. Is the author of Smart City Barcelona. The Catalan Quest to Improve Future Urban Living (2018, Eastbourne: Sussex Academic Press).

13   Antoni Vives (2014) Barcelona, proyecto y sueño social, Revista de Obras Públicas, 3550, 27-30.

14   Ajuntament de Barcelona (2012) MES (mobilitat, e-administració i smarts cities) l'estratègia TIC de l'Ajuntament de Barcelona al servei de la ciutat i dels ciutadans: mesura de govern.

15   *"[…] in addition to the development of CityOS, the [Mayor Xavier] Trias government had also made considerable inroads into positioning Barcelona as the prime international referent for smart city transformation through its leading role in the City Protocol Society: 'a delivery-focused network of global cities that, in partnership with industry, research agencies and other organisations', expressly sought to produce common technological and industry-based standards, technologies and solutions; 'recognised and certified projects and policies of reference for cities, tested in cities that can be used as examples for other cities'; and produced a database of indicators. […] to make Barcelona the standard referent or model at the centre of a profitable endeavour to generate and circulate a standardised, interoperable ontology that could provide a 'common language' with which to describe the anatomy of a city, whatever and wherever the specific urban context.*

[…] Under the Trias administration, a range of additional concrete initiatives were undertaken to make Barcelona the world's leading smart city and, in the words of Barcelona's then-Chief Architect Vicente Guallart, an international referent for 'a new model of networked cities, with self-sufficient and productive neighbourhoods at human speed, within a hyperconnected zero emissions city'. […] Contractual agreements were struck in 2012

with the likes of Cisco, Schneider Electric, Suez and Endesa to develop several local projects and pilots, principally in the areas of infrastructure, sensing and operation systems/software. Such was the additional progress made by the Trias administration by 2015 that, according to a Fortune report, Barcelona was 'the most wired city in the world' with a smart city agenda that, at that time, 'seemed unstoppable.'"*

In: Greig Charnock, Hug March & Ramón Ribera-Fumaz (2019) From smart to rebel city? Worlding, provincialising and the Barcelona Model, Urban Studies, 58:3, 581-600.

16   Meritxell Pauné (May 11, 2015) Ada Colau (BComú): "De lo primero que haré será convocar a la banca", La Vanguardia.

17   Pisarello continued: *"In Barcelona, too often, the smart city has been thought and designed according to the exclusive interests of large technological corporations that operate thousands of kilometers away from the city, regardless of their specific needs and their inhabitants. As a city government, we understand that this logic cannot continue. That we must broaden the focus of the debate and to go beyond the notion of smart city that, as sociologist Saskia Sassen condemned, 'kills the city.' [...] Nor we can allow that the huge amount of data that the city of Barcelona generates to end up in a few private pockets instead of operating as open-source, at the service of all the neighbors of the city. [...] The digital economy offers great opportunities to move towards a more diversified economy, more cooperative, and less dependent on current 'monocultures' such as tourism. [...] None of this, of course, can be done without the citizens' active participation in the co-production of public policies and within institutions that are too porous to private interests that are incompatible with the common good. This is why it is essential to rescue the concept of smart city from its purely marketing or commercial use. [...] We cannot conceive a city being smart if it is not at the same time, and above all, just and democratic."*

In: Gerardo Pisarello (November 25, 2015) Ciutat intel·ligent, per a què?, Diari Ara.

18   *"One of the greatest challenges for the new municipalism is to redefine the meaning of the so-called smart cities. [...] This authentic revolution could allow a significant leap in the improvement of urban public policies. However, in our experience from Barcelona, this is not always the case. Many cities hire services from large tech corporations without retaining any control over what they are paying for and how these companies operate. Often, these contracts are opaque, not very transparent, and do not involve the citizens or take into account their real needs. What is more, many of these tech giants prevent small and medium-sized companies or startups from accessing essential data to create innovative initiatives or jobs. [...] However, a city's smartness cannot be measured solely by its ability to place sensors and collect data. Technology must be linked to improving the quality of life of the most vulnerable residents and promoting a collaborative economy at the service of the common good. Otherwise, the concept of smart city runs the risk of legitimizing increasingly privatized and locked up communities, for a minority only. [...] The political agenda of smart cities cannot be purely technocratic or be taken prisoner by a few giants like Cisco or Microsoft, or benefit predatory deregulated platforms like Uber or Airbnb, without any compensation. On the contrary, in a democratic city, technology should serve to digitally empower citizens, to protect their privacy from abuses of public and private power, to fight corruption, and to advance toward a more fair and sustainable economy. This has a name: the conquest of technological, digital sovereignty for the common good."*

(Gerardo Pisarello (June 21, 2016) Ciutats amb sobirania tecnològica, El Periódico)

19   Ajuntament de Barcelona (2016) Transició cap a la Sobirania Tecnològica: Pla "Barcelona Ciutat Digital": mesura de govern:
"*Barcelona wants to lead a transition towards technological sovereignty [...] to produce a new economy and also facilitate knowledge-sharing among cities.*

From an economic point of view, it is necessary to orchestrate an inclusive public innovation strategy, with strong participation of key actors of the city (industry, academia, research centers, citizens, developers, social entrepreneurs, cooperatives, local service providers, etc.) that contribute to revitalizing the digital innovation ecosystem. With suitable public policies, technology can be the driving force for a more equitable and sustainable economic growth that reduces social and economic inequality, guaranteeing the leadership in urban innovation technology, technological and data sovereignty, democratizing the access and ownership, protecting the rights and privacy of the citizens, the autonomy and the self-determination. [...] Bottom-up innovation processes must enable talent attraction, the active participation of the citizens to resolve the city challenges, and the empowerment of the people for the new global challenges. [...] In recent years and during the previous government, the city of Barcelona has invested significant amounts in Smart City projects under an intense technological vision (technology-push), which resulted in a series of dependencies on providers of basic infrastructure and services [...]. The current administration does not step down from the work done and the positioning of Barcelona but wants to go further and overcome the current Smart City model to make Barcelona an open, equitable, circular, and democratic city.

In short, our goal is to prove that the implementation of network technology in the urban environment goes beyond instrumentalizing the city with technology, sensors, and actuators. It has a broader and more ambitious objective: to address long-term social urban challenges such as wage gap, climate change, environmental scarcity and employment while involving the population through participatory processes (bottom-up)."

20   For an evaluation of the smart city plan since 2015, see: Marco Berlinguer, Joan Subirats, Elisabet Roselló [et al.] (2019) Repensar la Smart City. Barcelona: ciudad abierta, colaborativa y democrática. Barcelona: Icària.

21   The report describes the full list of projects and initiatives carried out by Barcelona City Council from 2015 to 2019 in the following areas: digital transformation, digital innovation and digital empowerment. In: Ajuntament de Barcelona (2019) Barcelona ciutat digital: la tecnologia al servei de la ciutadania (2015-2019).

22   For comprehensive research on the cultural clusters of Barcelona: Joaquim Rius & Matías Zarlenga (2014) Industrias, distritos, instituciones y escenas. Tipología de clústeres culturales en Barcelona, RES Revista Española de Sociología, 21, 47-67.

23   56% of residents come from abroad (Pakistanis and Filipinos being the largest groups of foreign nationals after Spanish). El Raval has also been the alternative place of residence for the lgbt community for decades, the counterpart to the more recent market-oriented 'Gaixample' gaybourhood in the Eixample district.

24   Ajuntament de Barcelona (2000) Modificació del PGM per a la renovació de les zones industrials del Poblenou –districte d'activitats 22@BCN–: text refós.

25   22@NetworkBCN. El Districte 22@, el primer Innovation District.

26   Ajuntament de Barcelona (2020) Impulsem el 22@: Cap a un Poblenou amb un 22@ més productiu, més inclusiu i més sostenible: mesura de govern.

27   According to the Barcelona City Council, in 2017 Catalonia was the fourth region in Europe with the largest population employed in technology-intensive production (concentrated in the Barcelona metropolitan area). The ICT sector employed 54,000 workers (5.1% of the total workforce). Catalonia is home to 23% of Spain's technology and digital companies (90% of them in Barcelona). The ICT sector produces 8.1% of Barcelona's gross value added. Barcelona also has a good track record for start-ups and digital entrepreneurship. In: Ajuntament de Barcelona (2019) Barcelona en dades. Indústria 4.0, Barcelona Metròpolis, 110, 48-51.

28   "*The 22@ is dramatically affecting the creative density, both through demolitions and because of the increase in rents that the urban intervention has entailed. The owners of industrial spaces, aware of the possibility of converting their properties to attract more profitable uses, are raising prices to a point that artists cannot afford. [...] In addition, the 22@ is expelling artists by transforming the cultural landscape that originally attracted them. Artists look for places that symbolically represent their innovative and disruptive ethos; this is the reason why they generally opt for spaces that are in the margins of the economic mainstream but rich in urban character and social dynamism. The urbanism of the 22@, based on headquarters and a definition of the future that does not include the neighborhood's historical identity, is homogenizing and trivializing the Poblenou landscape. And artists choose to leave in search of places that maintain their authenticity.*"
In: Joaquín Sabaté & Manuel Tironi (2008) Rankings, creatividad y urbanismo, Revista Eure, 34:102, 5-23. See also Joaquín Sabaté & Manuel Tironi (2008) Globalización y estrategias urbanísticas: un balance del desarrollo reciente de Barcelona, Cuaderno Urbano, 7:7, 233-260.

29   For a complete record of this citizen movement, its actions, and the negotiation process, visit: http://salvemcanricart.blogspot.com.

30   The Fàbriques de Creació is a municipal program that tries to address the lack of spaces for creation, workshops and gathering as a result of the growing pressure from the real estate market. It seeks to spread the creative "spirit" to the neighborhoods where they are located.
"'*Creation factories' were pushed as a programme with this idea. It defined 10 spaces emphasizing experimentation and creation in different artistic areas of the city (visual arts, music, theatre, dance, circus, literature and audio-visual) as a network that was accompanied by the support and protection of all the existing initiatives that, from a social base (community, association, private, etc.), were creating the conditions for creativity to emerge by facilitating access to spaces that could be used by creative people under more affordable conditions than those offered by the market.*"
In: Marc Martí-Costa and Marc Pradel I Miquel (2011) The knowledge city against urban creativity? Artists' workshops and urban regeneration in Barcelona, European Urban and Regional Studies, 19:1, 92-108.

31   *"These Art Factories therefore provide a safe space, free from the pressures of the industry, the media and the market, without ever losing sight of the rigour, thoroughness and quality of the projects they cultivate. […] Today, the Art Factories network is made up of 11 centres spread across several Barcelona neighbourhoods. In total, 30,000 m2 of old industrial buildings have been converted into spaces dedicated to artistic creation and innovation.*

Despite the public ownership of all these facilities, each of them functions with a high degree of independence. Aside from Fabra i Coats, which is run directly by Institut de Cultura de Barcelona, all the Art Factories are run by an external entity related to a specific artistic field.

This project draws inspiration from other international initiatives that have emerged since the late 90s. The most obvious influence being the project surrounding Trans Europe Halles, a European network of cultural centres established by citizens and artists in old converted factories. Among the most significant are the Friche la Belle de Mai in Marseille, the Cable Factory in Helsinki and ufaFrabrik in Berlin, along with many others."

In: Institut Cultural de Barcelona. Fàbriques de Creació.

32   More on the return of the artists to the 22@ creative district in: Daniel Paül i Agustí (2014) Repercusiones inesperadas de una transformación urbana ralentizada por la crisis. El retorno de los artistas al distrito creativo 22@Barcelona, Cuadernos Geográficos, 53:2, 87-102.

33   Marc Martí-Costa and Marc Pradel I Miquel (2011) The knowledge city against urban creativity? Artists' workshops and urban regeneration in Barcelona, European Urban and Regional Studies, 19:1, 92-108.

34   Manuel Castells & Sviatlana Hlebik (2017) Alternative economic practices in Barcelona: surviving the crisis, reinventing life, In: Another economy is possible: culture and economy in a time of crisis. [edited by] Manuel Castells. Cambridge: Polity, 160-186.

35   For more on alternative models and urban movements in Barcelona, see: Marina Pera (2020) Potential benefits and challenges of the relationship between social movements and the commons in the city of Barcelona, Ecological Economics, 174; and Greig Charnock, Hug March & Ramón Ribera-Fumaz (2019) From smart to rebel city? Worlding, provincialising and the Barcelona Model, Urban Studies, 58:3, 581-600.

36   In: David Gómez Fontanills, Mayo Fuster Morell & Enric Senabre (2018) Barcelona share ecosystem: A timeline, In: Sharing Cities: A worldwide cities overview on platform economy policies with a focus on Barcelona. [edited by] Mayo Fuster Morell. Barcelona: Universitat Oberta de Catalunya, 251-262.

37   For the complete timeline, see: David Gómez Fontanills (2017) Transitant cap al procomú: La Comunificadora, Barcelona Activa/Ajuntament de Barcelona.

38   On the "technological sovereignty" network of Barcelona:
"Since around 2014, the notion of "technological sovereignty" has gained influence in Barcelona as a way of imagining and building alternatives to the hegemonic model of technological development. Since then, TS activists have collectively theorised what technological sovereignty might look like in practice and how it might be pursued. […] The community conference SobTec creates a space for local initiatives to exchange ideas and reflect on their own practices and their politics. Other events like the Solidarity

Economy Fair of Catalonia and the Mobile Social Congress create spaces for networking and exchange of ideas across open-source, community-based technology projects, out of which "technological sovereignty" emerges as a common organising concept. […] The TS movement sits in relation to other movements in Barcelona focused on reclaiming energy, food, residential, cultural, and health "sovereignties". The concept of "sovereignties" has become an increasingly powerful organising concept for progressive and radical politics in Barcelona and beyond in recent years. […]

While TS activists experiment with alternative economic relationships and practices around digital technology, they do so from within localised communities. […] While all of these projects are committed to working locally, many of them are also extensively networked beyond the city. […] By working from within localised communities and actively reshaping the spaces of the city, the TS movement contests hegemonic "smart city" models. Yet, most of these initiatives remain rather small […]."

In: Casey R. Lynch (2019) Contesting Digital Futures: Urban Politics, Alternative Economies, and the Movement for Technological Sovereignty in Barcelona, Antipode, 52:3, 660-680.

39   David Gómez Fontanills (2017) Transitant cap al procomú: La Comunificadora, Barcelona Activa/Ajuntament de Barcelona.

40   The renovation was a participatory design project carried out by the cooperative of architects Lacol, also established in the Sants district. The project was based on the principles of self-management and self-build, collective design and work, shared knowledge, and reuse of materials.

In another sector of Can Battló, a cooperative is developing an autonomous social housing project.

41   On Can Battló, see: Maria Victoria Sánchez Belando (2017) Building alternatives to the creative turn in Barcelona: The case of the socio-cultural centre Can Batlló, City, Culture and Society, 8, 35-42.

42   Ajuntament de Barcelona. What is the "Ateneus de Fabricació" Network?.

43   According to Miguel Kanai and Iliana Ortega-Alcázar, *"Largely shaping urban cultural policy in Latin America are concurrent, contingent and often contradictory processes of democratization and neoliberalization. On the one hand, democratic regimes and the rule of law have been (re-)instated in most countries. Political decentralization and the transfer of responsibilities to local governments may be seen as part of this democratic transition, and some argue that new institutional spaces have opened up for urban leaders to implement innovative and pro-poor policies […]."*

In: Miguel Kanai & Iliana Ortega-Alcázar (2009) The Prospects for Progressive Culture-Led Urban Regeneration in Latin America: Cases from Mexico City and Buenos Aires, International Journal of Urban and Regional Research, 33:2, 483-501.

44   Led by Mauricio Macri, who later became president (2015–2019).

45   Cecilia Dinardi (2017) Cities for sale: Contesting city branding and cultural policies in Buenos Aires, Urban Studies 54, 101-85.

46   For a comparative analysis of Buenos Aires and Barcelona, see: Matías Zarlenga & Juliana Marcús (2014) La cultura como estrategia de transformación urbana. Un análisis crítico

de las ciudades de Barcelona y Buenos Aires, In: Intervenir en la cultura. [edited by] Mario Margulis et al. Buenos Aires: Biblos, 33-55.

47 Other experiences and institutions were also relevant to defining the creative districts' policy. The British Council organized seminars and expert advice to transfer some of the creative ideas applied in the UK. Other support came from international organizations like UNESCO and the Inter-American Development Bank.

On the adoption of international models in Buenos Aires, see: Lía Barrese & Montserrat Pareja-Eastaway (2020) Glocalisation dynamics: The appropriation of the 'creative turn' discourse in Buenos Aires, Argentina (2007–2015), City, Culture and Society, 21, 100343:

"[…] Buenos Aires' case proves that the circumstances are, without a doubt, local but the model follows global conceptions, whereby international organisations and policy rhetoric has a lot of normative influence. However, CI [cultural industries] are situated activities, not a set of universal applicable strategies.

[…] With the aim of remaining competitive and attracting the right kind of activities, cities in the Global South should not take any 'if it works in the most important cities of the world' generalist prescription as granted […]. The institutional arrangements and the uniqueness of each territory matters. In the end, policymaking should respond to the local evidence, not to the global rhetoric or expectations."

48 Observatorio Regional de Planificación para el Desarrollo CEPAL, Plan Urbano Ambiental de Buenos Aires (Argentina).

49 Francisco Cabrera (October 26, 2012) Buenos Aires, talento y creatividad, La Nación.

50 *"Even though it is disguised as an economic development policy, the creative districts' policy implemented in Buenos Aires and in other cities that have adopted this model is, above all, a requalification/reconversion of urban land policy, frequently aimed at old industrial and port areas that were dismantled due to productive restructuring and globalization. They are ephemeral policies (fast policies) that increasingly 'travel' to very different social realities from those in which they were conceived with the help of publicists like think tanks, private consultancy firms, and public policy gurus. […]*

[But] one should not ignore the potential for reorientation of these major projects as a consequence of the mobilization of civil society, so that, to some extent, the broader public interest is taken into account."

Daniel Sanfelici (2017) Um olhar crítico sobre as repercussões urbanas das políticas de distritos criativos, Quid 16, 7, 62-66.

51 The implementation plans of the creative districts are supported by a mainstream – a narrative that is widely disseminated in the academic and public governance fields, based on three pillars: strategic planning, cluster model, and creative class.

[…] strategic planning assumes that local states generate conditions to attract private investment (urban marketing), based on new forms of public management (governance) that accept the direct participation of economic agents in public policy decision-making.

In: Natalia Lerena & Hernán Orozco (2020) Economías creativas y renovación urbana. Nuevos usos y usuarios en Parque Patricios, Buenos Aires, Revista INVI, 35:98, 1-44.

52 In 2018, 317 ICT companies had offices in the Technology District, with over 12,300 employees (19,000 estimated in the following year).

Gobierno de la Ciudad Autónoma de Buenos Aires (November 7, 2018), 10 años del Distrito Tecnológico: crecimiento y evolución.

53 Natalia Lerena (2016) Crónica de un negocio anunciado: operaciones de recalificación industrial en Barcelona y Buenos Aires, Revista de Estudios Urbanos y Ciencias Sociales, 6:02, 113-120.

54 The beneficiaries, in this case, are independent artists who work in the district (in studios or collective spaces) and other agents who commercialize, exhibit or mediate artistic products.

55 Ana Gretel Thomasz (2017) Etnografía de un proceso de resemantización simbólico: del barrio de La Boca a Distrito de las Artes, Quid 16, 7, 67-93.

56 In what is now the Arts District, two other cultural centers were already located in former industrial buildings: the Fundación Proa (a private visual arts center located in warehouse buildings, inaugurated in 1996) and the Museo de Arte Moderno de Buenos Aires (established in a tobacco factory in the 1980s).

57 On the Arts District, the debates and conflicts during its implementation, see:Ana Gretel Thomasz (2016) Los nuevos distritos creativos de la Ciudad de Buenos Aires: la conversión del barrio de La Boca en el "Distrito de las Artes", EURE, 42:126, 145-167;

Rodrigo Carmona (2017) Los distritos económicos en la ciudad autónoma de Buenos Aires como nueva forma de intervención urbana, Revista de Direito da Cidade, 9:4, 1862-1883.

58 *"The presence of an existing community of cultural producers in the neighborhood, who rejected the city government's creative district plans, thus contested the state's framing of the project. The conflicts around the neighborhood's true identity demonstrated one of the paradoxes of promoting communal values tied to culture and creativity. The arts district was connected to the city's branding strategy by offering an identifiably unique community for cultural tourism. Yet, residents feared that the project would convert the area into a space for outsiders. To this end, an official in the city's Ministry of Economic Development working on the project complained in an interview about the neighborhood's locally minded residents who opposed the project. They were, in her words, overly invested in their own "Boquense" (from La Boca) culture and constantly worried that the neighborhood might be turned into a global space, inundated with artists from other parts of the city, including the fashionable northern neighborhood of Palermo. Yet, this transformation, particularly its implications for tourism and investment, was precisely what the plan intended to do."*

In: Jacob Lederman (2015) Urban Fads and Consensual Fictions: Creative, Sustainable, and Competitive City Policies in Buenos Aires, City & Community, 14:1, 47-67.

59 For general information on the Design District and the CMD: Silvia Hernández, El rol del Centro Metropolitano de Diseño en el proceso de patrimonialización de Barracas (Ciudad de Buenos Aires), Quid 16, 7, 94-119.

60 Gobierno de la Ciudad de Buenos Aires, Buenos Aires Data – Empresas del Distrito del Diseño.

[61]   Paula Miguel (2009) Los recorridos del diseño de indumentaria en la ciudad de Buenos Aires, Apuntes de Investigación del CECYP, 15, 51-73.

[62]   It was also called Movimiento Nacional de Empresas Recuperadas; currently, there are 427 'recovered' companies (see Observatorio Social sobre Empresas Recuperadas y Autogestionadas, Instituto de Investigaciones Gino Germani, Universidad de Buenos Aires).

[63]   After years of legal battle, the local administration passed an expropriation law and authorized the cooperative to manage the company.

[64]   The city government declared IMPA La Fábrica Ciudad Cultural as a site of cultural interest in 2001 and defined it as the most creative and valuable experience that has taken place in the city.

[65]   Cecilia Dinardi (2019) Grassroots Creative Hubs: Urban Regeneration, Recovered Industrial Factories and Cultural Production in Buenos Aires and Rio de Janeiro. In: Creative Hubs in Question. Dynamics of Virtual Work. [edited by] Rosalind Gill, Andy C. Pratt & Tarek E. Virani. Cham: Palgrave Macmillan, 299-317.

[66]   Beatriz Botero Arcila (April 17, 2019) Latin American Cities in the Fourth Industrial Revolution: The Potential and Social Risks of Smart-Cities Technologies, Latin American Policy Journal.

[67]   Paola Jirón, Walter Imilán, Carlos Lange & Pablo Mansilla (2021) Placebo urban interventions: Observing Smart City narratives in Santiago de Chile, Urban Studies, 58:3, 601-620.

[68]   Santiago's metropolitan area is divided into 40 municipalities (*comunas*) with a total population of almost 7 million people (represents 40% of the Chilean population). The city does not have a metropolitan authority and the resources and services notably vary in each municipality, resulting in deep inequality.

[69]   One of the largest projects is Enel's Smart City Santiago, *the first prototype of smart city in Chile*, which consists of a series of solutions previously implemented in Spain, Italy and Brazil.

[70]   Sé Santiago is financed by the Chilean government through its development agency CORFO in partnership with Fundación País Digital (a think tank created by the main ICT companies operating in Chile) to develop pilots and technological solutions in the areas of mobility, security and environment. See more in: Martin Tironi Rodó (2019) Experimentando con lo urbano: Políticas, discursos y prácticas de la ciudad inteligente y la datificación, Athenea Digital, 19:2.

[71]   Start-Up Chile, Social, global and economic impact.

[72]   Start-Up Chile (2021) Brochure.

[73]   Melo also states that a series of concrete actions have been created to generate benefits at the local level, although beneficiaries are not required to stay in Chile after the program ends:
"*In terms of social return, Start-Up Chile has a system that helps assess the percentage return from the projects to the program and the community. This is known as the return value agenda, and it is organized as a sort of game or competition among program participants. The return value agenda awards*

points based on three metrics: attendance, organization, and innovation. Attendance refers to participation in local events, such as meetings and conferences at which entrepreneurs make themselves available to share knowledge and to network with locals. Organization can include giving a talk at a school, presenting a pitch to a local investor, or mentoring a local entrepreneur or student. Innovation refers to initiatives that actively engage the Chilean business community, such as starting a new business with a Chilean partner or patenting a product in Chile.
[...] Through CORFO, Start-Up Chile has created tools that contribute to the ecosystem, such as corporate meet-ups, where companies and entrepreneurs come together to solve specific problems the corporation faces, a process that creates connections and opens up the possibility of future business collaborations. There are also university meet-ups [...]. Start-Up Chile is becoming a point of reference for generating new ideas and trends [...]."
In: Horacio Melo (2012) Prosperity through Connectedness (Innovations Case Narrative: Start-Up Chile), Innovations: Technology, Governance, Globalization, 7:2, 19-23.

[74]   See more in: Juanita Gonzalez-Uribe & Michael Leatherbee (2018), The effects of business accelerators on venture performance: evidence from start-up Chile, Review of Financial Studies, 31:4, 1566-1603; Lynda M. Applegate, William R. Kerr, Josh Lerner, Dina D. Pomeranz, Gustavo A. Herrero & Cintra Scott (2012) Start-Up Chile: April 2012, Harvard Business School Case 812-158; Juanita González-Uribe (2015) N° 18. El caso de Start-up Chile. Programa de atracción de talento para fomentar el emprendimiento. Caracas: CAF.

[75]   Horacio Melo (2012) Prosperity through Connectedness (Innovations Case Narrative: Start-Up Chile), Innovations: Technology, Governance, Globalization, 7:2, 19-23.

[76]   *Start-Up Chile was conceived by Nicolás Shea, a Chilean serial entrepreneur [...]. After living in California for several years, Shea knew of the struggle that many recent graduates and highly qualified foreign entrepreneurs faced when trying to obtain a visa to stay in the US. These talented individuals represented a source of entrepreneurial energy that, when imported into Chile, could position the country closer to the main global innovation centers, and contribute to the development of the Chilean entrepreneurial ecosystem.*
Inspired by the book Start-Up Nation by Dan Senor and Saul Singer, Shea outlined a prototype program to import entrepreneurial talent with global connections into Chile. [...] The [CORFO Entrepreneurship] Committee was later led by Chuck Holloway, Director of the Stanford Center for Entrepreneurial Studies.
In: Juanita González-Uribe (2015) N° 18. El caso de Start-up Chile. Programa de atracción de talento para fomentar el emprendimiento. Caracas: CAF.

[77]   *"The origins of Start-Up Chile can be found in a visit that Vivek Wadhwa paid to Chile in 2009 at the invitation of CORFO. According to Mario Castillo, a former CORFO executive, Wadhwa had recently written about Indians who were interested in investment projects in the United States but were having difficulty obtaining visas. Castillo invited Wadhwa to Chile to discuss the ideas with Castillo and Raul Rivera, the President of the Foro Pro Innovacion. According to Wadhwa, he also criticized CORFO's assertions that they would be successful in building a world-class services platform on the basis that the country would eventually suffer from increasing wages due to the country's limited number of English-speaking scientists and engineers. At the time, also according to Wadhwa, he suggested that a bottom-up approach*

would be more effective than the top-down approach that characterized the High-Technology Investment Promotion Program; an approach that he detailed in an article that he wrote in Business-Week magazine upon his return."
In: David Feige (June 12, 2014) Start-Up Chile: A Critical Analysis, International Affairs Forum online.

78 Vivek Wadhwa (August 21, 2010) Chop-Shop Workers and Bootstrappers: Chile Really Wants You, TechCrunch.
In a subsequent article, Wadhwa stated:
"Governments the world over have tried to recreate the magic of Silicon Valley by focusing on infrastructure and industry. […] These efforts inevitably fail, because entrepreneurial ecosystems simply can't be built from the top down. They must be built from the ground up, with entrepreneurs helping entrepreneurs. What is needed – and what governments can't create – is a culture of information-sharing and mentorship, which is what has made Silicon Valley a success.
(…) I suggested a strategy to help Chile by taking advantage of weaknesses in U.S. immigration policy. I recommended that Chile build an innovation economy by importing the skilled immigrants the U.S. was chasing away. I suggested that they could attract these innovators and job creators to Chile by offering visas and financial incentives, and by providing them with mentoring and entrepreneurial networks like what they were leaving behind in Silicon Valley. […] Chile tried the experiment, and so far it has been a runaway success. […]
Cultures often take generations to change, and connecting entrepreneurs even within the same city is often a challenge, let alone across the world. That's why the Start-Up Chile experiment made so much sense for the country. […] Silicon Valley-style entrepreneurship has been spreading across the country. […] Foreign start-ups scoured local colleges for talent and started hiring and partnering with locals. Meanwhile, Chilean entrepreneurs saw tremendous value in having access to global networks and in the knowledge they could gain. They started asking to be part of the action."
Vivek Wadhwa (2012) The Magic Happens When You Focus on People (Innovations Case Commentary: Start-Up Chile), Innovations: Technology, Governance, Globalization, 7:2, 25-27.

79 See Martin Giles (October 13, 2012) The lure of Chilecon Valley, The Economist; Conrad Egusa & Victoria O'Shee (October 17, 2016) A Look into Chile's innovative startup government, TechCrunch; Stephen Keppel (October 10, 2012) How a Chile Startup Initiative is Changing Latin America, ABC News.

80 Adrián Blanco Estévez (2019) Startups, nuevo foco de las políticas públicas de atracción de talento, knowhow y transferencia de conocimiento. El caso de España e ICEX-Invest in Spain, ICE, 909, 143-153.

81 Other countries include Malaysia, Jamaica, Puerto Rico, Peru and South Korea.
See: Start-Up Chile, Global Impact.

82 The survey conducted by Start-Up Chile to measure the economic impact also demonstrates that 54.5% of startups accelerated by the program were still active in 2017, "on par with other prominent accelerators," while the total capital raised was 997 million USD, 18.3 times the public investment for Start-Up Chile (total sales in Chile were 2.5 times the public investment).
In: Start-Up Chile, Economic Impact.

83 15% of foreign startups are from the US, followed by Argentina, India, and Brazil.
See: Start-Up Chile (2021) Brochure.

84 Paola Jirón, Walter Imilán, Carlos Lange & Pablo Mansilla (2021) Placebo urban interventions: Observing Smart City narratives in Santiago de Chile, Urban Studies, 58:3, 601-620.

85 *"There have been important commercial developments in places with artistic or bohemian identity. They are unplanned and predominantly private initiatives with no direct influence by governmental urban development policies. […] These ventures internalize the added value of the neighborhood that consists of heritage architecture and an identity connected to creation. In other words, they capitalize the* genius loci *and the* milieu.*"*
Elke Schlack & Neil Turnbull (2011) Capitalizando lugares auténticos. Artistas y emprendimientos en la regeneración urbana, ARQ, 79, 28-42.

86 Christian Matus (2017) Estilos de vida e imaginarios urbanos en nuevos residentes de Lastarria y Bellas Artes: el barrio patrimonial como escenario de diversidad, distinción y movilidad, EURE, 43:129, 165-187.

87 On Barrio Italia and other spontaneous creative clusters in Santiago, see: Elke Schlack & Neil Turnbull (2011) Capitalizando lugares auténticos. Artistas y emprendimientos en la regeneración urbana, ARQ, 79, 28-42.

88 iF explains that the ecosystem consists of a series of 'labs' comprising startups, small to big companies, foundations, and social organizations: a cultural lab, a micromanufacturing lab, a visual lab, a social lab, and a digital and new media lab. The community also includes universities and organizations promoting entrepreneurship and innovation. (iF Chile, Ecosistema IF)

89 Manuel Tironi (2010) ¿Qué es un cluster? Geografías y prácticas de la escena de música experimental en Santiago, Chile, EURE, 36:109, 161-187.

90 On sociality and interpersonal relationships in Santiago's indie music scene, see: Shannon Garland (2019) Amiguismo: capitalism, sociality, and the sustainability of indie music in Santiago, Chile, Ethnomusicology Forum, 28:1, 26-44:
"[In the Chilean indie music scene, the] lack of separation between a distinct class of people making music and one that consumes […] appears as a problem when compared with non-Chilean indie networks. […] In a fully-functioning market system, musicians, bloggers, venue owners, and audiences would all be distinct enough from each other for exchange to take place between them. Given the historic emphasis of indie as anti-hegemonic, complaints about the difficulty of generating a market economy might appear ironic. But the irony […] raises the question of how people can construct and maintain musical worlds which are generated by particular social affinities, but which must expand beyond those affinities in order to be sustained within capitalist logics of production."

91 Manuel Tironi (2010) ¿Qué es un cluster? Geografías y prácticas de la escena de música experimental en Santiago, Chile, EURE, 36:109, 161-187.

Estonia as a Smart Nation: From Digital Country to Connected Cities

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Estonia as a Smart Nation: From Digital Country to Connected Cities

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Living in Tallinn is a pleasant and enjoyable experience: from its waterfront, where Tallinners go for long walks, one can observe the bustle of the Estonian capital, riveted on the northern shores of the Baltic Sea. In particular its port, which welcomes an almost uninterrupted flow of huge ferries and visitors from Helsinki, but also from Stockholm or the island Mariehamn (located in autonomous Finnish territory). This traffic shows where the heart of Estonians beats and towards which horizon their gaze is directed: the other side of the Baltic, towards the Nordic countries to which Estonia belongs, and with which it identifies more than with the Baltic States, contrary to widepread assumption.

The flow of ferries is matched by heavy freight traffic: large carriers and their containers dock by the dozen before heading mostly to Paldiski Northern Port or the Port of Muuga, two free zones on the outskirts of Tallinn.[1] These free zones, open to direct foreign investment, facilitate exemption from VAT and customs duties and preserve a well-known tax principle: profits reinvested by a company are not taxed. Estonia wants to be an attractive country. To distinguish itself, it wants to shine like a lighthouse. Its identity has rested on this model ever since the country gained independence in 1991.

Taxation is a singular but marginal part of the Estonian model, because internationally the country shines in digital terms. This small country of 1.3 million inhabitants has built its reputation as a "digital nation." Estonia appears at the top of all rankings in terms of digital transformation: for Estonian residents, almost all administrative procedures can be carried out online, enabled by simple and secure electronic authentication. The Estonian ID card opens up a wide range of possibilities: creating a company in a few minutes, voting online, signing or encrypting documents, paying taxes, picking up medication at pharmacies, etc. This small card makes countless services readily accessible.

Looking across the Baltic Sea toward Finland and at Estonia's advanced digital transformation: these two contextual factors are essential to understanding Tallinn as a smart city. The Estonian concept of the smart city rests on three cornerstones: (1) pilot projects developed by the Smart City Centre of Excellence and deployed by FinEst Twins (i.e. twinned Finland and Estonia); (2) digital innovations deployed on a national scale; and (3) a dynamic ecosystem of startups and tightened public-private cooperation. All these initiatives reflect the traditional pillars of smart cities: urban mobility, energy, urban planning, governance and the opening, analysis and exploitation of urban data.

This new field, opened up by the concept of the smart city, is one of the new ways for Estonia to maintain its leadership in innovation. If the spotlight was focused on this small country very early on, this was mainly because of its avant-gardism and foresight, which enabled it to pioneer digital innovation well before the world awoke to the prospect. But since then, many powers have entered this digital race, on the world stage, which imposes new rules on Estonia so as not to lose its visibility. The regional integration of FinEst is therefore fully in line with the country's soft power strategy and its exporting of a model that its small population prevents Estonia from earning the international recognition it deserves.

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[1]   https://investinestonia.com/business-in-estonia/infrastructure-and-premises/free-trade-zones/

Tallinn: an effervescent, innovative and connected city

In winter, nights are long in Tallinn and temperatures often drop below 15 degrees. The frozen Baltic Sea and icy gusts leave little time for outdoor activities. Therefore, when the workday ends at 5 p.m., many Estonians pursue secondary employment. It is not uncommon for Estonians to create their own company, or to develop their own business or startup when they get home from their main job. In Estonia, creating and closing a business is as easy as any other activity.

Tallinn, the capital, also ranks high internationally, reflecting the smartness of its innovations and entrepreneurs: 1st in the 2020 Emerging Europe Smart City Development Ranking; top finalist for the 2022 Green Capital Europe; top finalist in the 2020 Intelligent Communities Forum Awards; top 3 in the 2017 Innovation Capital of Europe Ranking. It even topped the 2020 Sharing Economy Index: "Tallinn leads the way as one of the most sharing-economy friendly cities. Its low level of regulation of ride-hailing and flat-sharing services along with openness to e-scooters, and outstanding innovation in the digital space helped take it to the first place. Estonia is well-known for its booming digital state, and the fact there is even a carpooling app for kids reinforces this fact."[2]

The other option for spending Estonia's long and cold nights is to take refuge in one of the bars or cultural spaces in Telliskivi. This trendy neighborhood, located next to the main railway station, is a former industrial complex, reputedly ill-famed during the Soviet era. Since 1991, it has been continuously rebuilt and now houses creative startups, associations, incubators (e.g. the famous Garage 48)[3], restaurants, coworking spaces (e.g. the unmissable Lift99)[4], underground bars and art galleries (e.g. Fotografiska). Together, these venues constitute a real creative city. The district now attracts families and crowds of young and international people within its maze of frescos, graffiti and garlands of color. It is here, for example, that Mari-Liis Lind has set up her company Vivita. Lind, the Young Female Entrepreneur of 2019, has established a creativity accelerator network for kids and youths that she describes as "a factory for creating startups for children."[5]

The Estonian capital is full of dynamic and creative poles such as Telliskivi. Ülemiste City is a modern city space, and appears almost from another era against the backdrop of the industrial and Soviet architecture characteristic of the surroundings. Walking among the modern buildings, as well the many trees and cafes, where young executives sip XXL coffees, one easily forgets that this is the heart of Lasnamäe, a Russian-speaking district of Tallinn full of Soviet housing projects. Ülemiste calls itself the "largest Smart City in the Baltics and the biggest privately owned business campus in Northern Europe."[6] This city in the city includes a host of family facilities: English and French kindergartens, international schools, sports clubs, etc. You'll never want to leave this neighborhood.

The history of this place is emblematic of the trajectory of Estonia as a whole. Originally, this space was a metallurgical complex belonging to a Russian company, Dvigatel, dating from the end of the 19th century, which witnessed independence in 1931 and Soviet occupation in the 2nd half of the 20th century, before its bankruptcy after the fall of the USSR in 1991. In 2005, Ülo Pärnits, the head of Mainor, decided to invest in the district. The aim was to build a "smart business campus" amid the ruins of Dvigatel: the Ülemiste City project was born. Finnish company Technopolis Plc accelerated the project in 2010, which led to establishing modern offices, state-of-the-art infrastructure and diverse services for business incubators, which now employ 10,000 people. The ambition for 2025 is to welcome 20,000 people per day, who can live, work or study there. This huge 36-hectare campus is home to more than 400 companies, and is among the most competitive and emblematic districts of Estonia's success story. In new technologies alone, the site is home to Skeleton Technologies (graphene-based ultracapacitors and energy-storage systems, developed for automotive, grid, and transportation), Playtech Estonia (an Estonian unicorn and a world leader in online

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[2]   https://consumerchoicecenter.org/sharing-economy-index-2020/

[3]   https://garage48.org

[4]   https://www.lift99.co/

[5]   «Mari-Liis Lind: a woman in tech ». A podcast from the French Institute in Estonia: https://ife.ee/fr/mari-liis-lind-une-entrepreneuse-engagee/

[6]   https://www.ulemistecity.ee/en/

gaming), Helmes (which designs software for e-Estonia), and FocusIT (for information systems security). The e-Estonia Briefing Centre is located at the heart of this complex: this futuristic center, equipped with the most high-tech innovations, promotes the Estonian system and demonstrates the e-Estonia model in practice.

But Ülemiste City is not the only success story in the capital. Science Park Tehnopol is another key figure in Estonian innovation: this campus brings together researchers, scientists and companies around Tallinn University of Technology (TalTech). This competitive cluster extends to a large campus around TalTech, the most renowned Estonian university. TalTech consists of an engineering school, a science department, a business and administration school, and an ICT department. With some 10,000 students, it is not surprising to see a startup incubator emerging on campus, which provides an ideal connection between university students and researchers on the one hand, and tech companies on the other. The Tehnopol Startup Incubator provides visibility for companies that are struggling to find qualified tech employees in a low- population country. In addition, successful Estonian companies such as Skype, Cybernetica, Starship Technologies have all set up relay points on this campus, alongside some 200 innovative companies.

Estonia as a digital state: from necessity to world-wide soft power

Today, all lights in Estonia are flashing green. With a growth rate of 4.3% in 2019, and an unemployment rate of 4.4%, the Estonian economy is highly integrated into the international market. Driven by new technologies, the country's growth – slowed down by the Covid-19 crisis – is driven by the new technologies sector, which accounts for nearly 30% of the value created by the Estonian economy. After Pipedrive in November 2020, the year 2021 began with Zego being valued at over USD 1 billion, making the company the 6th Estonian Unicorn. [7]

Ranked 1st in Startup Friendliness (Venture Index, 2018), 1st in the OECD Tax Competitiveness Index (2019), 1st in Entrepreneurial Activity (World Economic Forum, 2017): from an economic point of view, Estonia is a real entrepreneurial laboratory, largely driven by the growth of the new technologies sector.

The keys to this economic success are the country's digital take-off and the straightforward use. of digital technologies. Considered a "digital nation," Estonia's administration is entirely digitalized: whatever the sector – legislation, education, banking, police, elections, taxes, justice, health care, car registration, company creation – , citizen can carry out all procedures via the same digital platform. To do so, the system relies on three factors. First, electronic identification of every citizen, provided by an ID-Card, whose chip ensures citizen authentication by plugging the card into a designated terminal. [8] Second, a platform from which public services can be accessed. Third, a system that guarantees data security and protection, enabled by the X-Road infrastructure based on a decentralized technology (e.g., blockchain). X-Road thus provides a double functionality: on the one hand, it allows data interoperability between administrations (i.e., data must be readable by the tax administration as well as by the police system); on the other hand, a decentralized system (KSI Blockchain) that guarantees data security: data is incorruptible and inaccessible for unauthorized persons.

This system provides great confidence and makes life much easier. For instance, the "once only" policy is an illustration of time-earned: it ensures that citizens can submit information or administrative documents only once; other administrations requiring the document need to request access authorization without asking citizens. This avoids duplicating data – and thus its potential corruption – and assigns responsibility to public administrations for correctly updating information while avoiding centralization. This trust also manifests in the accountability of public action: all citizens can trace the history of data consultation and retrieval by administrative bodies, and can contest access at any time. If citizens are surprised that a doctor consulted their medical file, they may request an explanation and, if necessary, may report data abuse.

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[8]   Today, two solutions for mobile authentication have emerged: the MobilCard, provided by cell phone operators; or the SmartID, which provides this system through two-factor authentication.

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[7]   Skype in 2005, Playtech in 2007, TransferWise in 2015, Bolt in 2018, Pipedrive in 2020 and Zego in 2021.

But that's not all. Estonia wanted to ensure the continuity of its services beyond its borders. It has set up an e-residency program that allows non-nationals to access some of its online services as if they were living in the country, particularly for business creation and banking. The criterion of territoriality, that only "those on the ground" can benefit from a public service, disappears as a result. This revolution highlights the competition between governments for greater efficiency. Even if this policy is coupled with a form of e-branding,[9] it is a necessary to survive internationally. The challenge has been successfully met, with 70,000 e-residents from 165 countries around the world now "based" in Estonia.

This digital society, on the other hand, poses a risk to cybersecurity. The fight against cyber-attacks is one of Estonia's priorities. The country became aware of the problem already very early (in 2007). Following a dispute with the Russian community in Estonia, the system was paralyzed for several hours, bringing the country to a complete standstill. How such a paralysis be prevented from happening again? How to ensure the continuity of online public services? A solution was found: create a system backup by exporting a copy of the data outside the national territory, to an extraterritorial embassy.[10] This has been achieved by opening the 1st Data Embassy in Luxembourg in 2017. This new type of embassy guarantees the continuity of Estonian public services and the country's sovereignty in the event of a physical invasion.

Finally, to ensure geopolitical support following the 2007 crisis, Estonia has invested in cybersecurity: it hosts the NATO Cooperative Cyber Defence Centre of Excellence and organizes annual cyber defense training exercises, such as Locked Shields, one of the most important events in the world. Moreover, from a legal point of view, the country has become very active in promoting the regulation of cyberspace, both in military (with the NATO center) and in legal terms (by creating the Tallinn Manual on the application of international law in cyberspace). These efforts are coupled with a willingness to bring this major issue before the United Nations, via the two working groups (UN GGE and OEWG). The Tallinn Manual 2.0 describes itself as "the most comprehensive guide

for policy advisors and legal experts on how existing International Law applies to cyber operations."[11]

The cybersecurity dimension is essential in a context of growing threats in cyberspace, threats that are redoubled by the introduction of the Internet of Things and 5G networks, which increase the number of entry points and reinforce the interdependence of networks. The solutions introduced as part of the development of smart cities bring their own set of difficulties, as the interconnection of these sensors and collected data presents additional risks, which will again increase the exponential annual toll of cyberattacks worldwide.[12]

Estonian key factors for disruptive innovations

In Estonia, many services are available nationwide. Thus, what is left on the municipal scale of Tallinn? What role can a city play when innovations are developed locally by a company and implemented in a national infrastructure? A few solutions have been developed and proposed at the city level, but they are hardly revolutionary: a map allowing real-time visualization of public transportation[13]; access to cameras installed on major city roads or parking lots[14]; or online services available through X-Road (e.g. child allowance, archive queries to archives).[15] Not much is radically disruptive, however, from the perspective of city government: everything is done elsewhere.

Tallinn, home to one third of the Estonian population, is de facto the laboratory for these national innovations and their implementation. In the field of autonomous transport, a major milestone has been reached. In summer, it is now possible to board a self-driving bus on a short route connecting Kadriorg district to Kumu Art

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[9] Léa Ronzaud, "E-Estonie": le 'nation-branding' numérique comme stratégie de rayonnement International," Géopolitique de la #Datasphere, n. 177/178, 2ème et 3ème trimestres 2020.

[10] Anna Piperal, "What a digital government looks like," TED X, 2019. https://www.ted.com/talks/anna_piperal_what_a_digital_government_looks_like/transcript

[11] https://ccdcoe.org/research/tallinn-manual/

[12] RIA (Estonian Information System Authority), "Cybersecurity in Estonia, 2020": https://www.ria.ee/sites/default/files/content-editors/RIA/cyber_security_in_estonia_2020_0.pdf

[13] https://transport.tallinn.ee/mobile.html#map/ee

[14] https://ristmikud.tallinn.ee/index.php/cams

[15] https://www.tallinn.ee/eng/services#valdkond_12

Museum. This bus has been operating since 2019. It is part of a Sohjoa Baltic research project for the development of autonomous collective vehicles, focusing in particular on "the first/last mile connectivity." More recently, the Estonian company Auve Tech has developed, together with the University of Tartu,[16] a hydrogen-powered self-driving vehicle. Iseauto, an autonomous bus developed by the same company, has undergone several development phases: its technological capabilities, on the one hand, and safety and autonomy issues, on the other, have made it possible to map what is possible. Johannes Mossov, the company's CEO, hopes to move from the prototype to the industrial production stage. This change of scale is essential to reduce manufacturing costs. Iseauto has been licensed by Estonia's Road Authority, which entitles its vehicles to use Estonian and European roads.

A dynamic ecosystem of startups, co-working spaces, research laboratories, a digital state and digital public services: these are just some of the ingredients of the Estonian model and its actors. But would these innovations be successful without any overall coherence that allows all these actors to be interlinked? This is perhaps one of the keys to explaining Estonia's success, which comes from its ability to create synergies between the public and private sectors. The latest example, in the field of autonomous vehicles, involves former Prime Minister Taavi Rõivas joining the Auve Tech team to enhance its international development.

Far from being segmented, shared, and delimited according to predefined prerogatives, Estonian public actors are constantly developing calls for projects. Another illustration of this particular relationship between the public and the private sector comes from the ongoing initiatives at the Tehnopol Campus, such as the Accelerate Estonia (aE!) program. It has enabled the private sector to address the problems faced by the public sector in the context of the health crisis. In March 2020, the program launched the massive *Hack the Crisis* hackathon to find technological solutions to the Covid-19 epidemic. The success of this hackathon generated worldwide interest and led to the emergence of The *Global Hack*, an international initiative held a month later and following the same model.

Innovation, then, is integral to Estonia's method of governance, which is based on the concept of Government as a Platform (GaaP). Developed by Tim O'Reilly, the concept highlights the principles that underpin the new relationship permitted by public action in the digital age: openness, simplicity, participation, "learning from hackers," data mining, experimentation, "leading by example." A study conducted by two Oxford University professors[17] has shown that the Estonian model covers most of these criteria, thus elevating this digital state to truly agile governance.

This coherence can also be seen in the complete integration of players in the same sector, where public policy makes it possible to organize the needs of citizens with the technological solutions developed by companies. The e-Health sector is a good example in this respect: Estonia's e-Health program enables organizing various solutions and actors in this way. For instance, Electronic Health Records is coordinated jointly with the e-Ambulance service, pharmacies are linked with the e-Prescription system accessible to all citizens and doctors, and Tartu's Biobank works jointly with the University of Tartu on genomic research and DNA sequencing, in order to move from a health system based on healing to one focused on prevention and personalized medicine. Together, these technological solutions will improve the efficiency of the national health system and thus the health of the entire population.

Regional growth to keep achieving international visibility

It is important to remember that Estonia has been able to build its international soft power around the image of a fully digitalized state. In today's new global era, in which digital technology is a factor of renewed competitiveness, the challenge for Estonia is to maintain its leadership among the world's nations. Its small territory and population slow the movement it has instigated. This

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[16]   Tartu, Estonia's second largest, is known as the country's university city.

[17]   Helen Margetts and Andre Naumann, "Government as a platform: what can Estonia show the world?" Oxford Internet Institute, University of Oxford, 2017. https://www.politics.ox.ac. uk/materials/publications/16061/government-as-a-platform.pdf

is why one of the prospects lies in opening up to broader cooperation, particularly with Finland.

One of the keys to Estonian soft power is X-Road. This decentralized registry and data exchange system between administrations underpins Estonian public services. Although X-Road is a governmental platform, resulting from a successful public-private partnership, its ubiquity has made it the network that many large private companies also rely on. In addition, Estonia has exported its solution far beyond its borders. Together with Finland, which uses the same infrastructure for its public services, Estonia has founded NIIS (i.e. Nordic Institute for Interoperability Solutions) [18] to extend this X-Road architecture to other countries. Thus, the digital governance enabled by X-Road is the digital soft power that keeps Estonia at the head of a large empire: Iceland and the Faroe Islands have joined Finland and Estonia in the NIIS, allowing the perfect interoperability of their information systems. In addition, X-Road environments have been implemented in many countries: Germany, Argentina, Mexico, Japan, Colombia, Vietnam, Cambodia, El Salvador, Azerbaijan, Palestine, Djibouti, and Kyrgyzstan, not to mention the 23 countries currently in the consultation phase for deploying this infrastructure within their own administrations. [19] A string of pearls distilled in the information systems of governments around the world, allowing data interoperability between administrations: Estonia is a beacon that shines on global e-governance solutions.

The interoperability enabled by X-Road implies fundamental flexibility: new blocks of services or uses can be implemented in the platform. This technological adaptability is essential to understand how innovations can be tested, augmented, modified, and improved, especially in the context of smart cities. The perfect interoperability of Estonian and Finnish information systems appears to be a regional opportunity that is multiplied tenfold: from now on, only a political decision between the two countries will allow a Finnish hospital to have immediate access to the medical file of an Estonian citizen who suffers a serious accident in Finland. The technical tools are already ready to work.

Estonia's regional policy is also based on bringing Tallinn and Helsinki closer through tighter interstate cooperation on both sides of the Baltic Sea. This is illustrated even more strongly by the FinEst Twins project (Helsinki and Tallinn, the twins of Finland and Estonia). [20] This large-scale project has a budget of 32 million euros and is partly financed by the EU and the Estonian government. It involves establishing a Centre of Excellence (CoE) for Smart and Sustainable Cities on the Tehnopol of Tallinn University of Technology. The aim is to increase research and innovation in the fields of environment, energy, small mobility and urban planning. As director Ralf-Martin Soe says: "We are preparing for our future challenges, where we could be involved with our new technologies or start projects like the self-driving bus or the zero-energy project." [21] The project is being piloted with Aalto University in Finland, the Virium Forum in Helsinki and the Estonian Ministry of Economic Affairs and Communications. A call for projects is held every year to test a dozen pilot projects until 2023. At the end of this period, 10 projects will be selected and implemented on a large scale in urban space, to the tune of 15 million euros, in order to meet contemporary challenges in all smart sectors. All these solutions will be based on an interoperable infrastructure between Estonian and Finnish information systems.

The limits of a model

Estonia's *technological solutionism* [22] works and is effective. Nevertheless, several obstacles are slowing developments, which have attracted global attention.

First, the question of scale: due to its demographics, Estonia does not have the human resources to match its ambitions. As the French Ministry of the Economy and Finance pointed out, "the large number of vacancies is a striking feature of the Estonian labor market." [23] On

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[18]   https://www.niis.org

[19]   These include WHO, Spain, Norway, Sweden, Denmark, etc. https://x-road.global/xroad-world-map

[20]   FinEst Twins project: http://www.finesttwins.eu/en

[21]   Vision Conference 2020, Panel discussion "How will Tallinn become the most functional and smartest City in the world?": https://www.tallinn.ee/eng/visionconference/Vision-Conference-2020

[22]   Expression coined by Evgeny Morozov, in his techno-critical book Pour tout résoudre, cliquez ici ! L'aberration du solutionnisme technologique, éditions FYP, 2014.

[23]   Economic Outlook "Estonia. Macroeconomic situation," December 21, 2020: https://www.tresor.economie.gouv.fr/Pays/

the one hand, the country faces a flight of talent; on the other, attracting qualified workers proves challenging, due to lower salaries than in Sweden, which operates in the same business segments.

But the challenge of scale also lies in Estonia's ability to deploy solutions on a truly macro scale, over and above the demonstration of pilot projects, throughout a city. The Tartu SmartEnCity project, developed in Tartu, the country's second largest city, illustrates this problem. The European program for the development of Tartu's smart city focused on the energy renovation of old Soviet blocks of flats (Khrushchyovka). Installing sensors in these buildings, whose energy consumption is extremely high, offers a cost-effective solution (costs are covered by city). "We avoid adopting innovative smart city technologies to look cool. In this case, we actually need them. We faced a really big problem – the center of Tartu was full of costly energy-consuming old Soviet buildings," explains Tartu Lauri Sokk, Head of Smart City.[24] The project proposed to connect these buildings to a power supply based entirely on renewable energy produced by the city, which can be adapted and monitored according to the climate and varying consumption. Thus, 19 buildings (740 apartments) have been renovated and connected.

While these efforts are to be welcomed, European funds did not cover all the buildings that would have needed them. The program provided funds for five years, starting in 2016. When funds dried up, so did the ambition to pursue the city's energy transition: only 19 of the 42 target buildings benefited from the program. The same goes for the innovations developed in other sectors (mobility, transport, governance) of Tartu's smart city. As Jaanus Tamm, in charge of Tartu city government's smart city project, acknowledges, the solutions are exemplary on a micro scale, but have difficulty reaching the stage of industrial production, which is essential. So, what good is an innovation if it doesn't take root in the whole city?

Second, technological solutions are not always accompanied by citizen involvement. Participatory democracy, at the heart of the social pact between the new smart cities, is not necessarily renewed by these innovations. Once these services have been developed, a crucial issue remains: How can they be made known

and shared with citizens? How can we ensure that citizens take ownership of these solutions? And how can we get them to participate in decision-making? These solutions must be useful and used by citizens, which in turn guarantees success; otherwise, they risk deprive citizens of control over the city and its changes. As Toomas Sepp, former city secretary and administrative director of Tallinn City Office, concedes: "Digitally speaking, we are definitely a smart city. Now the ambition is shifting towards involving people in the planning process and making planning smarter in general."[25] This methodological problem breaks with the tradition of public consultation before launching projects. He also admits: "We conduct surveys and polls and even have a special investment programme that is set up as a result of citizen surveys. However, we have not yet embraced digital participation to the fullest, despite the fact that pretty much all the information we create is public."[26]

This is one of the contradictions of the Estonian model. While the country has become a true digital state, this development has not been accompanied by greater citizen participation. The introduction of electronic voting is emblematic in this respect. So-called i-Voting signalled a new democratic spirit: citizens could participate in elections from home, or from the other side of the world, in a few clicks. If digital voting is becoming more and more popular in Estonia, that is because those citizens who are used to voting, and who are already highly skilled and open to digital technology, are embracing this tool. The platforms for participating in public decisions, the e-Cabinet for government agendas, the possibility of introducing texts in parliament by citizen initiatives or Tartu's participatory budget: all these digital measures have not been accompanied by democratic renewal.[27] Moreover, the civic tech sector is paradoxically one of the least developed. Estonia ranks low on open data: in 2019, it came 24th in the OECD ranking on open data,[28] highlighting weaknesses regarding data availability and reuse. Taavi Kotka, former CIO of the

EE/situation-macroeconomique

[24]   Cities Forum, Interview with Lauri Sokk, Head of Smart City Tartu, https://www.citiesforum.org/interview/lauri-sokk-head-of-smart-city-tartu-cities-forum/

[25]   Federico Plantera, "Tallinn – The smart capital of a digital nation," May 2018, e-Estonia: https://e-estonia.com/tallinn-smart-capital-digital-nation/

[26]   Ibid.

[27]   Violaine Champetier de Ribes, Demain, tous estoniens ? L'Estonie, une réponse aux GAFA, éditions Cent Mille Milliards, 2018.

[28]   OECD, OURdata ranking, 2019: http://www.oecd.org/gov/digital-government/ourdata-index-key-messages-fr.pdf

Estonian government and digital strategy, said at a Franco-Estonian conference [29] that open data was "a trend that wouldn't last," while civic tech was "largely useless." Hence, this conception makes the users of the e-Estonian model service consumers rather than citizens.

In conclusion, Estonia is unquestionably a smart country. It has built its state model as a startup: transparent, citizen-controlled, resilient, building each brick according to an agile method and constructing a trusted digital path. The platform state has connected the whole country and, through the interoperability of its infrastructure and its digital soft power strategy, has built bridges with neighboring Finland, opening up a new horizon. But this new stage of development must not forget Estonia's cities where new solutions must gain sustainable support. The latest illustration is the beginning of predictive government, enabled by the development of AI in public services. [30] Soon, public services will be offered directly to Estonian citizens, without requiring any action on their part. Marten Kaevats, adviser for digital innovation at the Government Office of Estonia, in charge of the predictive government project, observes: "Right now the ICT-sector accounts for 5% of the GDP of Estonia. This figure will soar to around 25% in the next five years. The places responsible for this development are Tallinn and Tartu. Hence, public space needs to be centered around humans in order to keep and protect these talented individuals." [31] Innovations within Estonian smart cities are therefore delicately balanced between attracting international attention on the one hand and pursuing the model's technological influence on the other. This characterizes Estonia's trajectory today.

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[29]   Geoffroy Berson, "e-Estonia: the ultimate digital democracy?" November 2018: https://medium.com/@geoffrooy/e-estonia-the-ultimate-digital-democracy-f67bc21a6114

[30]   "AI – "Kratt" strategy: 50 use-cases of artificial intelligence in the public sectors by 2020": https://e-estonia.com/wp-content/uploads/2020-april-facts-ai-strategy.pdf

[31]   Vision Conference 2020, Panel discussion "How will Tallinn become the most functional and smartest City in the world?": https://www.tallinn.ee/eng/visionconference/Vision-Conference-2020

Bibliography

Geoffroy Berson, "e-Estonia: the ultimate digital democracy?" November 2018 https://medium.com/@ geoffrooy/e-estonia-the-ultimate-digital-democracy-f67bc21a6114

Violaine Champetier de Ribes, Demain, tous estoniens? L'Estonie, une réponse aux GAFA, éditions Cent Mille Milliards, 2018.

French Institute in Estonia, "Mari-Liis Lind: a woman in tech," podcast, March 8, 2021. https://ife.ee/fr/mari-liis-lind-une-entrepreneuse-engagee/

Amanda Haynes, "Smart solutions in Estonia's second city: smart Tartu," August 2020, e-Estonia: https://e-estonia.com/smart-solutions-in-estonias-second-city-smart-tartu/

Helen Margetts and Andre Naumann, "Government as a platform: what can Estonia show the world?" Oxford Internet Institute, University of Oxford, 2017. https://www.politics.ox.ac.uk/materials/publications/16061/government-as-a-platform.pdf

Evgeny Morozov, Pour tout résoudre, cliquez ici ! L'aberration du solutionnisme technologique, éditions FYP, 2014.

Dea Paraskevopoulos, "Estonia's capital Tallinn as a testbed for smart city solution providers," July 2020, e-Estonia: https://e-estonia.com/estonia-capital-tallinn-testbed-smart-city/

Anna Piperal, "What a digital government looks like," TED X, 2019. https://www.ted.com/talks/anna_piperal_what_a_digital_government_looks_like/transcript

Federico Plantera, "Participatory Budgeting: powerful tool to improve engagement and policy design," May 6, 2020, eGA (e-Governance Academy): https://ega.ee/blog_post/participatory-budgeting-improve-engagement-policy-design/

Federico Plantera, "The Estonian vision for new models of smart city," May 2019, e-Estonia: https://e-estonia.com/the-estonian-smart-city/

Federico Plantera, "Tallinn – The smart capital of a digital nation," May 2018, e-Estonia: https://e-estonia.com/tallinn-smart-capital-digital-nation/

Léa Ronzaud, "E-Estonie: le 'nation-branding' numérique comme stratégie de rayonnement International," Géopolitique de la #Datasphere, n. 177/178, 2ème et 3ème trimestres 2020.

Ralf-Martin Soe, "FINEST Twins: platform for cross-border smart city solutions," TalTech, 2017: https://www.etis.ee/Portal/Publications/Display/47c8ad7f-48f2-4fa5-af1e-b6dbdf245afc?lang=ENG#

RIA (Estonian Information System Authority), "Cybersecurity in Estonia, 2020," Annual Report: https://www.ria.ee/sites/default/files/content-editors/RIA/cyber_security_in_estonia_2020_0.pdf

Vision Conference 2020, Panel discussion "How will Tallinn become the most functional and smartest City in the world?": https://www.tallinn.ee/eng/vision-conference/Vision-Conference-2020

Economic Outlook, "Estonia. Macroeconomic situation," December 21, 2020: https://www.tresor.economie.gouv.fr/Pays/EE/situation-macroeconomique

Smart City Projects in the Arabian Peninsula: Transnational Mobilities and Local Effects
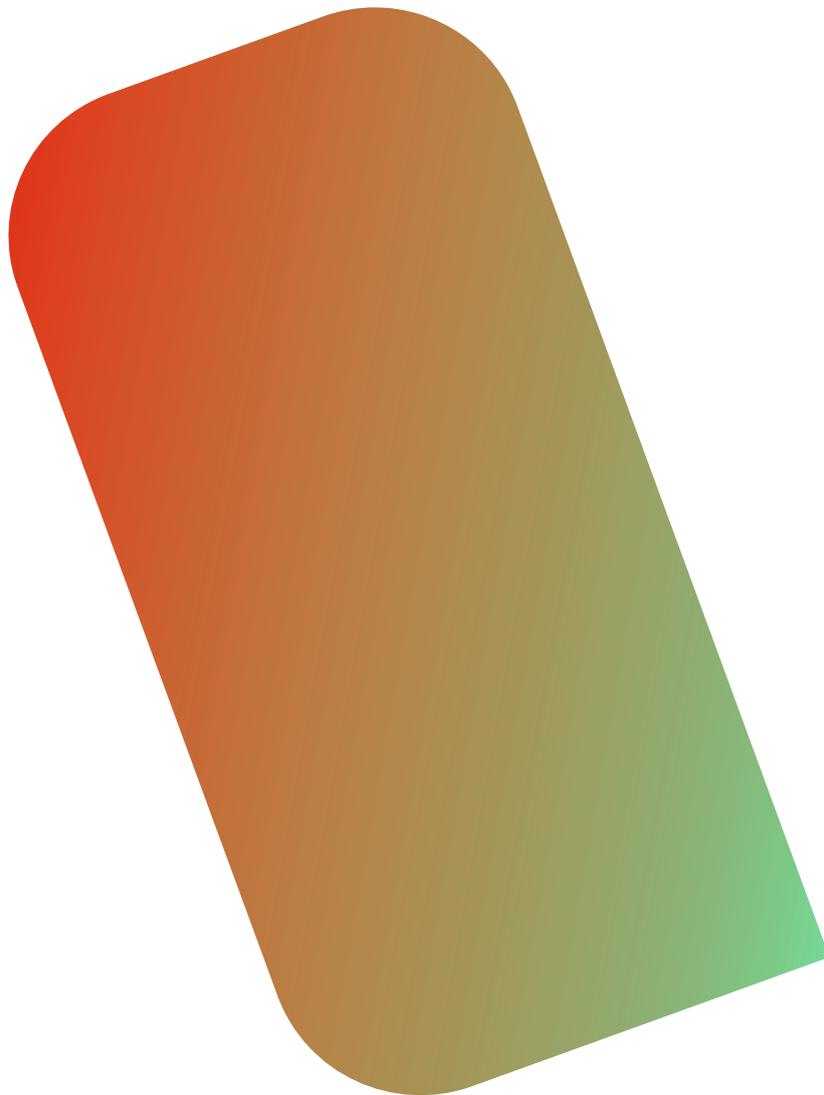
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February 2022

Contents

Smart City Projects in the Arabian Peninsula: Transnational Mobilities and Local Effects

Davide Ponzini

This report investigates and discusses how the concept of the smart city has been used in the Arabian Peninsula and in particular in UAE, Qatar and Saudi Arabia. Studying relevant cases of new smart cities such as Masdar City, Lusail City, King Abdullah Economic City shows how smart city initiatives are oriented more toward a global audience and mainly respond to government goals. Downplaying the socio-political interaction behind the smart city seems to prevent these experiments from having widespread impact, as such interaction impairs spontaneous urban innovation and the local adaptation of transnational solutions.

Introduction and framework: The transnational mobilities of smart city concepts

In recent years, the expression "smart city" has become a buzzword, an almost empty signifier that embraces quite different ideas and policies in a wide variety of urban and regional settings (Hollands, 2015; Karvonen et al., 2019). The variable mix of expectations regarding futuristic cities and innovation pertains to technological (e.g. remote sensing, A.I., big data), but also to the economic, social and political dimensions of contemporary cities (Vanolo, 2014). The success of the "smart city" and the adaptability of diverse socio-economic interests have fostered its international dissemination. In the past, several service and technology providers such as IBM, Cisco and Siemens have launched initiatives to engage with cities and governments, to promote "smart cities" and to generate a new market for themselves (McNeill, 2015; McNeill and Pollio, 2018). The idea of the smart city has been mobilized internationally in hundreds of cities, inevitably expanding its meaning and possible operationalization (Crivello, 2015). More and more experts have embraced the narrative of the smart city, either adapting their operations and services or simply relabelling them.

The narrative of the smart city often appears to be non-ideological and mostly technical, typically emptied of political bearings (Kitchin, 2015), typically a-historical and decontextualized (Shelton et al., 2015), while enjoying mostly positive acceptation despite its ambivalent urban effects (Hollands, 2008). More critical views have emerged (among others, Vanolo, 2014) and only recently have case studies started revealing the gap between smart city aspirations and their implementation and effects in actual cities (Karvonen et al., 2019).

Within this critical framework, this short report considers three smart city projects in the Arabian Peninsula in order to show the urban context and urban development agendas these initiatives are part of, their narrative and their actual goals and achievements. This brief report aims neither to generalize nor to create an ideal-type of smart city in this region. On the contrary, it seeks to identify the specificities of each project and to discuss

them within a common framework. This seems useful to understand the smart city initiatives in the region as well as, by comparison, in other parts of the world. The next section explains the particular features of this region in further detail.

Contemporary urbanization in the Arabian Peninsula and its futuristic appeal: High-tech and fast-track mega-projects

In current urban debates, many cities of the Persian Gulf and the Arabian Peninsula have been stereotyped as exceptional and futuristic: the world's tallest building in Dubai; Saudi Arabia's hyper technological cities being built from scratch; Qatar's 2022 World Cup world-class infrastructure. Against such celebratory images and propositions, critics have pointed to socio-political backwardness and inequalities, as well as cultural dependency on the West. As I have argued elsewhere, cities like Dubai, Abu Dhabi, and Doha exhibit extreme features of contemporary urbanization, but they are not exceptional internationally (Ponzini 2011; Ponzini & Arosio, 2017; Cugurullo & Ponzini, 2018; Molotch & Ponzini, 2019). For this reason, they are interesting laboratories for observing contemporary urbanization. In this paper, I focus on smart city projects and policies, acknowledging the significant public funding, international outreach as well as the specificities of the urban context.

When seen in their geographic context and as part of a longer history, these cities are strongly connected in the region and transnationally, that is, well beyond the Arab world (Andraos, 2019; Boodrookas & Keshavarzian, 2019). Today, this long-term characteristic – in addition to openness to international business, local availability of resources, concentrated political power, as well as limited restrictions to urban development – allows for significant experimentation. The results of such urban

test beds are extensively displayed and celebrated, often involving international design, engineering, and communication networks. This common trait reinforces not only the visibility, but also the relevance of experimentations in these cities for the rest of the world.

For example, Dubai has been depicted as the most rampant instance of spectacularizing the urban environment. Numerous large-scale developments have been programmed and implemented with the specific purpose of attracting international attention and amazing the public. The success and transferability of large-scale and decontextualized projects has turned Dubai into a model of the region (Elsheshtawy, 2010). Hvidt (2009) documented several aspects of recent development policies and approaches in Dubai. In particular, he argued that a "Dubai model" is characterized, among others, by a strong impulse toward diversifying the economic base of the city, improving tourism and other immaterial services, as well as by fast decision making and even faster urban growth fueled with abundant economic resources. Elsheshtawy (2010) and Acuto (2010) have argued that the extreme promotion of Dubai's image – and the gap between this image and actual experience – make modelling other cities on Dubai's social and economic life highly problematic.

In the Gulf, and in the Arabian Peninsula more generally, planners and designers are mostly foreign and typically not required by the local ruling class to attune their approaches to local specificities. The transnationally circulating idea of building a new urban system all at once, however, faces the reality of market fluctuations as well as the need for deeper local knowledge for complex organizations (as smart cities are supposed to be) to function. Adaptation to urban policies and projects can be seen as a positive way of modifying and testing variants. In the Gulf, the engineering of special zones in terms of taxation, social and urban regulation, as well as cultural restrictions limits disruption and consolidates political and media consensus regarding the ability of Gulf cities to accomplish urban planning advancement. On the other hand, this may mobilize ready-made solutions for complex propositions to the extent of creating paradoxical situations and parallel realities in the same cities (Molotch & Ponzini, 2019).

Three cases of smartness in the Arabian Peninsula

This report draws on my past research and publications (Ponzini & Arosio, 2017; Cugurullo & Ponzini, 2018; Molotch & Ponzini, 2019) and includes brief examples that are based on existing data and secondary sources (academic literature and policy documents). The aim is not to provide either a comprehensive picture of or extensive literature on the cities, projects and initiatives under observation, but rather to answer two main questions: How are new smart city initiatives conceived and planned in the region? In which ways does the specific context affect these experimentations and their likely urban effects?

UAE's sustainability and economic diversification: Masdar City

Since its foundation in 1971, Abu Dhabi has been the capital of the United Arab Emirates. It is also the capital of the oil-rich Abu Dhabi emirate. Until the mid-2000s Abu Dhabi's GDP relied heavily on the petroleum industry. Following a change in the ruling family, the mid-2000s marked a season of reforms, a partial liberalization of the real estate and other markets, and welcoming foreign investments. Abu Dhabi's leadership developed long-term strategies, also thanks to great amounts of liquidity. Diversification of the economic base was key, as the potentially decreasing natural resources, the increasing population and other local and international factors suggested embracing more sustainable development models. The Economic Vision and the Urban Structure Framework Plan of 2007 envisioned trends and policies for the development of the city until 2030. Tourism, advanced technologies and renewable energies are among the targets of the national strategies. Government-owned companies and other national agencies promoted and supported the initiatives in tandem with the political leadership.

Several flagship initiatives got underway. Masdar City started in 2006 as a zero-carbon development on the outskirts of Abu Dhabi. Its planned size is 6 sq km and the city is expected to house 50,000 people, including a wide array of research and service activities. The original budget allocated about $20 billion to the project and integrated several fronts of action in terms of development, investment and research (Masdar City, Masdar Carbon, Masdar Capital, Masdar Power, and Masdar Institute of Science and Technology). The original master plan was designed by Foster + Partners and attracted significant media attention. The Masdar Institute campus was partnered by the Massachusetts Institute of Technology.

Over the years, the project was labelled a "smart city." Experiments with reinterpreting local green solutions (from wind towers for cooling outside spaces to integrated eco-villas), solar power, self-driving cars (so-called personal rapid transport system) and others have led to private investments and partnerships with dozens of companies (e.g. Siemens, General Electrics, Irena).

The environment of Masdar City became the stage for showcasing the successful solutions and amplifying the narrative for the UAE's policy on innovation, environmental friendliness and the smart city. Some solutions started to be exported internationally and led to further partnerships in Spain, the UK, Polynesia and other developing countries. However, the project has been criticized for seeking to portray the emirate as a sustainable state, as well as for attempting to make patentable and exportable technical breakthroughs, rather than being an actual "city." Clear social, economic, or political limitations are considered to slow the innovation and transformation of Masdar City and hence its impact on the country (Cugurullo, 2013 and 2016; Günel, 2019). The difficulties in developing an innovative district from scratch surfaced and led to further adjusting the original plan in order to leverage the real estate market.

Qatar: Urban infrastructure and Lusail City

Qatar is a politically stable and influential nation in the Persian Gulf. Its communicative and diplomatic strategies have brought it to the center of Middle Eastern and international affairs. Its immense natural gas resources, the dynamic entrepreneurship of its actors and its ability to collaborate with international actors have allowed this small state to develop an articulated set of local and international activities (Djermoun & Hersant, 2013). In 2005, the government created the Qatar Investment Authority (QIA), which coordinated a number of agencies in order to diversify the national economy and to invest in options and properties with limited risk in order to suffer less from fluctuating gas prices. Among others,

Qatari Diar and Qatar Holding were briefly generated from the QIA sovereign wealth fund for investing locally and internationally. More specifically, Qatari Diar develops large-scale development projects, infrastructure (e.g. the new national railway system), both nationally and in over twenty foreign countries. Its strategy follows the same lines as QIA's strategy. It has developed a significant network of partnerships with large planning and construction firms in several countries in Europe and beyond. Qatar's contemporary "soft power," a mix of cultural branding, financial investment, and policy projection has established a distinctive approach and role for itself (Peterson, 2013).

The capital city, Doha, has been in the spotlight both for hosting sport mega-events and for boasting new cultural institutions designed by renowned architects, for instance, Pei (Museum of Islamic Art), OMA (National Library), and Jean Nouvel (National Museum of Qatar). The 2022 FIFA World Cup is an opportunity for developing new infrastructure and flamboyant sport stadiums and facilities, as part of a strong modernization push and national strategy (Qatar Development Framework and Qatar National Vision 2030). Individual mega-projects are the main tools for implementing Qatar's vision, although in a quite fragmented and car-dependent urban form. Qatari Diar's first flagship and large-scale development project was Lusail City, in the northern quadrant of Doha (Tok et al., 2015). This vast area will host the main sport and touristic infrastructure of the 2022 World Cup. One of the drivers of recent urban development in the Lusail area is the Lusail National Stadium designed by Foster+Partners.

The size and plan envisions a whole new city of 38 sq km for over 200,000 people divided into several districts to be progressively built in the next decade and including residential, commercial and retail development as well as community services (schools, mosques, medical facilities, sport, entertainment, etc). Multiple developers will be coordinated by Qatari Diar. Although figures change over time, the cost of this operation is often said to exceed $30 billion. Smartness has resurfaced in the discourses on Lusail City, that has been depicted as the city of Qatar's future. First, infrastructure and technology are planned in order to sustain this innovative settlement and the new activities aimed at diversifying Qatar's economic base. Second, although not specified technically so far, mobility and the built environment will be automated. Third, social, health and education services will be integrated and digitized as part of a single smart system. Finally, security will be managed through one single control center, i.e the Lusail Command & Control Centre (LCCC), as is often the case with smart cities. This will provide data for managing services to and control over the population of Lusail City.

The 2022 FIFA World Cup will provide an occasion for displaying and marketing this new area as well as other accomplishments that correspond to the national narrative and quest for relevance in the Middle East and the world (Eggling, 2019; Hertog, 2019). The core idea is to cast a positive light of modernization and openness on Qatar as this and other developments tend to embody the national development vision. High-technology and smartness contribute to connecting Qatar with global urbanization narratives and trends.

Kingdom of Saudi Arabia: New town approach and the development of King Abdullah Economic City

The Kingdom of Saudi Arabia is the largest state in the GCC in terms of economy, population and territory. Here, globalization and modernization processes have accelerated only recently, following a substantial change in orientation of the ruling class in the 2010s. The economic base has been and still is oil-dependent while a strong diversification policy has emerged with the 2030 Vision. Compared to Qatar and the UAE, the Kingdom has remained more conservative. Its national strategy has included, at different stages, the development of new towns rather than new districts or making additions to existing cities.

In the mid-2000s, four new-town projects started to take shape. The core idea was to generate specialized poles for the diversification of economic activities, in a country that was and is still looking for a post-oil future. Special rights and rules were established in order for these and other projects to go ahead (e.g. increasing the Western population and international tourism) as part of a more general trend toward liberalization. These projects are the King Abdullah Economic City (KAEC) on the Red Sea; Prince Abdulaziz bin Mousaid Economic City (PABMEC), in the north of the country; Knowledge Economic City in Madinah (KEC); and Jazan Economic City (JEC), in the south-west of the country. Other initiatives for research (e.g. King Abdullah University of Science and Technology – KAUST) and for business (e.g. the King Abdullah Financial District – KAFD) have followed similar patterns of master planning enclaves with special rules and liberal orientation.

KAEC has a budget of $100 billion and is expected to generate substantial innovation and employment in the high-tech manufacturing, food processing, logistics and pharmaceutical sectors. In addition, chemical and energy-intensive activities will be developed by leveraging the oil industry and by making available cheap energy. The expected population is over 1 million people, spread across an area of 180 sq km (Moser et al., 2015).

The company that is developing the city has been given significant power by decree. It will act as the main regulator in a sort of special economic zone. This arrangement was made to speed up the permit and licensing process and to welcome foreign players. The project envisages cooperation with Emaar, a large Dubai-based real estate operator. The development is aimed at fostering tourism, providing new housing and facilitating foreign ownership. The proximity of Mecca is seen as an opportunity, given the massive scale of religion tourism in the area (e.g. annual haj pilgrimage).

The label of "smart city" became internationally prominent after the master plan for KAEC was defined by a team of international planners and designers, including the firm SOM. However, the project emphasizes automated and smart mobility: several sensing systems will be installed to improve the city's infrastructure and functioning. KAEC is expected to foster start-ups together with R&D activities and to become an important hub for cultural innovation, given the special regulations in place as a special economic zone.

With the new generation of the national ruling elite, the mid-2010s witnessed the start of a new and more radical wave of modernization. The national vision for development until 2030 has set in motion a number of new initiatives. In 2017, the government announced one further (and bigger) project for the new town of Neom, supported by the Public Investment Fund. This new and futuristic city on the Gulf of Aqaba uses the same approach and rationale of high-tech and smart city development.

Conclusions: Implementation and effects of smart city initiatives in the Arabian Peninsula and beyond

Cities of the Persian Gulf and Arabian Peninsula cannot be conceived as a single type of city or as places with identical urbanization processes (Molotch & Ponzini, 2019). However, there are similarities in terms of projects and transformations, economic diversification goals, and political narratives. Indeed, important smart city initiatives in the region are oriented toward diversifying the economic base of the respective country and toward an international audience, as evidenced by the examples discussed in this report. These initiatives obviously aim to represent the rulers and their country as innovative, forward-looking and open-minded, in some cases even becoming new centers for soft power (Hertog, 2019). In this framework, large development projects are labelled as "smart cities" and are expected to become urban-scale test beds for new technologies, and for attracting international investments and companies. Especially favorable conditions are created, massive investments are made available, new arrangements and technologies are tested and eventually transferred elsewhere.

The high speed and large scale of urban development in the region are important as certain kinds of projects – including smart city projects – are pursued more intensively here than elsewhere. The existence of certain solutions is essential for eventual duplication, supported by the international networks of experts involved as well as by great local sources of finance in search of good business opportunities abroad (Moser, 2019). At the same time, operating top-down limits enriching urban projects with multiple social and economic interests (Carvalho, 2015), as well as reflecting on failures or shortcomings before moving to the next project (Ponzini, 2020). In addition, Gulf cities rarely engage in mutual learning exercises, aiming instead to be compared and benchmarked with non-Gulf cities. There are evident limitations to the governance and implementation of

these new districts and cities in the Arabian Peninsula (Moser et al., 2015). Here, cities are conceived mostly in terms of infrastructural and economic dimensions, while social and political ones are systematically downplayed. Significant adjustments and substantial delays in implementing these master plans (often leaning more toward real estate operations rather than their initial mission) in part depend on mistaken assumptions about the capacity of government agencies or companies to simply enact a whole city (Molotch & Ponzini, 2019; Ponzini & Alawadi, 2021). Typically, mobilizing interests enriches and changes the plans for districts as well as for new towns.

The transnational spread of the image of Gulf city and Arabian city initiatives such as those discussed here may be considered problematic. Projects such as Masdar and KAEC are explicitly regarded as reference models by cities in the Middle East and Africa (Moser, 2019), despite the fact that resource availability and the particular socio-economic and political conditions in the region are not common elsewhere. The urban effects of such experiments seem, at this stage, to fall short if compared to their great expectations (Günel, 2019). In this sense, further and in-depth analysis of the urban and political effects is needed in the coming years.

Bibliography

Acuto, M. (2010). "High-rise Dubai urban entrepreneurialism and the technology of symbolic power." Cities, 27(4), 272–284.

Andraos, A. (2019). "Problematizing a Regional Context: Representation in Arab and Gulf Cities." In Molotch, H., Ponzini, D. (Eds.) The New Arab Urban: Gulf Cities of Wealth, Ambition, and Distress, New York: New York University Press, 58–78.

Boodrookas, A.,Keshavarzian, A. (2019). "Giving the Transnational a History: Gulf Cities across Time and Space." In Molotch, H., Ponzini, D. (Eds.) The New Arab Urban: Gulf Cities of Wealth, Ambition, and Distress, New York: New York University Press, 35–57.

Carvalho, L. (2015). "Smart cities from scratch? A socio-technical perspective." Cambridge Journal of Regions, Economy and Society, 8(1), 43–60.

Crivello, S. (2015). "Urban policy mobilities: the case of Turin as a smart city." European Planning Studies, 23(5), 909–921.

Cugurullo, F. (2013). "How to build a sandcastle: An analysis of the genesis and development of Masdar City." Journal of Urban Technology, 20(1), 23–37.

Cugurullo, F. (2016). "Urban eco-modernisation and the policy context of new eco-city projects: Where Masdar City fails and why." Urban Studies, 53(11), 2417–2433.

Cugurullo, F., & Ponzini, D. (2018). "The transnational smart city as urban eco-modernisation." In Karvonen, A., Cugurullo, F., Caprotti, F. (Eds.). Inside Smart Cities: Place, Politics and Urban Innovation, London: Routledge, pp. 149–162.

Djermoun, S., & Hersant, E. (2013). Qatar(isme)?: Essai d'analyse du mode de fonctionnement d'un système. Paris: l'Harmattan.

Eggeling, K. (2019). "'If you build it, they will come?'–Future oriented sense-making and the politics of urban space in Qatar." In Gulf Research Meeting 2016. Future Cities Laboratory Singapore; ETH Zurich, 106–124.

Elsheshtawy, Y. (2010). Dubai: Behind an Urban Spectacle. New York: Routledge.

Günel, G. (2019) Spaceship in the Desert: Energy, Climate Change, and Urban Design in Abu Dhabi, Durham NC: Duke University Press.

Hertog, S. (2019). "A Quest for Significance: Gulf Oil Monarchies' International Strategies and Their Urban Dimensions." In Molotch H., Ponzini D. (Eds.) The New Arab Urban: Gulf Cities of Wealth, Ambition, and Distress, New York: NYU Press, 276–299.

Hollands, R. G. (2008). "Will the real smart city please stand up? Intelligent, progressive or entrepreneurial?" City, 12(3), 303–320.

Hollands, R. G. (2015). "Critical interventions into the corporate smart city." Cambridge journal of regions, economy and society, 8(1), 61–77.

Hvidt, M. (2009). "The Dubai model: An outline of key development-process elements in Dubai." International Journal of Middle East Studies, 41(3), 397–418.

Karvonen, A., Cugurullo, F., Caprotti, F. (Eds.). (2018). Inside smart cities: Place, politics and urban innovation. London: Routledge.

Kitchin, R. (2015). "Making sense of smart cities: addressing present shortcomings." Cambridge journal of regions, economy and society, 8(1), 131–136.

McNeill, D. (2015). "Global firms and smart technologies: IBM and the reduction of cities." Transactions of the institute of British geographers, 40(4), 562–574.

McNeill, D., and Pollio, A. (2018). "Tracking the Global Urbanists." In Harrison, J. and Hoyler, M. (Eds.). Doing Global Urban Research. London: Sage, 81–95.

Molotch, H. & Ponzini, D. (Eds.). (2019). The New Arab Urban. Gulf Cities of Wealth, Ambition, and Distress. New York: New York University Press.

Moser, S. (2019). "'Two Days to Shape the Future:' A Saudi Arabian Node in the Transnational Circulation of Ideas about New Cities". In Molotch H., Ponzini D. (Eds.) The New Arab Urban: Gulf Cities of Wealth, Ambition,

and Distress, New York: New York University Press, 213–232.

Moser, S., Marian S., Mohammed H. A. (2015). "King Abdullah Economic City: Engineering Saudi Arabia's Post-oil Future." Cities 45 (2015), 71–80.

Peterson, J. E. (2013). "Qatar's international role: branding, investment and policy projection." Policy Brief, Norwegian Peacebuilding Resource Centre.

Ponzini, D. (2011). "Large Scale Development Projects and Star Architecture in the Absence of Democratic Politics: The Case of Abu Dhabi, UAE." Cities 28(3), 251–259.

Ponzini, D., & Alawadi, K. (2021). "Transnational mobilities of the tallest building: origins, mobilization and urban effects of Dubai's Burj Khalifa." European Planning Studies, forthcoming, 1–19, https://doi.org/10.1080/09654313.2021.1908233.

Ponzini, D., & Arosio, P. M. (2017). "Urban effects of the transnational circulation of branded buildings: Comparing two skyscrapers and their context in Barcelona and Doha." Urban Design International, 22(1), 28–46.

Ponzini, D. (2020). Transnational Architecture and Urbanism: Rethinking How Cities Plan, Transform, and Learn. London: Routledge.

Shelton, T., Zook, M., & Wiig, A. (2015). "The 'actually existing smart city.'" Cambridge journal of regions, economy and society, 8(1), 13–25.

Tok, E., McSparren, J. J., Al Merekhi, M., Elghaish, H., Ali, F. M. (2015). "Crafting smart cities in the Gulf region: A comparison of Masdar and Lusail." In Handbook of Research on Digital Media and Creative Technologies (pp. 448–460). IGI Global.

Vanolo, A. (2014). "Smartmentality: The smart city as disciplinary strategy." Urban Studies, 51(5), 883–898.

Smart Cities in Lebanon

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June 2021

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Smart Cities in Lebanon

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This paper maps out several smart cities initiatives in Lebanon, including implemented projects, plans put forward, etc., and categorizes them to analyze how different actors and stakeholders think about smart cities in the context of the country. It also compares the development of smart cities initiatives in Lebanon to those in the Arab World – mainly in the Gulf, making the case for the specific context of Lebanon as a smaller country with a different political and economic context to other Arab countries. Besides that, the author starts by discussing the critical nature of the concept of smart cities. The problematic nature of the smart cities concept is discussed in order to provide a critical view on smart cities ahead of discussing smart cities initiatives in Lebanon.

Introduction and Methodology

As part of the Zurich Centre for Creative Economies' project on smart cities, this paper was initially commissioned to be written about singularities of smart cities in Lebanon, with a focus on how art is embedded in smart cities initiatives. However, after research, the author found out that the topic of smart cities is barely touched in Lebanon, leave aside the embedment of arts in smart cities. Indeed the amount and the size of smart cities initiatives in Lebanon is very small, and there were no works or attempts found about embedding arts in these initiatives, so the author decided to keep this paper limited to the singularities of smart cities initiatives in Lebanon in general, without delving into the topic of the arts.

This paper maps out several smart cities initiatives in Lebanon, including implemented projects, plans put forward, etc., and categorizes them to analyze how different actors and stakeholders think about smart cities in the context of the country. It also compares the development of smart cities initiatives in Lebanon to those in the Arab World – mainly in the Gulf, making the case for the specific context of Lebanon as a smaller country with a different political and economic context to other Arab countries. Besides that, the author starts by discussing the critical nature of the concept of smart cities. The problematic nature of the smart cities concept is discussed in order to provide a critical view on smart cities ahead of discussing smart cities initiatives in Lebanon.

Research for this paper was conducted in the period between April and May 2021. It was based on an online desk review of various smart city initiatives in Lebanon and other countries in the Arab world, in addition to general literature about the concept of smart cities. The sources are provided in the references section.

The Critical Nature of the Concept of "Smart Cities"

Believing in the role of "smart cities" technologies in creating better cities, various governments around the world have initiated "smart cities" missions (Martel, 2014). For example, in Russia, Prime Minister Dmitry Medvedev announced in 2009 a plan to establish the "Skolkovo Innovation Center," the biggest technological project in the history of Russia, to make Moscow a "smart city" (Martel, 2014). In India, the government of Prime Minister Narendra Modi announced in 2015 the "Smart Cities Mission," which provided funds for 100 Indian cities to become "smart cities." In Kenya, the government issued a plan in 2012 to create "Konza Smart City," just outside the capital of Nairobi, to let the "silicon of computers" meet "the trees of the Savannah" (Martel, 2014). In Saudi Arabia, the new King, Muhammad Bin Salman, announced a plan in 2017 to establish a new "Mega Smart City" on one of his country's islands.

The examples persist with similar smart cities projects exist in China, Brazil, USA, and elsewhere. In some countries, there have been efforts to use smart city technologies in urban planning in order to rehabilitate poor and declining urban neighborhoods and slums. For example, in Pittsburgh, the mayor's office has been working on the "Smart Pittsburgh" initiative to bridge the gap between the socio-economic decline of inner-city neighborhoods and the city's transformation into a technological hub where high-tech solutions are developed (2017c). Other stories about implementing "smart cities" initiatives in poor urban areas include providing ICT skills for slum dwellers in Nigeria, creating an online presence for Favelas in Rio (so as to change the negative image that politicians and media propagate), using smartphones to store and transfer money in Kibera, a Nairobi slum, to combat theft, etc. (2010).

It is a fact that "smart cities" technologies have become an umbrella for various urban development projects around the world. This makes it crucial for academics and researchers to investigate how exactly these technologies are thought of and put into practice (Mock, 2017). From an urban perspective, there are two main definitions of smart cities:

1. Smart cities as in having "data" about the city, i.e. having devices that can quantify the urban environment in order to monitor and improve it. Examples include the use of sensors to monitor water levels and to anticipate floods in cities built along rivers, using digital detectors to detect air particles and measure pollution levels in highly polluted cities, deploying digital cameras to monitor streets and provide more security in cities with high crime rates, etc. In this sense, smart cities can change the epistemological lens through which we know the city as this involves using new tools (i.e. data) to measure and improve aspects of urban life (Shepard, 2017).

2. Smart cities as in applying digital technology to improve urban infrastructure. Examples include smart cars, connecting buses to phone tracking applications, using water meters to mitigate water consumption, installing "smart" traffic lights, etc.

Despite smart cities being a highly appealing subject for the public, smart cities initiatives have been criticized. Criticism falls into two main categories:

1. Technical criticism. This comes from urbanists, architects, engineers, etc., who are not necessarily against the innovation characteristic of smart cities, but against considering smart cities as "better" or more important solutions compared to other "traditional" solutions simply because they are "digital".

2. 2- Political criticism. This comes from political scientists, social scientists, journalists, intellectuals, etc. It focuses on understanding the political interests behind smart cities and is concerned with questions similar to those listed in the chart below: Why should smart cities be funded? Why should society's resources be directed towards smart cities? What is the propaganda in favor of smart cities? Whose interest is it to fund smart cities (i.e. which politicians, which corporations, etc.)? Political criticism also focuses on understanding that smart cities are not the "panacea" for urban ills and that the road towards smart cities can leave behind a lot of social and environmental damage (Kaika, 2017)

What are «Smart Cities» initiatives?

Who has interest in pushing these plans forward?

Who is impacted by these plans?

What are the ideas and arguments for these plans?

What are the impacts?

Singularities of Smart Cities in Lebanon

In Lebanon, smart cities are still in their infancy and yet to take a prominent position in the eyes of the Lebanese public and politicians. It is safe to say that smart cities initiatives are rare in Lebanon. Nor are the large majority of Lebanese people aware of such ventures or familiar with the concept. Nevertheless, there have been some few attempts to push Lebanon to ride the wave of smart cities as other Arab countries have done. In 2017, Lebanon's Ministry of Telecommunications and OGERO Telecom[1] rolled out a nationwide IoT (Internet of Things) network. The potential benefits of IoT for industry, agriculture, healthcare, urban planning, exports, etc., were recognized. It was hoped, moreover, that increased efficiency, competitiveness and resource management would result from the precision and data provided by M2M connectivity and, more specifically, by LoRaWAN technology. In 2018, mayors, politicians and entrepreneurs from across Lebanon started working in coordination with the Arab Forum for Smart Cities to digitally and electronically transform Lebanon with a view to creating smart, that is, "e-"cities (2018a). Participation in this forum was based on the view that a national strategy for smart cities in Lebanon would be essential to delivering good services to citizens and to solving the country's traffic, environmental and social crises. However, as is the case with many "plans" and "strategies" in Lebanon, work has yet to begin or the results are yet be implemented.

Critics say that if Lebanon and its capital, Beirut, are to become "smart," one should not count on the government randomly "appifying" its services (Kanaan, 2019). As Lebanese metropolises continue to grow, businesses and public services are becoming increasingly dependent on the robust grids and internet infrastructure needed for connected, automated and intelligent cities. However, for many Lebanese, this might sound like a

utopia that will never see the light of day (Kanaan, 2019). It is clear that the government's inability to provide adequate traditional infrastructure prevents Lebanese cities from becoming interconnected and "smart."

Despite this pessimism, there have been several initiatives in Lebanon, mainly by private institutions, to create smart cities or to use smart city technologies to improve everyday life in the country. What follows categorizes these initiatives fall, whose singularity in the Lebanese context is discussed..

Smart Cities for Better Real Estate Projects

The first type of smart city that can be found in Lebanon is the "real estate type." This focuses entirely on innovation in the building and construction sector and aims to increase the standard of living. This type, moreover, concerns building technology, energy consumption, connectivity and security, sensor-based monitoring of the physical environment, and data usage aimed at improving service quality, etc.

Examples include Beit Misk smart city. This real estate project comprises 1800 units (apartments, villas and townhouses) in the town of Beit Misk on the western hills of Mount Lebanon, near Beirut. In 2017, Data Consult, a digital consultancy firm, worked on transforming Beit Misk into "the first smart city of the middle east" by "providing innovative solutions insecurity, Internet of Things, data centers, network & system infrastructure and management, etc., for over 25 years" (2017a). The aim was to digitize elements of the village's infrastructure and residential utility gauges, to connect these elements to a customized digital platform through a wireless network and to analyze and secure the massive flow of data. Work included "deploying sensors for collecting data on a variety of sources including gas, water and electric apartment meters, oil and water reservoirs, atmospheric gases, sewage treatment systems, legacy security systems, fire alarms, etc." A Smart City app was created to connect city operators and citizens to the platform and to display a responsive dashboard with analytics and visual data. A Facebook Messenger chatbot was also developed for tenants to easily access information and interact with their surroundings. The project's most striking results were the speed at and the ease with which the city was digitized. The project enabled Beit Misk Facility Management Team to view, in real time, different readings related to water levels, energy consumption and environmental conditions. They were also

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[1] This private company was hired by the state to manage telecom networks in Lebanon. It provides the backbone infrastructure for all Lebanese telecom networks, including Mobile Operators, Data Service Providers (DSPs), Internet Service Providers (ISPs) and others.

able to control different water pumps and be alerted in case of fire or any equipment malfunction. In addition, air quality sensors were added to measure the level of air pollutants (2017b).

Such smart city initiatives exist across the world and are not specific to Lebanon. Such initiatives, led by private building contractors and real estate developers, focus entirely on building innovation while being completely detached from political and social realities. However, there are lessons to be drawn from such initiatives, so as to contextualize them in Lebanon's socio-economic realities. Indeed, the fact that Data Consult were able to install and activate their smart city process in a relatively short period of time and with an affordable investment can pave the way for other initiatives in Lebanon to address the country's many problems: traffic control, waste management, pollution, etc. In fact, the technology used at Beit Misk is scalable and secure, and therefore meet the needs of bigger cities such as Beirut, or any other large cities in Lebanon that would like to provide their residents with a modern and improved citizen experience. However, it is important to stress the political element of such smart city initiatives, especially

given their ties with the Lebanese government. Private initiatives that implement smart cities like Beit Misk seek to include themselves under the umbrella of national government strategies and plans in order to facilitate funding and receive more public support, hoping that they will implement government projects related to smart cities. For example, in 2017, Data Consult, who were behind the Beit Misk smart city initiative, were selected to partner OJERO's national strategy to create more Internet of Things (IOT) networks. Given the Lebanese context, and how "national strategies" are always put in place to support the interests of specific individuals and businesses to monopolize economic sectors and trends, one cannot but stress the importance of the political benefits behind such smart city initiatives.

Smart Cities for Better Urban Neighborhoods

The second type of smart city initiative in Lebanon is adopted by social and academic institutions seeking to employ smart technologies to improve living standards in poor areas – mainly urban areas – in ways that are similar to how smart cities technologies are used to improve
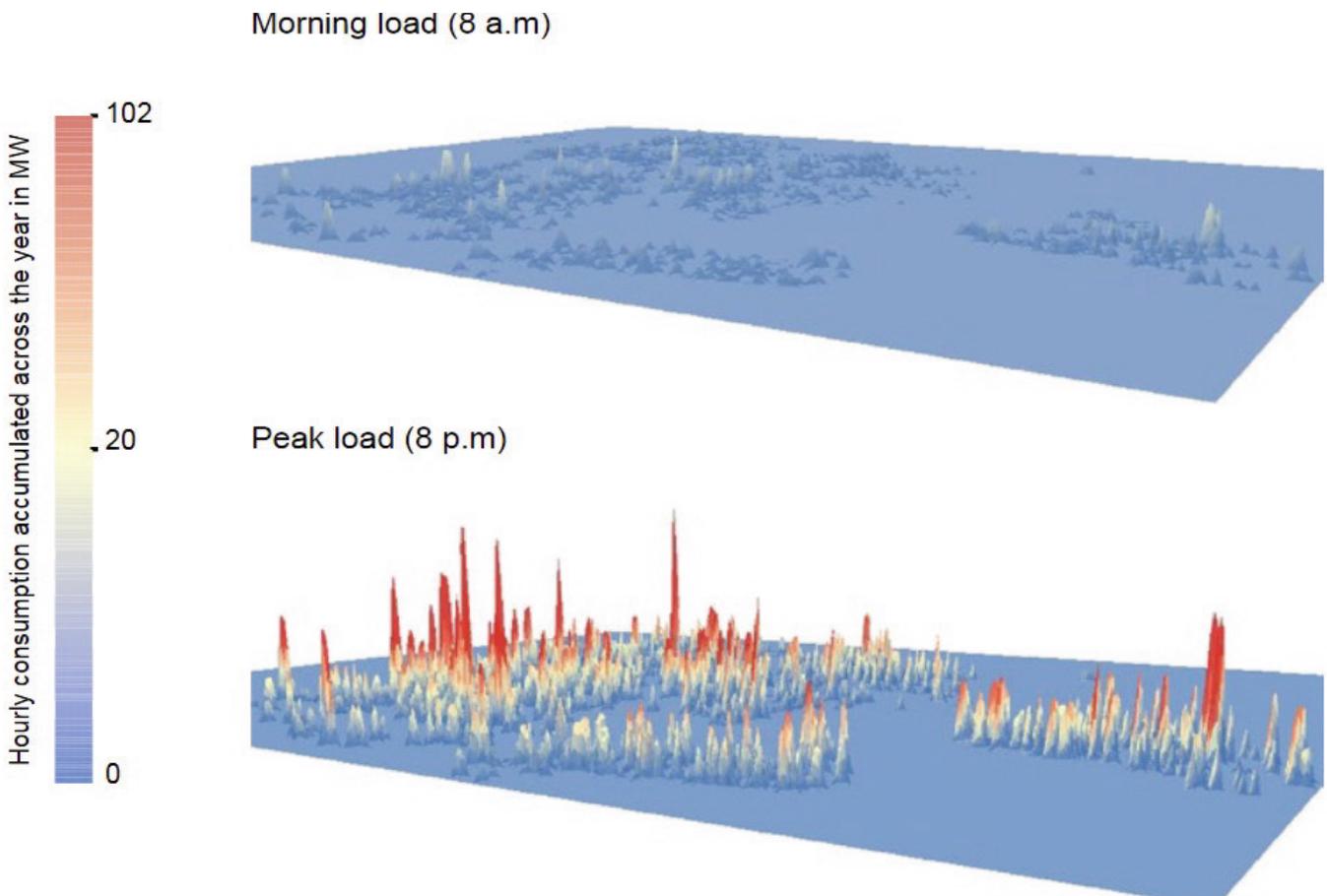

Figure 1: Modeling of Energy Consumption on the neighborhood of Bachoura

life in slums and informal settlements in countries like India, Kenya, etc.

One example is the smart energy saving project implemented by the American University of Beirut (AUB) in the poor and crowded neighborhood of Bachoura in the northern suburbs of Beirut (2019a). In this project, a team of energy experts developed an Urban Building Energy Model (UBEM) to measure the energy performance of buildings in the neighborhood (see Figure 1). The aim was to use the results to identify peak energy-use hours and to recommend a policy that ensures that rationed hours [2] of electricity supply match peak hours of demand to optimize the provision of the limited power supply in the neighborhood. Energy modeling was adopted to simulate buildings' energy consumption, to evaluate the efficacy of various design options, and to optimize the overall performance of building systems in the Bachoura neighborhood. Every building was represented by a 3D thermal model, divided into floors, with windows on facades and balconies in the case of residential properties.

Clearly, predicting electricity consumption patterns through such an initiative could ultimately help inform "smart" rationing electricity in this urban neighborhood. Indeed, this "smart rationing" model fits the context of electricity provision in Lebanon. Its multi-scalability can be used to develop larger decision support systems for the country as a whole by estimating energy consumption patterns and by identifying peak grid demands. However, it is easy to criticize such a model for not addressing the root cause of problematic electricity supply in Lebanon. The model instead aims to deal with the problem more "smartly" by better matching supply and demand. This approach does not address the root causes: corrupt and incompetent supply, and its monopolization by the state power company.

Smart Cities for Better Public Service

The third type of smart city initiative in Lebanon is found among entrepreneurs in start-up hubs. These have developed various apps to enable Lebanese people to "smartly" overcome the public sector problems they face

Figure 2: Map of Public Transport in Beirut by YallaBus

because of government corruption and mismanagement. In Lebanon, start-ups have been working on developing smart solutions to increase citizen wellbeing (and address everyday problems), thus replacing the role of the government. Examples include YallaBus (i.e. "Go Bus" in Lebanese) and Waynak (i.e. "Where Are You" in Lebanese) (2018b).

YallaBus is a platform that aims to revive public transportation in Lebanon. The app helps people find the right bus to move around based on GPS tracking technology: by choosing a destination, users receive live updates on which bus to take, where and when to wait for buses while tracking vehicles in real time. The app thus marks a response to Lebanon lacking a proper bus system with clear routes and stations, making it impractical for most people to use on a daily basis, and meaning it is used only by the lower social classes (who

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[2]   The residents of Beirut suffer from at least three hours of blackouts per day. This period increases as one moves further from Beirut. In neighborhoods like Bachoura, the blackout lasts much longer, especially during Lebanon's current economic crisis.

bottom-up in future and, especially if supported properly, might thus help solve some of Lebanon's most serious problems.

Smart Cities for Holistic Governance

The other examples of smart cities in Lebanon includes ones related to holistic governance, specifically at the municipal level.

One case in point is the municipality of Baakline in the Chouf district where local authorities began putting in place a plan in 2018 to implement various smart city interventions: governance, community engagement, learning and adaptation, and investing in the future by reshaping an entire market and ecosystem (Ghosseini, 2018). The plan involves both enhancing democratic participation with local residents while implementing smart energy saving programs to reduce emissions and improve service provision. The municipality believes that governance-related smart city interventions should turn citizens from passive consumers into active and concerned citizens, as well as into the producers of ideas, content, applications, and activities; and that the choose their society, especially when it comes to sustainable development and energy choices. Indeed, the plan makes Baakline committed to intervening in all public matters affecting local inhabitants by working hard to find smart and effective ways of dealing with potential issues (e.g. climate change) through combining an integrated planning process with low energy consumption and a large supply of renewable and decentralized energy.

The Baakline approach to a smart city invites all municipalities in Lebanon to reflect on and act through pilot projects that are expected to change local mindsets and to integrate this concept into their future plans. However, such an approach must always be understood in its specific context, that is, how Baakline tries to appeal to the local community. As mentioned, public or state-sponsored programs in Lebanon should always be scrutinized to understand why they are happening and who benefits from them. In the case of Baakline, its electorate, which largely belongs to the Progressive Socialist Party, wishes to see progressive changes from elected officials. In response, the municipality has put forward agendas (including a smart city plan) that cater to public expectations.

have no other option). YallaBus has also mapped bus trajectories, especially in Beirut, to inform passengers about how they can use public transport (see Figure 2).

Waynak, on the other hand, is a platform that allows users to create their personal digital address in a personalized, more detailed map to solve Lebanon's complicated address system. Users are able to use Waynak's address on various other platforms without going through the hassle of repeatedly filling in the same information. This is in response to Lebanon lacking a proper address system because not all buildings and streets have postal addresses due to a mixture of informality and mismanagement in urban and rural authorities.

While it is yet to be seen whether smart start-up initiatives like YallaBus and Waynak are going to succeed since it is uncertain how much the Lebanese will use these start-ups, these solid attempts might grow

Comparing Smart Cities in Lebanon to Smart Cities in the Arab World

Although diverse, smart city initiatives in Lebanon are still very small compared to other Arab countries, especially the Gulf. In Lebanon, smart city initiatives pop up incrementally via small-scale private or public initiatives that seek to innovate and use technology to improve the future of the country. In Arab countries, such as Saudi Arabia and the United Arab Emirates, smart city initiatives are implemented top-down by governments able to pursue mega-projects. While this disparity goes back to Lebanon being a smaller country with a smaller budget,[3] and therefore unable to undertake mega-projects as in the Gulf, it also concerns the difference between how politicians appeal to the public in both countries. In Lebanon, the topic of smart cities is yet to attract the interest of politicians and to appeal to the Lebanese public. Both find the idea of smart cities "too advanced" for a country that still has no proper basic infrastructure and services (e.g. water, electricity, roads, etc). In the Gulf countries, however, it is more in the interest of politicians to show off technological advancement, in order to demonstrate that they are modernizing their countries and competing with the West.

Moreover, it is also important to point out the different purposes of smart cities in Lebanon and in the Arab world. While in Lebanon smart cities are conceptualized to respond to lacking public services, and to the need for private initiatives to replace the role of the government, in Arab countries such as in the Gulf, smart cities are conceptualized more to respond to pressing climate issues or as complementing government agendas to move the Gulf countries "beyond oil" (2019b). Masdar City in UAE, for instance, is more about responding to local climate conditions and their challenges. Indeed, Masdar City

was designed based on ancient cities such as Cairo and Mascat to see how they maintained cool temperatures. Those cities coped with hot desert temperatures through shorter and narrower streets where the buildings at the end of these streets create just enough wind turbulence to push air upwards, creating a flushing effect that cools the street, something which was duplicated in Masdar. The City of Neom in Saudi Arabia, which is still being planned, is part of Muhammad Bin Silman's political agenda to "open up" Saudi Arabia to the world. This venture seeks to blend environmentally friendly and energy saving applications with "wild" technologies such as flying cars and robotic maids. It also looks to attract young and open-minded people in order to retain local talent, as well as attract manpower, international companies, etc.

Because they are bigger and more influential, smart cities in the Arab world usually face more scrutiny than smart cities in Lebanon. Indeed, many skeptics believe that smart city initiatives in the Gulf countries have purely symbolic value, first and foremost for their governments. For example, Masdar was described by many critics as unrealistic and not as environmentally friendly as publicized. Others have criticized smart cities in the Gulf countries for excluding vulnerable populations. For instance, Masdar was described as a "gated community for the rich" as opposed to how it is popularized; the plans for Neom have been accused of evicting the Howeitat tribe from its historic land..

Future Outlook for Smart Cities in Lebanon

In conclusion, it is important to emphasize that all Lebanese smart city initiatives mentioned here took place before the drastic political and economic changes since the revolution of October 17, 2019. The political climate in the country has since revealed a sort of "divorce" between the Lebanese people and the government. This divide may have initiated "smart" proactive actions among the Lebanese people to cope with a crisis that the government is doing nothing to prevent or solve. So far, it has not been clear how Lebanese people have relied on smart technologies to cope with the economic crisis. One example could be Bitcoin, even though it is not directly a "smart city" technology. Since October 2019, Bitcoin

[3]   In 2015, the MENA and North African region governments spent around $12 billion on ICT products, of which a significant part was due to smart city initiatives. This figure is immense compared to the size of Lebanon's economy. For instance, the full reserves of the country's central banks do not usually exceed 30 billion dollars.

has been used in Lebanon to enable Lebanese citizens to transfer money in and out the country without going through the corrupt banking system, which is blocking deposit transfers and has imposed unrealistic capital controls on international money transfers (AlJazeera, 2020). Will a "smart" Lebanon be a country where money is decentralized and ruled by people and not by the government? Will Bitcoin make Lebanese people smarter citizens, who can exchange and mine a currency without needing a corrupt government? All these questions spring from discussing how technologies can improve life in a suffering country such as Lebanon.

Bibliography

Neom Smart City, https://www.neom.com/index.html

2010, Improving the lives of slum dwellers through innovative uses of ICT, ITU News

2015, Smart Cities in the Arab Region – Are They Exclusive or Inclusive?, Beirut: SkyNews Arabia https://www.youtube.com/watch?v=6V5F9Mx-aNA

2017a, BeitMisk, Lebanon Paves the Way to Smart Cities in the Middle-East, Actility, https://www.actility.com/beitmisk-lebanon-paves-the-way-to-smart-cities-in-the-middle-east/

2017b, Lebanon Smart City Experience, Data Consult, https://dcgroup.com/lebanon-smart-city-experience/

2017c, Smart Pittsburgh Vision, http://smartpittsburgh.org/vision

2018a, Lebanon Set on Creating Smart Cities, https://www.albawaba.com/editorchoice/ lebanon-set-creating-smart-cities-1197772

2018b, A Smart City Is Led By Smart People: Insights From Jounieh Smart City 2018, BeryTech, https://berytech.org/jounieh-smart-city-2018/

2019a, BEIRUT AS A SMART CITY: REDEFINING URBAN ENERGY

American University of Beirut, https://www.aub.edu.lb/ifi/Documents/publications/ policy_briefs/2018-2019/20190402_beirut_as_smart_city. pdf

2019b, 'Smart cities in the Arab world – Overview and perspectives'

University of Vale do Itajaí (Univali) in Santa Catarina, Brazil: Foreign Trade, Port Management and Logistics Symposium, https://anba.com.br/en/smart-cities-in-the-arab-world-the-topic-of-lecture/

ALJAZEERA, 2020, Distrust in Lebanese banks spurs bitcoin boom, https://www.aljazeera.com/ajimpact/distrust-lebanese-banks-spurs-bitcoin-boom-200224202742678.html

GHOSSEINI, N. 2018. Baakline: Towards a Smart City – Leading Change into Chouf Souayjani Region

Springer Smart Cities in the Mediterranean – Coping with Sustainability Objectives in Small and Medium-sized Cities and Island Communities, 59–84

KAIKA, M. 2017. 'Don't call me resilient again!': the New Urban Agenda as immunology...or...what happens when communities refuse to be vaccinated with 'smart cities' and indicators. Environment and Urbanization, 29, 89–102.

KANAAN, S. 2019. 'The time is now': Experts talk turning Beirut into a 'smart city'. The Daily Star. https://www.dailystar.com.lb/Business/Local/2019/ Jun-13/485122-the-time-is-now-experts-talk-turning-beirut-into-a-smart-city.ashx

MARTEL, F. 2014, Smart: enquête sur les internets, Stock

MOCK, B. 2017, Can Cities Hack Diversity?, CityLab, https://www.citylab.com/life/2017/06/can-cities-hack-diversity/527544/

SHEPARD, M. 2017. Intersections: Understanding Urbanism in the Global Age, Ways of Knowing the City. Radcliffe Institute for Advanced Study, Harvard University. https://youtu.be/eeqrMhEdmAE?t=1420

Characteristics of Smart Cities and the Cultural Industry in China
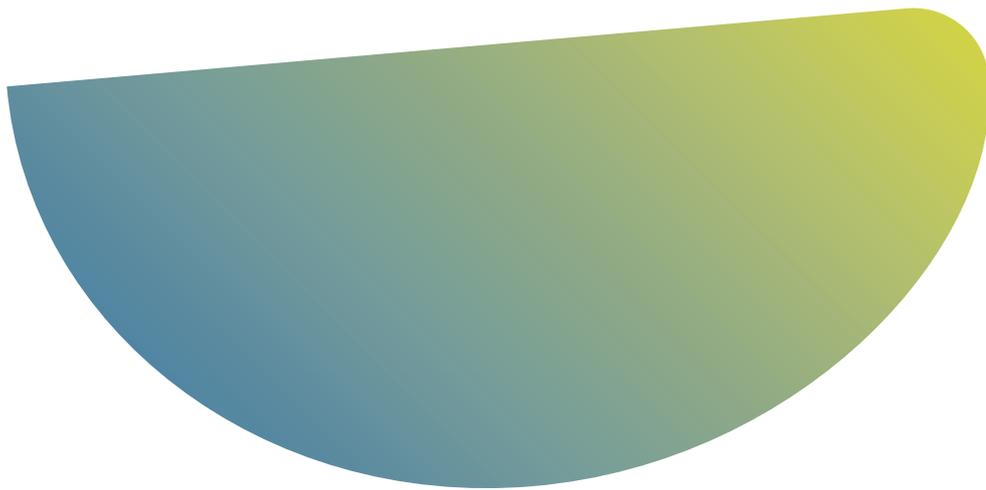
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Characteristics of Smart Cities and the Cultural Industry in China

Jing Su

The acceleration of human urbanization means that cities face many challenges. How to solve the manifold problems caused by urban development and how to achieve sustainable development has become an important question for urban planning and construction. In this context, "smart cities" have gradually become a feasible way of solving urban problems.

There are many discussions in society and academia on the definition and focus of smart cities, and they have changed over time. In the late 1990s, the US government put forward the concept of "Smart Growth of the USA" and applied it to urban construction, in order to solve the many problems caused by "urban sprawl."[1] Batty and Marshall believed that planning should focus on the smart economy and technological construction.[2] In 2006, the European Union launched the European "LivingLab" organization, which uses new tools and methods, advanced information and communication technology to mobilize all aspects of "collective wisdom and creativity," so as to provide opportunities for solving social problems.

It also launched the European Smart Cities Network. In November 2008, at the Foreign Relations Council held in New York, IBM presented of smart cities. A year later, the company explained the function of "smart cities" as follows: a smart city consists of six core systems related to the main functions of the city, namely, organization (people), business and government, transportation, communication, water and energy. These systems are not fragmented, but connected in a collaborative way, while the city is a macroscopic system composed of these subsystems. Most scholars believe that a smart city represents an overall approach to urban planning based on ICT (Information, Communications, Technology).

Developing smart cities in China

Around 2009, China began to develop smart cities. The related research was incorporated into the country's national development strategy plan. The report of the 18th National Congress of the Communist Party of China in 2012 stated: "Develop a modern information technology industry system, improve an information security assurance system, and promote the widespread use of information network technology."[3]

In addition to highlighting the importance of technological development in the construction of smart cities, Chinese scholars also proposed that smart cities should be cities that meet the needs of human development, and that can promote human progress and solve urban problems with technology. Their evaluation depends on the development quality of urbanization. Smart cities are also a kind of spatial organism.[4] Smart city research and development in China revolves around the tenet of "people-oriented." This represents an upgrade of urban informatization after "Digital Cities" and "Intelligent Cities." It also manifests the integration of information and industry development, as well as a way of achieving China's goal of economic transformation.

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[1] Paolo Neirotti and Elisabetta Raguseo, "On the contingent value of IT-based capabilities for the competitive advantage of SMEs: Mechanisms and empirical evidence," Information & Management, 54 (2), 2016.

[2] Michael Batty and Stephen Marshall, "The evolution of cities: Geddes Abercrombie and the new physicalism," The Town Planning Review, 2009 (6).

[3] The report of the 18th National Congress of the Communist Party of China, 2012.

[4] Yang Danxiu and Xiang Qifeng, "The way of creative industry: the strategic development of the integration of culture and technology," Journal of Southwest University for Nationalities (Humanities and Social Sciences Edition), 2015 (7).

In terms of development, China's "smart cities" have four characteristics:

First, the development model of China's "smart cities" is dominated by the government. Development strategies and tactics are carried out "top-down" by the government. The government conducts research through research institutions, formulates development policies, implements them in industry by providing encouragement and support, and invests in infrastructure construction to improve related public services. In addition, the government also popularizes its concepts to enable the public to understand its measures and policies. In other countries, companies take the lead in the construction and development of "smart cities" (e.g. Siemens' smart transportation project in Singapore).

Second, China's construction of "smart cities" is also service-oriented. It is hoped that through the effective allocation of resources, the service value of resources can be better realized and that the needs of city populations can be met. The construction of smart cities in China has changed everyday habits and methods in the past 10 years or so. Examples include the development of the Internet to the Internet of Things, digital payments, online sharing platforms, online city services, etc.

Third, China develops smart cities differently in the various regions, with cities having different priorities. China's large cities (Beijing, Shanghai, Guangzhou, Shenzhen, and Hangzhou) are clearly ahead of some small and medium-sized cities in terms of smart city construction. In addition, the focus of each city in the construction of smart cities is different. For example, Beijing pays more attention to municipal services, while Shanghai heeds the digital economy and intelligent transportation.

Finally, China's building of smart cities currently focuses on economics, commerce, technology, transportation, medical care, and government affairs. Cultural factors are gradually being given greater attention. Culture is also a very important aspect of building smart cities as it "can simultaneously express (soft) 'intangible indicators' – affirmation, identity, quality of life, praise and social justice – and (hard) 'tangible indicators' – economic development, financing capacity, industrial strategy, infrastructure, training programs, urban design, transportation, etc."[5]

[5]   Deborah Stevenson, "Cities and Urban Cultures," Open University Press, 2003.

Combining China's Smart Cities and Cultural Industry

In recent years, China has paid more and more attention to developing the cultural industry. As a pillar of future economic development, the cultural industry influences the macro-control of China's resources and the in-depth integration and development of other industries. It can be said that developing smart cities must include the cultural industry. At the technical level, smart cities will also have a positive effect on the development of cultural creativity. For example, such cities can change the consumption and production methods of industry, promote the development of cultural innovation and creativity, and foster the sharing of industrial results. The combination and results of the development of China's smart cities and cultural industry are reflected in the following aspects.

First, the upgrading of the cultural industry. The construction of smart cities combines technology and culture in order to introduce new industrial forms. At the technical level, graphics and image processing technology, video and audio transmission technology, word processing technology, information communication technology, among others, have all revolutionized the cultural industry. The publishing industry, radio and television, film, music, animation, games and other cultural subdivisions have changed as a result. The industrial chain and the market operation model of the entire cultural industry have changed accordingly. "Digital content" has become a key factor.

China's "Eleventh Five-Year Plan" already clearly defined the important position of the digital content industry and included it as a national pillar industry. The digital content industry provides new opportunities for cultural industry development. The advent of new media and big data provides opportunities for upgrading China's cultural industry. At present, the social characteristics of decentralization, personalization, and instant interaction have promoted the production and development of many cultural products. Local governments are also advocating and supporting the development mechanism of culture + technology.

Second, the new way of cultural industry development. The development of smart cities is reflected not only in the development of science and technology, but also

in changes to citizens' lifestyles. For example, the cultural industry is upgraded through the construction of smart cities, which will affect people's cultural needs and drive new methods for developing the cultural industry and cultural products. The changes to China's cultural industry brought about by developing smart cities are mainly reflected in content, scenes, and carriers, as explained below.

In terms of content, the "cloud" and "digital think tank" required to build smart cities provide the creation of cultural products and cultural practitioners with standards for content quality control and a rich creative reserve. In terms of scenes, cultural products are more targeted and can even be customized. For example, when China's very popular online literature is transformed into film and television drama, the data analysis platforms of smart cities can accurately grasp the audience's interest and psychology to make changes and better meet the needs of target audiences. As for carriers, live broadcast platforms, AR, and VR have enriched the diversity of cultural carriers and brought a different atmosphere to urban construction.

Third, the cultural industry is combined with other industries. In 2018, the Chinese government merged the Ministry of Culture and the Ministry of Tourism into one department. The tourism industry and cultural industry are deeply integrated and further deepened and developed through smart cities. At the practical level, Shanghai's "Building Readable" project, for instance, illustrates the rich results brought about by integrating the cultural industries and other industries within the framework of smart cities.

Fourth, the promotion of public services related to the cultural industry. As mentioned, one of the characteristics of smart city development in China is service-oriented. Public services related to the cultural industry also benefit from the development of smart city technology. Various developments make everyday life more convenient (e.g. online library lending, the establishment of a shared cultural data resource database, etc). In addition, public cultural services combined with science and technology are conducive to improving the regional imbalance in developing China's cultural industry and in bringing cultural resources to areas and small cities with fewer resources.

Conclusions

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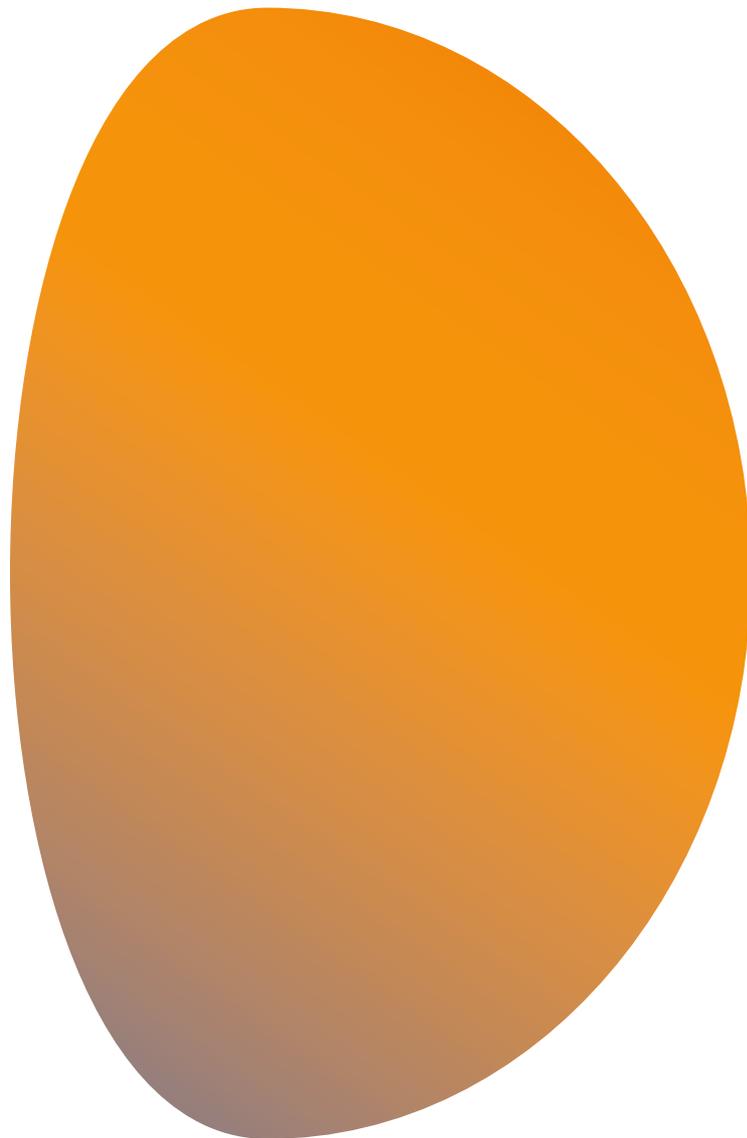
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Smart and Creative Cities? On the Flip Side of a Debate or: the Other Half of the World.

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Who Owns the Region?

How suitable are the concepts of the smart[1] or creative city for addressing the pressing questions of the present and the future, both in the city and their regions? This is the starting point for my reflections on where the limits of the concepts of the smart and creative city lie and why they cannot simply be transferred to the countryside or the region. This is done not least with the aim of arguing from the perspective of regions rather than that of cities. I first critically discuss the opposing pairs of urban/rural and creative/non-creative, which are the basic tenor of the discourse on the "creative city" and the "smart city." Examining the concepts and promises behind the triad of space/creativity/knowledge in the wake of digitalization shows why it is not expedient to speak of a creative or smart region as long as this is understood as a technology-driven discussion about optimization with which structural change is to be managed. This paper also describes why a new conceptual politics and other approaches to researching the creative economies are needed, ones which radically place people and the consequences of human-made things centre stage. Based on these remarks, I conclude with a case study on how a partly rural, polycentric region is trying to cope with the challenges of structural change triggered by digital transformation and what role individual actors play in this process. My analysis focuses on the quadripoint in the Lake Constance region (Germany/Austria/Switzerland/Liechtenstein) and ties in with two international research projects of mine in the region.[2]

City or Country?

The term "smart city" holds out the promise that all areas of life will become "smart" – or rather better – in the future. As the Smart City Hub Switzerland puts it: "Smart city stands for holistic future-oriented development concepts that aim to make cities more efficient, technologically advanced, greener and socially inclusive."[3] To express this desire for improvement, a comparative slant has since been added to the debate: smarter cities. It has never hurt anyone to imagine the best of all possible futures. Nonetheless, the smart city narrative seems to disregard many real-world problems most of the time. Seen critically, this narrative amounts to a technology-driven discussion on optimization. The concept of the smart city is based on the fundamental assumption that cities play a special role in late modern societies. This idea is shared in the second formative discourse, the creative city. Within it, urbanity and creativity are inextricably interwoven. Firstly, through the assumption that the city is a privileged place in which creativity can

[1]   I have deliberately omitted initiatives for promoting digitalization, which are difficult to survey and partly overlap with smart city initiatives.

[2]   See Lake Constance Region's Creative Economy – Value Creation between Culture, Economy and Technology, ed. Janine Schiller, Zurich University of the Arts (2019). Available in German as Kreativwirtschaft Bodensee. Wertschöpfung zwischen Kultur, Wirtschaft und Technologie. The second IBH-funded project focuses on architecture, the second largest industry in the region; see Regional Value Creation through Architecture and Building Culture in the Lake Constance Region (CE_ARCH).

[3]   See Smart City Hub Switzerland: https://www.smartcity-hub.ch/ziele.14de.html, accessed 12 May 2021.

flourish; and secondly, in the assumption that creativity is the crucial resource with which the city can flourish. At the same time, a pioneering role is formulated for both the smart city and the creative city in relation to other forms of settlement.

On the one hand, the fact that the discussion about the smart and creative city has precisely this focus can be explained by increasing urbanization. The urbanization process exerts tremendous transformative force and holds an emancipatory promise. Cities have therefore always been places of innovation and drivers of developments. On the other hand, digitalization is adding to this dynamic. The inexorable urbanization of the world, [4] in which more than half of humanity already lives, will continue to increase. According to United Nations predictions, by 2050 urban spaces will represent the central form of organization for two-thirds of the Earth's population. It could therefore be concluded that all questions concerning the future of humanity will also be decided in cities.

With "Countryside: A Report," [5] a 2020 exhibition at New York's Guggenheim Museum, Dutch architect and journalist Rem Koolhaas held up a mirror to these statements on the future of cities, statement which have long since become common knowledge. He "discovered" the region and, in the publication accompanying the exhibition, presented a manifesto for the exploration of rural space and gathered various stories all situated "in the countryside and that we therefore never hear about." These stories, he adds, "make the countryside suddenly look more futuristic than any big or 'smart' city, a world full of drama and potential." [6] From robotization to pixel farming, from climate change to migration: Koolhaas sees a radical potential in the (rural) regions in order to fundamentally change our way of life. A multitude of recent publications confirm this trend, in that the "hinterland" of cities or peripheries is newly "discovered" or described as terra incognita, [7] not least because the urban sprawl

or suburbanization is increasing and becoming more of a problem. Of course, Koolhaas is not alone in his newly discovered focus on remote and rural areas of the world: generations of scholars and researchers have been concerned with the relationship between city and countryside since the emergence of large cities and the increasing mechanization and industrialization towards the end of the 19th century. Also in terms of a second aspect, Koolhaas's wake-up call hardly differs from the promise of a smart or creative city: he announces that he has discovered a new perspective that will be decisive for the future, prosperity, sustainability or inclusion, even if the solution is now found in that very half of the world that has so far been less in focus. [8] Not least for this reason, turning around the current discourse on the relationship between urbanity and regionality, and identifying the innovative potentials in the countryside, offers an attractive starting point for my reflections.

Smart City, Smart Region?

In view of the climate crisis, the need to think radically differently or innovatively about the future is as great as the hopes associated with smart city or smart region projects. In Switzerland, many municipalities and pioneering cities are now striving to become "smart cities" or "smart regions." "Smart City Officers" or "Chief Digital Officers" are hired in order to shoulder the great responsibility of the digital future and innovation. They must tackle issues that cut across administrative units and interlink them – a challenge for units still strongly entrenched in silo thinking when interdepartmental action would be more useful. Instead of visionary or innovative thinking or design thinking mindsets, to mention two key terms that should very briefly indicate how closely the discussions on smart and creative cities are connected, these managers are expected to have particular competences: "above all project management," "organizational development" and "in the long run also competences in the management of a

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[4]   See, for example, the issue of Society and Space dedicated to "Planetary Urbanism," Volume 36 Number 3, June 2018.

[5]   Rem Koolhaas, Countryside: A Report (Cologne, 2020).

[6]   Ibid, blurb on dust jacket.

[7]   See, for example, the research projects "European Countryside or Architecture of Territory" (Professor Milica Topalovic, ETH Zurich), "Vergesst das Allgäu nicht!" (Professor Fabienne Hoelzel, Staatliche Akademie der Bildenden Künste Stuttgart), and "Cities – Regions – Hinterlands, Metabolisms, Markets, and Mobilities Revisited." Jahrbuch für Geschichte des ländlichen Raumes/Rural History Yearbook 17/2020.

[8]   See also Koolhaas' contribution to the webinar "The Future is Unwritten," 23 September 2020, accessed September 2020.
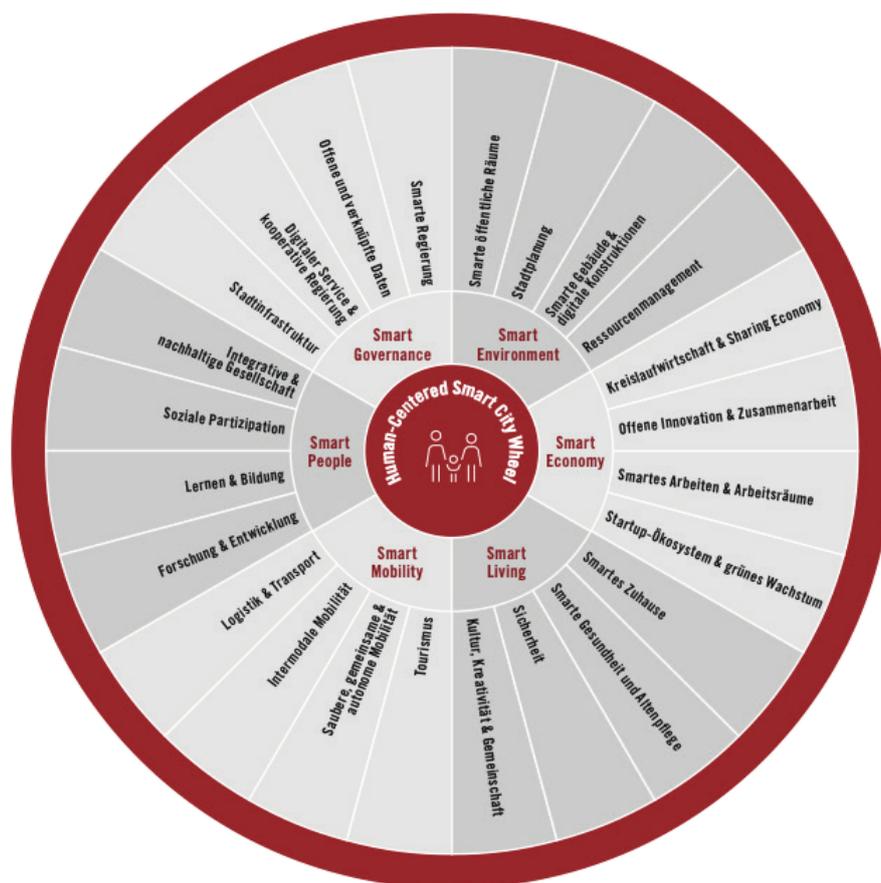
Figure 1: Human-Centred Smart City Wheel

transformation process [...]." [9] Shouldn't smart city officers be capable of "Imagineering" – a term that combines "creative imagination" and the rather technology-driven "engineering" – if they are to imagine alternative futures? [10] Instead, the suspicion is that the fundamental impetus with which the questions about the future – living together, work, supply and demand, infrastructure, housing and mobility – are not being considered or implemented with the radicality that the pressing questions of our time actually demand. Even

though the "Smart City Wheel" [11] (Figure 1) focuses on people, simply put, we speak of a smart city when the city or smart administration involves the use of data and technologies.

There are countless variants of the wheel; in the illustration of the "Human-Centred Smart City Wheel," [12] the human being at the centre is surrounded by those areas of life that have become smart: environment, economy, living, mobility, people and governance. In Switzerland, in addition to the Smart City Hub Association, the federal government is addressing the issue with a programme conducted under the auspices of EnergieSchweiz. [13] These efforts also include various other activities and initiatives, such as the Platform for Digitization and Regional Development, [14] which is sup-

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[9]   See the guide published by the Smart Cities and Regions Platform of ZHAW together with the federal government; see Musiolik, J., Kohler, A., Vögeli, P., Lobsiger-Kägi, E. & Carabias-Hütter, V. (2019). Smart City: Leitfaden zur Umsetzung von Smart-City-Initiativen in der Schweiz. Bern: Swiss Federal Office of Energy. p. 7

[10]   The term "Imagineering," which is attributed to Walt E. Disney and the first theme parks, is now trademarked; see Louis J. Prosperi, The Imagineering Pyramid: Using Disney Theme Park Design Principles to Develop and Promote Your Creative Ideas (2016), p. 4, cited in Jörg Metelmann and Harald Welzer, "Imagineering. Eine Poetologie der Transformation," in: Eds. Jörg Metelmann and Harald Welzer, Imagineering. Wie Zukunft gemacht wird (Frankfurt a.M., 2020), p. 14.

[11]   The Human-Centred Smart City Wheel was originally developed by Boyd Cohen and further developed by the Smart City Hub in Switzerland; see https://www.smartcityhub.ch/smart_city_wheel.120de.html accessed 8 May 2021.

[12]   https://www.smartcityhub.ch/smart_city_wheel.120de.html

[13]   Based at the Federal Office of Energy.

[14]   https://regiosuisse.ch/plattform-digitalisierung-und-regionalentwicklung

ported by the federal government and deals with issues relating to smart villages/regions. This puts Switzerland on a par with European initiatives such as "Smart Villages," which is dedicated to promoting intelligent and competitive rural areas.[15] A look at the implementation of smart city or smart region activities and projects in Switzerland also reveals weak points: smart governance, energy and mobility systems, smart grids or local renewable energy and smart buildings. The achievements and the state of development will be measured and published in a Smart City Survey[16]; a Smart City Index[17] will one day provide information on the "degree of maturity."

The *Sidewalk Lab*, a frequently cited vision for a newly planned smart city district (in Toronto's harbour area), provides more concrete information about the quest for sustainable and inclusive urban development. In the Toronto project, a pervasive digital network overlays all physical infrastructure and, through the use of sensors and cameras, results in the real-time, seamless datafication of infrastructure, public space, mobility and traffic flow. That is, measures and geo-references everything, "...from pedestrian traffic to energy consumption to the filling level of waste bins and the occupancy of an apartment building."[18] This vision of the smart city, for some more of a scary dystopia of "google island,"[19] shows how great the expected impact would be of the technology companies providing the software and orchestration needed to operate, control and monitor public infrastructures.

But how much influence on the democratic community do city or municipal governments want to transfer to private companies? To what extent do these data-driven activities serve a more sustainable and inclusive community? There is no doubt that cities produce a vast amount of urban data. But are they also collecting the relevant data, that is, those data needed to ensure better coexistence? The comparison with such large-scale projects

as in the Toronto district also shows that while this may be considered as consequentially as required, it nevertheless triggers fears about the future. The smart city, for example, promises security, comfort and sustainability and thus undermines traditional social values and the leitmotifs of European urban planning – freedom, equality and solidarity – in the form of a silent revolution.[20] This ambivalence of the future, or of the ideas about it, must be confronted – whether in the city, region or village – just as one-dimensional, truncated notions of the salvation or threat promised or posed by smart solutions must be viewed critically.

Creative City, Creative Region?

Research on the creative industries has so far focused largely on urban areas,[21] as many European cities have developed their economies into knowledge centres with the advance of information technology from the late 1970s onwards. These are environments where the best, most creative and innovative workers gather, as evidenced by surveys of the creative industries (with IT, software and computer services as the largest industry complex leading the creative hotspots across Europe).[22] The concept of the creative city,[23] developed in the 1990s, has long since found its way into the vocabulary of urban planning and location promotion. Since 2004,

[15] https://enrd.ec.europa.eu/enrd-thematic-work/smart-and-competitive-rural-areas/smart-villages_de

[16] Swiss Smart City Survey 2020; see https://smartcity-survey.ch; accessed 8 May 2021.

[17] https://www.smartcityhub.ch/smart_city_index.125de.html; accessed May 8 2021

[18] MAK in: Sidewalk Labs; Arch+, no. 236, 2019, p. 66.

[19] Mat Honan criticized the ideas of the project already early on; see Mat Honan, "Welcome to Google Island," in: Wired, May 17, 2013: https://www.wired.com/2013/05/on-google-island/, accessed 12 May 2021.

[20] See the thematic issue dedicated to Posthuman Architecture, Arch+, No. 236, 2019.

[21] The region is dealt with, for example, in "Great Britain. Regional Issues Working Group: Creative Industries: The Regional Dimension." Department for Culture, Media and Sport (2000); see also C. Rost, Potenziale für Kultur- und Kreativwirtschaft in strukturschwachen Regionen, Berlin: Kompetenzzentrum Kultur- und Kreativwirtschaft des Bundes (2010). On Austria, see V. Ratzenböck, X. Kopf, A. Lungstrass, A., Der Kreativ-Motor für regionale Entwicklung. Kunst- und Kulturprojekte und die EU-Strukturförderung in Österreich (2011); E. Häfele, K. Greussing, K., Creative Industries in Vorarlberg. Eine massnahmenorientierte Untersuchung (2007); The creative industries as a regional factor was also a focal topic in: Fünfter Österreichischer Kreativwirtschaftsbericht, creativ wirtschaft austria (2013).

[22] See: Lake Constance Region's Creative Economy, Value Creation between Culture, Economy and Technology (2019)

[23] Charles Landry, The Creative City: A toolkit for urban innovators (2000).

UNESCO has been coordinating a worldwide network of cities that use creativity as a strategic factor for sustainable urban development.

As is well known, the discourse on the "creative city" has been fuelled by two protagonists: Charles Landry, a British urban development consultant for urban development projects who has been championing the power of creativity since the end of the 1980s [24]; and the American regional economist Richard Florida with his theses on the "Creative Class." [25] While Landry focuses on how cities can be made more livable and vibrant, and presupposes creative thinking, planning and action in the process, Florida formulates a theory in which cities prosper when they rely on talent, technology and tolerance. The creative city and the concept of the creative class were identified and promoted as drivers of the post-industrial economy. These concepts gave rise to hope for the future of cities that wanted to reinvent themselves against the background of the structural change from an industrial to a knowledge society, not least with the help of the creative industries. Even though Florida's claims in particular are highly controversial, they were enthusiastically received by urban policy-makers and city marketers worldwide. Since then, numerous and critical discussions have addressed the interplay between globalization, regional structural change, and the evolving significance of knowledge for politics, the economy, and society. The buzzword gentrification represents the flip side of a hardening urban competition associated with this development.

Beyond the question of how to describe the relationship between urbanity and creativity, or between space and knowledge, a powerful *dispositif* (i.e. apparatus) has developed around the concept of creativity. In the constant search for the new and unique, the link between culture and economy is transformed. In this reading, creativity as a social imperative not only refers to the world of work and the economy, but addresses all areas of life. The German sociologist Andreas Reckwitz has described this change, according to which creativity went from being an ideal for a small part of the population in the early phase of modernity to the norm among wider social circles in the course of the 20th century. That is, the opportunity for creativity was transformed

into a social expectation of creativity. [26] One example in the field of urban development is culturalized cities: driven by "state policies guided by the ideals of cultural regeneration and the creative city," [27] such cities constitute an important factor of economic development and attractiveness for citizens and tourists. Charles Landry succinctly formulates this urban policy, which increasingly relies on creativity and technology, in the figurative sense of "hot" to "cold" cities. In other words, where the FIRE sectors – finance, insurance, and real estate – previously formed the economic basis of the city, those responsible are now focusing on ICE – innovation, creativity and entertainment. [28]

Limits of Concepts and New Conceptual Politics

This brief outline of the concepts of the smart and creative city shows that the terms "smart" and "creative" are metaphors and labels rather than analytical categories (whether digital, global, knowledge or information city), but at the same time require a "call to action." [29] They summarise a bundle of meaningful perspectives to make the city more efficient, more effective, more sustainable, more inclusive, and more intelligent, …. And they circumscribe the creative potentials – both in cities and of cities – that provide the environment in which culture is not only created but also economically exploited. The terms "smart" and "creative" are the subject of planning and scientific discourses but, as shown, they are above all political discourses. But they also reveal the limits of a concept that is reduced to data-driven, technical or creative optimization in which structural change is

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[24]   Ibid.

[25]   Richard Florida, The Rise of the Creative Class (2002).

[26]   Andreas Reckwitz, The Invention of Creativity. Modern Society and the Culture of the New (Cambridge, Polity Press, 2017).

[27]   See Ibid., p. 131.

[28]   Sebastian Borger and Peter Lau, "Die beste Stadt für die Welt." Charles Landry, urban development expert, in an interview in: brandeins, https://www.brandeins.de/corporate-publishing/bo-city-of-wood/die-beste-stadt-fuer-die-welt, accessed 12 May 2021.

[29]   Charles Landry, Creative City, an urban Toolkit (2000), p. xi.

supposed to succeed. There are possible alternatives, which do not so much promise the resources to a solution through "smart" or "creative" approaches, but rather focus on a fundamental question: "how?"

The main theme of and the contributions to the 2021 International Architecture Exhibition in Venice might be understood along these lines, which Hashim Sarkis brought together in the question "How will we live together." [30] This question also points to how the United Nations Innovation Technology Accelerator for Cities UNITAC-Hamburg is trying to address the potential of digital technologies, data and innovation for open, transparent and participatory city governance. [31] Initiatives in politics, such as those formulated by the "new European Bauhaus," [32] are also seeking ideas for more beautiful, sustainable or inclusive forms of living together at the interface of art, culture, social inclusion, science and technology.

It therefore cannot be a matter of transferring the attribution of "smart" and "creative" to the region – nor, in the sense of an unexpected "discovery," as Koolhaas puts it, of becoming more aware of rural space and thus empirically answering the same questions beyond urban boundaries. A critical, cultural-scientific view of the region and the respective debates requires, on the one hand, a different vocabulary and a different linking to discourses beyond promises of salvation for the discussion in the sense of a conceptual politics. On the other hand, it also demands a different, more radical questioning of how future coexistence in the city and the countryside can be developed and realized.

Considering any region from the perspective of cultural-analytical spatial studies reveals corresponding intellectual traditions with different terminologies. These may need to be dusted off in order to address the urgency of future issues and digitalization, and to interrelate space, knowledge, economy and creativity. For example, the debates on the cultural landscape are reminiscent of questions of nature conservation and open space protection. They link the historical growth of settlement forms with a specific cultural character and economic tradition that is open to thinking beyond the boundaries of the human species and, for example, to taking into account the coexistence of humans and animals or to paying greater attention to the diversity of life forms. For this reason, spatial analyis is suited to linking cultural, economic, social and ecological aspects, which can thus circumscribe the broad field of the creative economies. In fact, such a view enables placing the human-made at the centre, and thus addressing urgent current questions against the background of historical developments and linking them to debates that are conducted under the banners of sustainability and ecosystems.

Case Study: Education, Economy and Culture in Lake Constance Region

Thus, what might it mean to address questions about the future in the region and to identify and describe protagonists and their sustainable ecosystems beyond officially funded smart or creative cities initiatives? The following examples will illustrate that, against the backdrop of digitalization, the interfaces of business, technology, culture, politics and society might be considered as a foundation for actor-centred research in the creative economies. [33]

First of all, the geographical location of the Lake Constance region and its characteristic and most important economic sectors will be briefly outlined. The eponymous lake forms the centre of the Lake Constance region at the heart of Europe. Germany, Switzerland and Austria share 273 kilometres of shoreline, towards which the adjoining municipalities in the Alpine foothills orient themselves. They turn their backs on the capitals of Bern, Berlin and Vienna and are located on the periphery of the respective countries in a border

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[30]   International Architecture Exhibition 2021 https://www.labiennale.org/en/architecture/2021, accessed Nov 28 2021

[31]   See UNITAC Hamburg – United Nations Innovation Technology Accelerator for Cities, https://www.hcu-hamburg.de/en/research/citysciencelab/research/projects/ accessed 28 November 2021.

[32]   See New European Bauhaus, European Union: https://europa.eu/new-european-bauhaus/index_de, accessed 28 November 2021.

[33]   For a more detailed account, see Janine Schiller, "Regionale Ausprägung und historische Wurzeln der Kreativwirtschaft. Eine Annäherung an die Eigenlogik der Region." In: Kreativwirtschaft Bodensee, ed. Janine Schiller (Zurich, 2019), pp. 6–13.

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region. The airports in Zurich, Munich or Stuttgart can be reached in about one and a half hours by car – and thus all European centres. Nevertheless, as creative hubs these major cities do not seem to exert a great influence on the Lake Constance region. The urban economic and commercial centres are Constance, Bregenz, Zurich or St. Gallen; as knowledge centres and cultural locations, these cities offer identity formations that originate in the creative industries. At the same time, and in addition to lakeshore zones, the more inaccessible areas further away from the lake (Toggenburg, Appenzell, Bregenzer-wald or Allgäu) offer recreational areas and opportunities to experience nature. Agglomerations include Greater Zurich and St.Gallen, the Rhine Valley around Dornbirn and Feldkirch, or around the southern German cities of Constance, Friedrichshafen, Lindau or Ravensburg.

The Lake Constance region has a long tradition as a creative centre. Reichenau Abbey, St. Gallen Abbey and the bishop's seat in Constance attest to the intellectual relationship between culture, economy and education, first comprehensively conceived in the Middle Ages. Over the centuries, a unique network of industries developed in this region and, intertwined with other economic sectors, specific submarkets have emerged. Mechanical engineering partly explains the strong position of industry in southern Germany, Vorarlberg and Switzerland. The textile industry, together with agriculture, was the oldest industrial sector in eastern Switzerland and in the Rhine valley. It was a major economic factor and thus also a key driver of the creative industries. In Vorarlberg, architecture and crafts established themselves and are internationally among the leading idea generators in the field of sustainable building. Precision mechanics for watches have established themselves in Tübingen and Freiburg, just as software and advertising have in Zurich. Historically, the cross-section of the creative industries has been linked to education as a driver of knowledge, with the combination of crafts, arts and crafts and industry shaping each economic area. Then and now, production and design have emerged hand in hand – but this has hardly ever been considered in terms of economic history. Proximity to educational institutions is central to the creative industries: [34] The International

Association of Lake Constance Universities IBH serves as an example. As the largest multi-disciplined network of universites in Europe, the IBH supports and facilitates cooperation between more than 30 higher education institutions around Lake Constance: They attract talent, exchange ideas with the industries, form alliances and drive research and development. The result is a network of experts who are familiar with the local business culture and possess highly differentiated knowledge.

A look at *Cilander*, a company based in Herisau, in the rural canton of Appenzell, shows how "smart" and "innovative" the "countryside" can be and how worthwhile exploring creative ecosystems can be. As the oldest and one of the last textile finishing factories in the region, *Cilander* invented a transparency process in the 20th century that led to the production of the Swiss cotton fabric Organdy, which was in demand worldwide. The company has also patented a synthetic resin process that helped produce non-iron shirts. Today, it is a leading supplier of the Ghutra, the traditional Arabic headdress for men. It also develops fabrics for temporary buildings, digital print supports or flame-resistant seat cover fabrics for buses and trains. *Cilander* occupies a niche in the region's historically strong textile industry by positioning itself on the world market as a supplier of finishing high-tech textiles through innovative product development.

Not far away, in Trogen, in the Appenzell Mittelland, a Bach cantata is performed [35] once a month ¬– live and following historical performance practice – in the baroque atmosphere of a magnificent church designed by Hans-Ulrich Grubenmann. The entrepreneur and private banker Konrad Hummler initiated this philanthropic project. Using private funds, he established the J.S. Bach Foundation in 1999 with the goal of performing Bach's complete vocal works in original instrumentation – consisting of 200 cantatas, six motets, as well as his masses, passions and oratorios – until 2030. While on-site seating is limited, streamed recordings of the concerts are clicked millions of times by an international audience. Hummler has also founded a publishing company. This subsidiary distributes and sells the Trogen productions on a dedicated online platform. Today, it has around 300,000 followers, mostly from the USA and Latin America.

[34] Janine Schiller, "Vom Elfenbeinturm in den Leuchtturm. Über das Verhältnis von Wissensarchitekturen und Stadtentwicklung." In: Common: Journal für Kunst und Öffentlichkeit, 3 September 2015; see http://commonthejournal.com/staedte-als- producers-of-stories/ vom-elfenbeinturm-in-den-leuchtturm/, accessed 12 May 2021.

[35] See Janine Schiller und Katharina Nill, "Bach für alle." In: Kreativwirtschaft Bodensee, ed. Janine Schiller (Zurich, 2019), pp. 38–39.

Headquartered in Lustenau, in the industrial Rhine Valley, known as Europe's Silicon Valley, is Roman Rabitsch's *Angelbird*. [36] Founded in 2011, the company develops, produces and distributes premium storage solutions internationally that meet the high demands of professional content creators in the media and entertainment industry. Angelbird is the only company in Europe that produces SSD hard drives and holds its own in the international market, particularly due to large demand from the USA, Europe, Canada and Australia. It thus shares the market with giants such as Samsung, Toshiba and Western Digital, which are traded on stock exchanges and focus on mass, price and quantity. Rabitsch, on the other hand, runs his company with five shareholders, consistently orients his offerings to the creative sector, focuses on niche and quality and is now one of the hidden champions.

Vorarlberg is regarded as the model region for sustainable building. In the 1970s, it developed designs and architectures now considered among the most innovative in Europe. This success is attributed, among other factors, to the tradition of the Baroque master builders of the Au Guild, who built some of the most magnificent Baroque churches in southern Germany, Switzerland and Alsace. The close ties between highly talented craftsmen and master builders promoted local craft culture and helped refine their techniques. [37] Today, various innovation clusters (e.g. wood, mud or system construction methods) are evident in the Vorarlberg building industry. For example, Hubert Rhomberg, a member of the fourth generation, runs his family business with around 3,000 employees, making it one of the largest construction companies in Austria. In 2012, CREE, a Rhomberg subsidiary, erected the first smart prefabricated eight-storey building (in Dornbirn in just eight days). Rhomberg's timber-hybrid system is revolutionising smart, sustainable construction – smart functions are integrated as standard into the prefabricated components.

Conclusion: Ecosystems in the Region

The structural change towards a post-industrial economy, which has impacted the Lake Constance region in the last 20 years, affects many working relationships, in both creative and non-creative fields. Computers are replacing humans in the standardized forms of work of industrial modernity: ongoing digital transformation is raising increasingly pressing questions about the future of work. The case studies discussed here offer possible answers to these challenges: product innovation and supply expansion, platform models, transformed business fields or philanthropic giving. How are actors and ecosystems shaping digital transformation? We urgently need to investigate this question (and others) more closely. In doing so, we need to address the "green deal" in the Lake Constance region. Another key aspect concerns the highly skilled workers in the region, who can develop great potential precisely through the possibilities for reorganizing work in a post-Covid era. The new forms of work can be described with key terms such as "dissolution of boundaries" and "subjectification." Increasingly producing immaterial goods, these forms are characterized by flexibilization and specialization. They are performed by the competition-driven "entrepreneurial self" in the organizational form of "projects," which, as it were, strives to attain an ethos of self-development.

The German sociologist Andreas Reckwitz describes this comprehensive transformation, which economises culture and culturalises the economy as the "singularization of the working world." [38] The postulated singularity manifests in the fact that the entire world of work is changing with the form of the produced goods. Reckwitz states: "At the institutional core of the singularization and culturalization of the late modern economy, we find what has variously been called the creative industries, the cultural economy, or the creative economy. The creative economy is the driving force behind the post-industrial economy." [39]

[36]   Janine Schiller und Katharina Nill, "David versus Goliath." In: Kreativwirtschaft Bodensee, ed. Janine Schiller (Zurich, 2019), pp. 48–49.

[37]   Janine Schiller und Katharina Nill, "Über die gesellschaftliche Relevanz der Architekturvermittlung." In: Kreativwirtschaft Bodensee, ed. Janine Schiller (Zurich, 2019), pp. 50–51.

[38]   Andreas Reckwitz, Society of Singularities (Cambridge: Polity Press, 2020), p. 182.

[39]   Ibid. p. 114f.

Driven in this way, the future of work orients itself – in theory, management theory and the workplace – towards the creative economies and the attribution of creative actors. What Reckwitz formulates as a social theory manifests in management theory in booming New Work approaches. Based on the notion of agile transformation, they hail design thinking as a key discipline and place the creation of meaning at the centre of organizational development. The comprehensive change in values foregrounds purpose instead of profit, networks instead of hierarchies, empowerment instead of controlling, experimentation instead of planning and transparency instead of privacy. And because a "creative" setting and atmosphere are crucial for innovative work, new mobile and supposedly flexible office and work environments are being set up. These represent the delimited organizational culture with common rooms, lounges and coffee kitchens. Moreover, work is increasingly remote or distributed, in co-working spaces or at home. A paradox, or at least a dilemma, exists in this world of singularities, namely, that co-creation or "better together" are described as the ideal form of collaboration. Describing these, in order to test the concepts of future work through concrete cases, as Reckwitz suggests, would be necessary to place research on the creative economies and their actors on a solid empirical basis.

I began this paper by explaining that both the smart and the creative city fall short as analytical terms, since they were developed for one half of the world in cities as optimization discourses, besides serving as political instruments and primarily addressing the management of structural change. Thus, they cannot be applied to the region, or at least not convincingly. Especially for the post-pandemic period, the Lake Constance region would be suitable as a research area to show which innovative ecosystems deal with issues central to a sustainable future (e.g. living, building, working and living together) and how the region thus offers itself as a place to work, not least for highly competitive skilled workers. Lake Constance region combines the best of two worlds (city and countryside). Historically, this combination was once conceived as the garden city. It was recently applied to our time by Carlos Moreno, a professor at the Sorbonne, as the 15-minute city.[40] Moreno proposes that everything needed for "urban life" should be reachable within a 15-minute radius. His model thus relies on four principles of rethinking the city: ecology, proximity, solidarity and participation. The Lake Constance region illustrates (at least in part) not only that these four principles have supposedly long held true for regions but also how essential questions of digitality, cooperation and sustainability are.

This paper has highlighted the importance of looking for future-oriented, sustainable and innovative solutions for working and living together in both cities and regions. This will not be possible through technology or creativity alone, but only through the interplay of aesthetic, technological, economic, ecological, social and political approaches. Thus, more is at stake than managing structural change. My aim has been twofold: to inspire discussion, radically and beyond buzzwords such as "smart" or "creative"; and to engage, on a robust empirical basis, in current debates. The urgency of the question of alternative futures does not mean improving existing concepts and looking for smart solutions for cities, which have been planned for cars since the 1970s, and refreshing (i.e. updating) these solutions digitally. Parking apps and digital payment systems may be smart, but they miss the point of the much larger concerns discussed here. We must instead radically rethink and reformulate the central tasks of cities and regions. With an eye to future generations, we should devote ourselves to these tasks. Serious hope surrounds the debate, not least because the human being appears at the centre of the "Human-Centred Smart City Wheel." This places humans in a tradition that has perhaps been somewhat forgotten. Or as Shakespeare [41] asked a good 400 years ago: "What is the City but the People?" As my remarks have shown, this rhetorical question can still be applied to the region today, as long as it includes the basic question of living together and thus takes into account the consequences of human-made things. This question thus invites us to imagine an ecological, social, economic, digital (…) planetary future without losers.

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[40]   See TED Talk by Carlos Moreno: https://www.ted.com/talks/carlos_moreno_the_15_minute_city, accessed 20 March 2021. Moreno formulates three golden rules: 1. The rhythm of the city should follow the people, not the cars. 2. Every square metre already built should be used several times. 2. every square metre already built is used several times. 3. Neighbourhoods are designed together.

[41]   William Shakespeare, Coriolanus, 1604, ed. Barbara A. Mowat and Paul Merstine; see https://shakespeare.folger.edu/downloads/pdf/coriolanus_PDF_FolgerShakespeare.pdf, accessed 12 May 2021.

Bibliography

Sebastian Borger and Peter Lau: Die beste Stadt für die Welt. Charles Landry, urban development expert, in an interview in: brandeins, https://www.brandeins.de/corporate-publishing/b-o-city-of-wood/die-beste-stadt-fuer-die-welt, accessed May 12 2021

Cities – Regions – Hinterlands, Metabolisms, Markets, and Mobilities Revisited. Jahrbuch für Geschichte des ländlichen Raumes/Rural History Yearbook 17/2020

Fünfter Österreichischer Kreativwirtschaftsbericht, creativ wirtschaft austria, 2013.

Richard Florida: The Rise of the Creative Class. New York 2002.

Great Britain. Regional Issues Working Group: Creative Industries: The regional dimension. Department for Culture, Media and Sport, 2000

E. Häfele, K. Greussing: Creative Industries in Vorarlberg. Eine massnahmenorientierte Untersuchung, 2007

Mat Honan: Welcome to Google Island, in: Wired, 17.5.2013: https://www.wired.com/2013/05/on-google-island, accessed May 12 2021

Keativwirtschaft Bodensee. Wertschöpfung zwischen Kultur, Wirtschaft und Technologie. (Lake Constance Region's Creative Economy – Value Creation between Culture, Economy and Technology) ed. Janine Schiller, Zurich University of the Arts 2019.

Rem Koolhaas. Countryside. A Report, Cologne 2020

Charles Landry: The creative city: a toolkit for urban innovators. London 2000.

MAK: Sidewalk Labs, in Arch+, no. 236, 2019, p. 66.

Jörg Metelmann and Harald Welzer: Imagineering. Eine Poetologie der Transformation, in: Eds. Jörg Metelmann and Harald Welzer, Imagineering. Wie Zukunft gemacht wird. Frankfurt a.M. 2020, p. 9–37

J. Musiolik, A. Kohler, P. Vögeli, E. Lobsiger-Kägi, & V. Carabias-Hütter, V.: Smart City: Leitfaden zur Umsetzung von Smart-City-Initiativen in der Schweiz. Bern, Swiss Federal Office of Energy 2019. p. 7

Planetary Urbanism In: Society and Space, Volume 36, Number 3, June 2018.

Posthuman Architecture, Arch+, no. 236, 2019.

V. Ratzenböck, X. Kopf, A. Lungstrass: Der Kreativ-Motor für regionale Entwicklung. Arts and Culture Projects and EU Structural Funding in Austria, 2011.

Andreas Reckwitz: The Invention of Creativity. Modern Society and the Culture of the New. Polity Press, Cambridge, 2017.

Andreas Reckwitz: Society of Singularities. Polity Press, Cambridge, 2020.

C. Rost: Potenziale für Kultur- und Kreativwirtschaft in strukturschwachen Regionen. Berlin: Kompetenz-zentrum Kultur- und Kreativwirtschaft des Bundes.

Janine Schiller: Regionale Ausprägung und historische Wurzeln der Kreativwirtschaft. Eine Annäherung an die Eigenlogik der Region. In: Kreativwirtschaft Bodensee, ed. Janine Schiller, Zurich 2019, pp. 6–13.

Janine Schiller, Katharina Nill: Bach für alle. In: Kreativwirtschaft Bodensee, ed. Janine Schiller, Zurich 2019, pp. 38–39.

Janine Schiller, Katharina Nill: David vs. Goliath. In: Kreativwirtschaft Bodensee, ed. Janine Schiller, Zurich 2019, pp. 48–49.

Janine Schiller, Katharina Nill: Über die gesellschaftli-che Relevanz der Architekturvermittlung. In: Kreativwirtschaft Bodensee, ed. Janine Schiller, Zurich 2019, pp. 50–51.

Janine Schiller: Vom Elfenbeinturm in den Leuchtturm. Über das Verhältnis von Wissensarchitekturen und Stadtentwicklung. In: Common the Journal, Sep 3 2015, at: http://commonthejournal.com/staedte-als- produc-ers-of-stories/vom-elfenbeinturm-in-den-leuchtturm, accessed May 12 2021

Online resources

Architecture Biennale 2021, https://www.labiennale. org/en/architecture/2021, accessed Nov 28 2021

Daniel L. Doctoroff: Why we're no longer pursuing the Quayside project – and what's next for Sidewalk Labs, Sidewalk Toronto, May 7 2020, accessed May 12 2021 https://medium.com/sidewalk-talk/why-were-no-longer- pursuing-the-quayside-project-and-what-s-next-for- sidewalk-labs-9a61de3fee3a

Rem Koolhaas: The Future is Unwritten. Countryside, The Future. A UN75 Dialogue. Hosted by Rem Koolhaas and Samir Bantal in collaboration with The Guggenheim, Sept. 23, 2020, online at: https://www.youtube.com/watch?v=MMWYOb5ZzAw, accessed Sep 23 2020.

Carlos Moreno TED Talk: The 15 Minute City: https:// www.ted.com/talks/carlos_moreno_the_15_minute_city, accessed March 20 2021

New European Bauhaus, European Union: https://europa.eu/new-european-bauhaus/index_de, accessed Nov 28 2021

regiosuisse.ch, the platform for regional development in Switzerland, https://regiosuisse.ch/plattform- digitalisierung-und-regionalentwicklung

Smart City Hub Switzerland www.smartcityhub.ch

Smart Villages, European Network of Rural Develop- ment, https://enrd.ec.europa.eu/enrd-thematic-work/ smart-and-competitive-rural-areas/smart-villages_de

Swiss Smart City Survey 2020, cf. https://smartcity- survey.ch, accessed May 8 2021

UNITAC Hamburg – United Nations Innovation Technol- ogy Accelerator for Cities, https://www.hcu-hamburg. de/en/research/citysciencelab/research/projects, accessed Nov 28 2021

William Shakespeare, Coriolanus, 1604, ed. by Barbara A. Mowat, Paul Merstine, online at: https://shake- speare.folger.edu/downloads/pdf/coriolanus_PDF_ FolgerShakespeare.pdf, accessed May 12 2021

Digital in the (Smart) City: Enhancing the City by Implementing Technologies
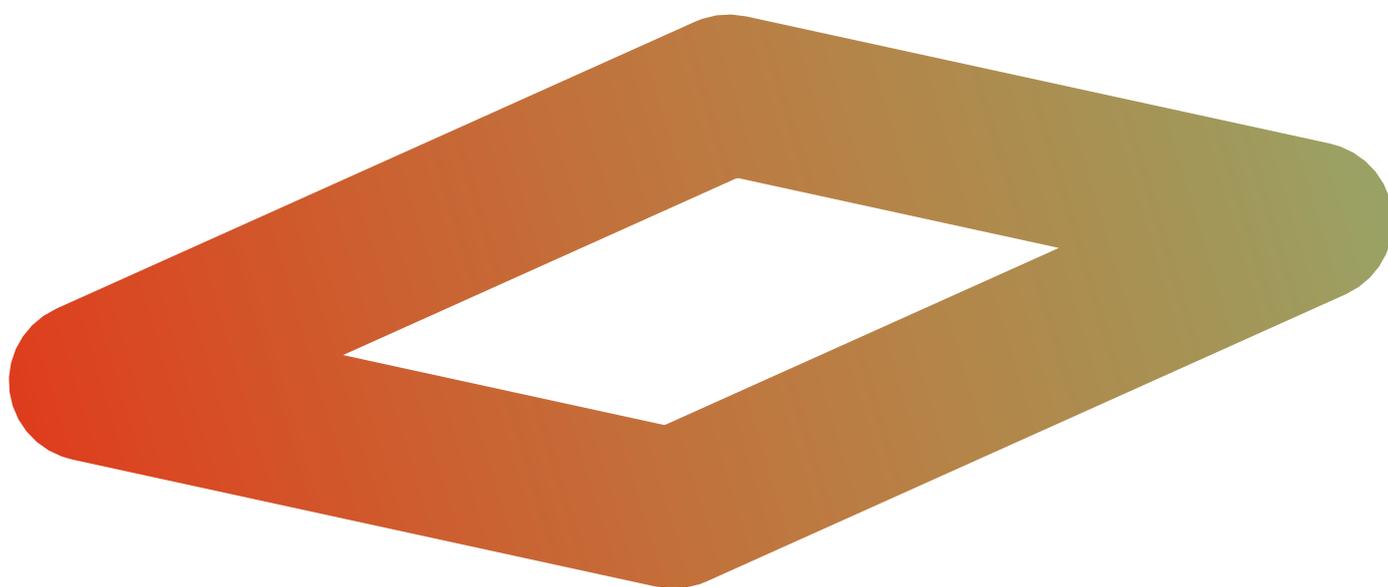
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Contents

Digital in the (Smart) City: Enhancing the City by Implementing Technologies

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This article discusses digital technology in relation to the problems of smart cities. Each part provides avenues for reflection or hypotheses that may give rise to in-depth work. The article asks what digital technologies bring to the city and what it means to make a city smart. Implementing such technologies extends the characteristics and functions already inherent in the city. We also propose some thoughts on the relative failure of cities created from scratch. Part of the article focuses on the role of technical and digital devices per se. How the choice of device is decisive and what it says about the implemented public policies. The article also focuses on the circulation of information in cities through these devices and on the processes that come into play. Finally, it considers the problems of adopting the implemented technologies and raises questions about the use of the collected data. One of the particularities of digital technology in cities is that it is locally rooted and connects inhabitants to their territory.

Making the city smart: Developing the functions and characteristics of the city by implementing digital technologies

The first part of this contribution looks at the purpose of a city and to what extent making it smart is part of this purpose. Why define an objective for the city? On the one hand, because this enables pursuing public policy. It is matter of defining goals in order to put in place the right policies. On the other hand, because if we talk about smart cities, then there are technological challenges, but technology is not neutral and serves a purpose. Cities must define this purpose in order to put in place the technological tools that will make it smart.

The city is characterized by social practices with which inhabitants can identify.

What characterizes the city? The example of smart cities created from scratch ("smart from the start cities") is interesting to observe because it suggests what may not work in cities. It also helps to identify what is not sufficient for a city to be a city beyond its purely technical definition, as indexed by the number of inhabitants.[1] For example, Kilamba in Angola,[2] which was planned to house 200,000 inhabitants, has only 50,000 today, almost 10 years after its inauguration. The city was financed and built by Chinese companies and is intended for a middle class that hardly exists in Angola. Another example, Nanhui, 60 km from Shanghai, is unable to entice people to relocate there because despite numerous real estate purchases during the city's development refuse to move

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[1]   A town is defined as a municipality with more than 10,000 inhabitants in Switzerland; 5,000 in France and Germany; 20,000 according to the United Nations.

[2]   Louise Redvers, "Angola's Chinese-built ghost town," BBC, 02/07/2012 https://www.bbc.com/news/world-africa-18646243.

there. Faced with this reluctance, the government has established universities there, so many in fact that the city is now mainly populated by 100,000 students. In Egypt, the same effect is feared for the country's new administrative capital, which is supposed to relieve congestion in Cairo.[3] Saudi Arabia has presented its NEOM[4] project, described as "the urban habitat revolution." Once again, however, it will be necessary to convince citizens living in existing cities to come and populate this new city.

To think that we can attract citizens to new cities is to think that the city is inhabited by citizens who are not attached to the territory they live in. This is the distinction made by Bruno Latour[5] between globalization plus and globalization minus, between "those who want to eliminate local differences and identities, those who take advantage of the world instead of understanding it, those who defend a 'modernization front' without limits."[6] These advocates of a life disconnected from a territory to which one is attached is the vision held by the promoters of ex-nihilo cities, disembodied cities where citizens from all over the world are reluctant to live.

So why do people reject this way of life in spaces that often have many assets on paper (modern transportation, schools and universities, hospitals, absence of urban congestion, sports and cultural facilities, etc.)? Because being attached territorially to a city offers what a city created from scratch cannot. This attachment is linked to several elements, including heritage. But it is not the most interesting lever in terms of public policy because it tends to be fixed: it exists or it does not. Historian Patrick Boucheron explains that the city can be defined as "the neutral floor for collective action." New cities therefore lack this "collective action."[7] How is this collective action embodied in cities? By sociabilities understood as the character of relations between people within a given social group. The social group here being the inhabitants of a city and all the microgroups that are

constituted within the city. This holds true regardless of a city's size. As Patrick Boucheron has argued: "These routes are not only places, they are also the social practices that they attract and provoke, but it is also and above all a memory that, in a certain way, guides the use we make of these places."[8]

The city is a city not only because it has the characteristics of a city (homes, schools, etc.), but because its urban structure generates social practices that it both allows and prevents. In addition, there is a historical dimension, the memory that Patrick Boucheron talks about, which impacts how we use the city. For example, the village square is used as the village square because of its shape and positioning, but also because particular events take place there that are not found elsewhere, or because of the presence of businesses or activities that encourage inhabitants to go and meet there.

What new cities lack, and what historically established cities offer, is the social practices that take place in them. Urban projects try to recreate these practices, but without any guarantee that inhabitants will appropriate these uses, which also result from the historical practice of the city. This is the difficulty of creating cities from scratch: there is no guarantee that citizens will once again be able to live the sociabilities they had in their city of origin. This is important for an urban lifestyle. Carlo Ratti, director of MIT Sensable Lab, and Anthony Townsend have argued that sociability rather than efficiency should be the "killer app" for all cities, including smart cities.[9] As this article does not intend to propose solutions for new urban developments, let me return to its main focus: the digital and technologies in smart cities. Having identified sociabilities as a key element of urban life, I focus on the development of smart cities with the aim of making city dwellers live together. More specifically, I consider the implementation of technologies that make the city smart and that promote sociability among its inhabitants.

The pitfalls of technological determinism and the absence of technological neutrality

Let's return to the importance of defining the aims of technological projects. Considering smart cities,

[3]   Roman Stadnick, "Sissi-City, la 'nouvelle capitale' d'Égypte," Revue du Crieur 2017/3 (N° 8): 62–89; https://www.cairn.info/revue-du-crieur-2017-3-page-62.htm

[4]   See the project website: https://www.neom.com/en-us/

[5]   Bruno Latour, "Où atterrir," La Découverte, 2017

[6]   Frédéric Martel, "Du Covid à l'écologie: 'Le confinement est définitif' alerte le penseur Bruno Latour," France Culture, 18/01/2021.

[7]   "L'urbain et le politique," interview with Patrick Boucheron, Nonfiction.fr, Pierre Henri Ortiz, 12/06/2012 https://www.nonfiction.fr/article-5873.

[8]   Op. cit.

[9]   Carlo Ratti and Anthony Townsed, "The Social Nexus," Scientific American 305, no 3 (2011): 42–49

collecting data on the frequency of bicycle traffic on a city axis is not relevant in itself. Ultimately, examples can be drawn from measuring such traffic as part of a communication strategy. And yet, measuring the number of cyclists passing at a specific point is not necessarily a public policy that makes the city smart. On the other hand, if we measure this traffic in order to think about the development of urban transportation routes, and thus potentially to adapt the size of these cycle routes to traffic volume, then we have an example of technology feeding political action. Vraiment Vraiment has produced a map of the sidewalks in the city of Paris that do not provide sufficient physical distance between two people. According to their report, "how, tomorrow, to reconnect with desirable forms of social life, while respecting a sufficient distance to limit the transmission of the Covid and without relying on a tracking application that carries risks in terms of freedom and is potentially not very effective?"[10] That's the risk in times of a pandemic: reducing the sociability offered by the city to a minimum. This map is neither enough on its own, nor enough to exploit the available open data and to create a map that claims to be "smart." Enter Vraiment Vraiment. Their map identifies areas where it is impossible for people to walk side by side in Paris while respecting the prescribed physical distance between two people, in order to propose solutions that allow the city to evolve and thus maintain satisfactory living conditions.

The example of air pollution also works. This is often measured but less often followed by actions aimed at combating pollution or at identifying its sources. One might be satisfied with measuring pollution and alerting the population when it becomes too high, as in Paris or also in Delhi. One option would be to introduce far more ambitious public policies for combating pollution in urban areas. In the long run, the risk is either that urban dwellers will suffer from poor health or that they will leave the city to live elsewhere. Not to mention the problems in terms of the city's image and the stakes on a global scale.

Implementing technologies in a city necessarily correlates with affordability. All technologies have uses and implementation is not neutral. If cities want to fight air pollution or demonstrate that it is not so important, they will not implement the same technology (e.g. the same

sensors), as this will not provide the same data. Deciding which technology to implement is a political project. Sometimes choices are made without knowing the full potential of a technology, as is the case for example with advanced technologies that have not yet revealed their full potential, such as certain artificial intelligence. Even in this case, politicians must take into account the potential of installing this type of technology in a city.

Digital in the city does not create new functions but offers solutions to improve cities.

At the beginning of the Covid-19 pandemic, the French government spoke of "social distancing," a term that was later replaced by the much more appropriate "physical distancing." This distinction is crucial in defining what the city should be and what technology can bring to the city. Indeed, the dilemma in a pandemic is how to respect physical distancing without accentuating social distancing. As mentioned, the social aspect of the city is important: it should not disappear at the risk – in the context of a pandemic – of seeing other public health problems (depression, isolation, etc.) multiply.

And this is what the digital and technologies are going to try to bring to cities: namely, how to increase sociability in an already structured space (let's leave aside smart from the start cities) in which inhabitants already have their own urban practices. First of all, there are two essential levers of technology when applied to smart cities. Either they are put in place to support public decision-making (see the examples of traffic measurement or pollution measurement). In this case, inhabitants do not benefit directly from the technologies but rather from the public policies that are based on them. Or inhabitants have direct access to these technologies, which directly improve the living environment. As regards traffic, technologies worth mentioning include applications that allow users to monitor congestion in real time (e.g. on public transport) or websites that enable checking whether seats are available at the public library before travelling there.

Smart cities create relatively few functions in the city. Digital technology is being used to achieve goals that public policies were already aiming at before, but the growth of technology and innovation is making it possible to achieve those goals in other ways. Integrating technologies enables cities to become intelligent in the sense that they realize their potential as a space for social interaction. Supporting and politically encouraging sociability within the city means supporting its vitality and attractiveness.

[10]   https://autrementautrement.com/2020/04/21/demain-maintenant-lespace-public/

I have already mentioned public health as a means of combating isolation and depression. We can also look at business examples and encourage exchanges between residents, which means encouraging the development of activities in a given area. Examples include discussion forums (thematic or not) for city residents, whether on-site or on a social platform. These vectors of exchange and meetings contribute to attaching city inhabitants to their territory. The same can be said of the cultural and creative industries in that sociability allows people to meet and get to know works and artists. And it allows artists to feed themselves and develop projects. Multiplying sociability also means pushing inhabitants towards places of culture. The more people meet, the more they will find themselves around cultural events and activities.

One might think that municipalities are installing intelligent devices first and foremost to reduce costs. In fact, any public investment is considered in terms of expenditure. Take the example of sensors: they allow adapting urban lighting and thus help reduce municipal energy expenditure. Besides, ecological initiatives can have positive externalities for inhabitants, who feel proud to belong to a city that thinks about the environment and keeps modernizing. It is also a factor in reducing crime and therefore can encourage local residents to go out in the evenings and at night. Another example is connected parking, for instance, devices enable finding parking spaces based on real-time analysis of parking data. This type of device can be found in Sète in France and Ibiza in Spain, for example. They save time and relieve traffic congestion. They also increase parking revenues, reduce CO2 emissions and therefore positvely impact public health, besides being environmentally friendly and reducing noise emissions due to reduced traffic.

In an article that questions the performativity of cities calling themselves "smart," Thierry Côme, Stéphane Magne and Alexandre Steyer write: "It is in the interest of cities to communicate on concrete innovation that is close to the citizens in order to develop their image as a smart city. Conversely, communicating on a conceptual and future innovation does not make it possible to be 'smart.'"[11]

This remark raises the question of what "smart" means in terms of cities. Is a city smart because it uses technology? No, as we have seen, implementing technologies to collect data is not an end in itself and does not make a city smart. Are the elected officials who implement these devices smart? Once again, measuring pollution doesn't make elected officials good per se. Are residents smart? That could be considered. These technologies enable exploiting what citizens do in a city. In any case, inhabitants or the traces they leave in the city provide data that, if used wisely, make the city smart. This hypothesis leads us back to Como, Magne and Steyer's remarks on the effectiveness of "concrete innovation close to citizens" in the face of "conceptual and future innovation." That is, when the city glosses over conceptual and future technological projects, it does not become smart because it is disconnected from exploiting the intelligence already existing in the city. The city is smart when it concretely exploits what is happening in its territory and therefore what citizens do on a daily basis. How do they get around? How do they consume? How do they interact with the municipality? etc. The digital and technologies implemented in smart cities are there to exploit (in the primary sense of the term, i.e. "to take advantage of") how citizens live in a city, in order to improve living conditions.

The creative and cultural industries, forgotten in smart from the start cities

Let's focus on the place of the creative and cultural industries in a smart city. Or rather on the role of the digital and technologies in the creative and cultural industries in a smart city. The creative tissue of a city evolves over the long term. Just because a city has large theaters, or new and connected schools, that its cultural offerings will meet the expectations of its inhabitants. Culture is established, young artists attend schools that have seen their peers debut, and artists play in those halls where their models have passed through. If we take the example of the futuristic and intelligent NEOM city project in Saudi Arabia, we really have to search for information on "culture and entertainment."[12] The discussion[13] accompanying the

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[11] Côme Thierry, Magne Stéphane, Steyer Alexandre, «Être ou ne pas être une smart city: une étude empirique des innovations valorisées sur le site web des villes», Gestion et management public, 2018/4 (Volume 7 / n° 2), p. 73-101. DOI: 10.3917/gmp.072.0073. URL: https://www.cairn.info/revue-gestion-et-management-public-2018-4-page-73.htm

[12] See the project website: https://www.neom.com/en-us/sector/entertainment-culture-and-fashion/

[13] Used here according to the definition given by Yves Jeanneret: "objects have no value in themselves [...] These objects, real or ghostly, are escorted by a whole valorizing discourse"; see "Les TIC objets de valeur," Communication & Languages 128, June 2001, p. 33.

project praises the "future of entertainment" with state-of-the-art technology. But is this really what the locals want? Technologies can accompany the development of the cultural industries by facilitating ticket sales, and by capturing performances that can be put online and made available worldwide. But some sectors (e.g. the performing arts) are unable to digitize their works. Imagine accessing a major part of music currently available on Apple Music or Spotify without being able to attend young emerging artists in concert, due to a lack of infrastructure or artists. The cultural dimension is one of the important limitations of the development of smart cities created from scratch. The counter-example is perhaps precisely certain Gulf cities such as Dubai and Abu Dhabi. But this model cannot be copied ad infinitum. These two cities rely heavily on their airports to attract travelers from all over the world. Their cultural offering is limited although Abu Dhabi has the Louvre Abu Dhabi, which serves more as a means of attracting tourists than as a cultural offering for local residents.

The discourse of companies and states financing smart from the start cities needs to be put into perspective. They make people dream of the ideal city because they encounter real difficulties in populating these cities. This is logical, since they are unable to offer inhabitants what connects them to their city of origin (especially sociability). Moreover, if we consider the creative and cultural industries, new cities do not make these a priority, even if they are an important part of what makes a city. Making a city smart is therefore not about creating new functions for the city thanks to technologies and digital technology, but rather about using digital technology as a tool that allows the city to better perform its functions in the service of its inhabitants. Thus, as we will see, digital technologies are the link between citizens and their elected representatives.

The digital and technology in the city is a medium that connects citizens and their institutions

This second part looks at the technologies that are used to make cities smart as devices. First, these technologies connect citizens and governments, or citizens and citizens. This concerns a process of mediatization, in the sense that information circulates between several actors via a device. This perspective enables considering the smart city as a space where a certain type of information and documents are mediatized.

The digital technologies implemented in smart cities are decisive devices in the choice of public policies.

Concretely, there are many ways of making the smart city smart: opening up public data, installing sensors, developing applications or sites, etc. All these solutions share a common structure. A public authority implements a technology or digital solution that serves as a platform for information exchange. Creating sites enables establishing, conveying and using information (public data, for example); likewise, installing sensors enables gathering and disseminating information (water quality, air quality, etc.). Technology, then, serves a medium between installers (elected officials) and citizens, who provide information via the installed devices (e.g. urban traffic).

What does the concept of the device tells us about the digital technologies that enable the city to be smart? Michel Foucault argued that "the dispositif[14] has a dominant strategic function [...] the dispositif, therefore, is always part of a power game, but is also always linked to one or more knowledge terminals, which are born from it,

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[14]   It seems that some translators choose not to translate the term from French. Sometimes I speak of "device" but not when talking about Foucault and Agamben.

but also condition it"[15] (see also the first part of the article on the lacking neutrality of technology). The technological system, whatever it may be, produces knowledge (often based on data), which subsequently becomes part of the logic of power as soon as we talk about governing a city based on this knowledge. Continuing Foucault's reflections, Giorgio Agamben has explained the etymology of the *dispositif*: "What brings all these terms together is the reference to an economy, i.e. to a set of praxis, knowledge, measures, institutions whose aim is to manage, govern, control and orient, in a useful sense, the behavior, gestures and thoughts of men."[16]

At their level, this is what smart city technologies do. Reducing traffic means directing people's behavior towards parking spaces and thus controlling their actions. Agamben explains: "I would call a dispositif anything that has, in one way or another, the capacity to capture, orient, determine, intercept, model, control and ensure the gestures, behavior, opinions and speech of living beings."[17] And that's what this is all about. Agamben believes that subjects, constantly caught between dispositifs, are desubjectified and thus controlled by these same devices. I think this is where we need to move away from his analysis (he mentions that he has thought of jailing cell phone users). What interests me is that while we sometimes imagine that these technologies are new, the principle of using dispositifs is as old as the world. It is therefore crucial for public policy to think carefully about the devices that will equip smart cities, at the risk of citizens being subjected to behavior or decisions they would not want to be subjected to. We can cite video surveillance and all tracking and facial recognition devices as solutions for smart cities. Public and citizen reactions to these projects show that the concept of the dispositif applies to these technologies and that citizens are anticipating the effects that having cameras equipped with a facial recognition system on every street corner could have on their approach to the city.

Michel Foucault's remarks on the articulation between knowledge and power are interesting in this respect because the information provided by digital dispositifs is considered by those in power (elected officials) as knowledge. On the one hand, this knowledge is produced by a certain type of dispositif, which in turn produces a certain form of knowledge. On the other, it is not because traffic indicators rank high on an axis (knowledge from the device) that cycle paths must be widened (power from the dispositif) at the risk, for example, of encroaching on pedestrians or on the rest of the roadway, and thereby creating negative externalities (e.g. traffic congestion, delays to public transport). The dispositif – which is digital in our context – carries within it the conditions of the knowledge it produces. It is therefore important to carefully consider the dispositif prior to installation. The choice of device determines the public policies that are implemented on its basis.

From data to documents, knowing how to read is not enough to govern the digital city

All of the devices found in intelligent cities, at least those that have been cited as examples so far, are in fact based on issues related to the circulation of information, often in the form of data. In his *Critique of Triviality*,[18] Yves Jeanneret continues Foucault's reflections on dispositifs and turns the media into places of power-knowledge. On information, he writes: "the notion of informationnalization thus designates a complex of practices and objects, a composite that passes through mediatization, but also textualization operated by architextes and small forms, to produce various qualities of information."[19] In other words, what circulates is not information but documents. Information as such can neither circulate nor be mediatized. It exists in a particular form (documents) and is received in a particular framework, which in turn influences its treatment.

Take a pollution indicator. The information is the figure resulting from this indicator. With the Atmo index, for instance, this is between 1 and 10. This index, already a construction in itself, makes it possible to read data. When this index appears on a public bulletin board, its enunciation and its reception are different than when it appears in the Facebook newsfeed of citizens following their municipality's social media channels. Besides, the index might appear between a soccer video and the wedding photos of a distant cousin.

[15]   Michel Foucault, Dits et écrits, vol. III, 299–300.

[16]   Agamben Giorgio, "Théorie des dispositifs," Po&sie, 2006/1 (N° 115): 25–33. DOI: 10.3917/poesi.115.0025. URL: https://www.cairn.info/revue-poesie-2006-1-page-25.htm

[17]   Op. cit.

[18]   Yves Jeanneret, "Critique de la Trivialité," Non Standard, 2014.

[19]   Op. cit. p. 627.

This example suggests that innovations in smart cities, whatever they may be, must be considered as the result of mediatization. A problem (pollution) has been addressed, a technical device has been set up to measure the problem (sensor), data has been collected (documents), and decisions have been made to better govern the city. Pitfalls exist at each stage of this process. Identifying the problem, choosing the technical device, reading its results, the political choice that is supposed to respond to the problem. How come? Well, because information does not circulate as if it were unalterable and neutral, but as documents that appear in an editorial framework that influences their value.

Digital technologies to mediate information from citizens to citizens

Technical devices are the cornerstones of smart cities. Their use makes cities smart. They play a central role in the mediatization of information. And, as Jacques Rancière said about the medium, these devices are "what stands between."[20] They are not just go-betweens for making the city smart, but become "the materiality that defines its essence."[21] This happens because the technical device stands between the idea and its realization or between citizens and the political purpose that defines its essence.

What do devices stand between in intelligent cities? Two answers are possible, and I have just mentioned the first: the device would be between citizens (the governed) and politicians (those who govern). This would allow exercising this political role of governing based on information about citizens. The other possibility involves making politics an additional medium (downstream of the technical device) and to see this process as what takes place between citizens (who live in the city), for whom politicians govern, and for whom these technical solutions are implemented. This brings us back to the definitions at the beginning of this article on the role of the city and on the place of so-called smart devices therein. The city, inhabited by citizens, implements devices (technical, political, etc.) to enable its inhabitants to lead better lives.

Implementing digital technologies as a key to public policies

In 1969, Jay Forrester, an engineer and computer scientist at MIT published *Urban Dynamics*,[22] a controversial book whose main claim has been summarized by Germaine R. Halegoua[23] as follows: "urban development could be thought of on the basis of information," in the sense that city government should be based on data from technical calculations rather than on human decisions, which tend to be erroneous. This claim is always defended. The result is smart from the start cities, where measuring is assumed to be enough to make a city livable. This claim is mistaken because it leads to believing that information makes it possible to steer public policies as neutral and fair data – whereas, as we have just seen, devices that allow feeding back data are not neutral. Nor does the collected information circulate neutrally but as documents open to political exploitation.

The challenge for smart cities in terms of public policy is therefore to think carefully about those devices that will make the city smart. And this is de facto quite complicated to achieve. For example, it involves taking into account all the affordances of a technology. Experience, however, has shown that it is difficult to think about all the potential uses of a technology before actually comparing it with its actual uses. Moreover, studying the implemented devices is an important way for citizens and associations to understand the political will behind technological implementation or when such projects are underway. Indeed, in many cases, analyzing the chosen technology says a lot about what leaders want to retrieve as information. This political orientation of the technologies that make our cities smart is not intrinsically good or bad. It does, however, underscore the importance of the chosen technological device for the resulting policy decisions. It is also a way for citizens to control the actions of elected officials who are not very technophile, and who would be sold a miracle solution (the historical players in intelligent cities are companies like Cisco and IBM[24][25])

[20] Jacques Rancière, "Ce que 'medium' peut vouloir dire: l'exemple de la photographie,"| 2008, published online on 17 February 2008, accessed 25 January 2021. URL: http://journals.openedition.org/appareil/135 ; DOI: https://doi.org/10.4000/appareil.135.

[21] Op. cit.

[22] Jay Forrester, Urban Dynamics, Portland, OR: Productivity Press, 1969.

[23] Germaine R. Halegoua, Smart Cities, The MIT Press, 2020.

[24] Anthony Townsend, Smart Cities: Big Data, Civic Hackers, and the Quest for a New Utopia, New York, W W. Norton & Company, 2013.

[25] Donald McNeill, "Global Firms and Smart Technologies. IBM and the Reduction of Cities," Transactions of the Institute of British Geographers, 2015, vol. 40, 4, 562–574.

whose potential uses they themselves would not recognize, for example, as risks in terms of personal data being exploited by the company implementing the device. Thus, devices are key to in understanding which public policies will be implemented based on their use.

Digital technologies in the city: between adoption, data management and territorial anchoring

The inhabitants of smart cities interact more with the city thanks to the implemented technologies. There are two modes of interaction. In the first, citizens are active. For example, when they open a municipal form to report a problem with garbage collection. The second mode of interaction involves a passive citizen. For example, the sensor that counts the number of times someone rides their bike. Here, "taking part consists of providing data, but also of acting as an individual agent optimizing his choices and participating in the real-time adjustment of transportation use.[26]" Whether we like it or not, we give this information to the city, which can then process and use it. If the city only exchanges with those who have the means (technical, temporal, etc.) to do so, this poses a problem for democracy. The system does not take into account all inhabitants. On the other hand, when inhabitants passively pass on information, they (tacitly) consent to their data being used (if these are personal) and are obliged to participate in city policy. Do citizens consent to their movements being tracked and analyzed because these processes are (supposedly) meant to serve citizens? The answer is far from self-evident. However, for public authorities, it is simpler and more reliable to be able to collect data in public space without citizen consent.

Beyond implementation, the adoption of a technology by citizens is problematic

Concerning the democratic aspect, the situation is similar to what we experienced in the early days of the Internet. While the possibility of connecting everyone and being able to network citizens from all over the world was announced, reality is quite different. There are two main reasons for this; first, the issue of Internet access; and second, the emergence of platforms whose structure does not offer the possibility of realizing the great promises of the early Internet. Smart cities present the same problem: access to digital technologies. Just because a city has a parking assistance system that tells drivers where the nearest parking space is does not mean that all inhabitants benefit. To do so, they need to overcome several obstacles that are more or less difficult depending on their sociological profile. First of all, they need to know that this device exists. Second, they need to be technically capable of using the device (both in terms of know-how and being equipped to do so). And finally, they need this practice to correspond to their needs and to fit in with their habits. But to pursue the example of the parking system: its success depends on its use (by locals and tourists). The higher its adoption rate, the more effective the device. Conversely, if no one uses it, then all the means used to set up the system are lost.

In an intelligent city, no such device can concern 100% of the population. Which raises a problem in terms of public policy: Do cities want to set up systems for only part of the population? As regards this dilemma: if such digital systems are not introduced, citizens will not agree. An ideal public policy would involve setting up a system in the knowledge that initially only part of the population will use it, while anticipating its adoption by the rest of the population in the medium term. In reality, it is more complicated.

If citizens use technologies only passively, no adoption is necessary. Take measuring the energy expenditure of buildings or using artificial intelligence to analyze the evolution of buildings to prevent disasters such as collapses.[27]

[26]   Brice Laurent, David Pontille, and Félix Talvard, "La politique des expérimentations urbaines, innovations technologiques et transformations des villes à Singapour et San Francisco," in: Gouverner la Ville Numérique, PUF, 2019.

[27]   Dauphiné André and Provitolo Damienne, "Chapitre 12: La prévention des risques de catastrophe," in: Risques et catastrophes. Observer, spatialiser, comprendre, gérer, eds. Dauphiné André and Provitolo Damienne. Paris, Armand Colin, "U," 2013,

In the case of smart technologies that require users to be active, there are always limits to their use by the simple fact that not all inhabitants are able to access or use these technologies. Take the example of participatory budgeting, which is about letting citizens choose how to use part of the city's investment budget (e.g. to rebuild green spaces, create parks, rebuild sidewalks). In an article on the sociology of this participatory engagement, Alice Mazeaud and Julien Talpin observe that "we know that the public of these devices is not the public dreamed of by the theorists of democracy, it is neither representative, nor egalitarian, nor completely profane and disinterested.[28]" In explaining the reasons for this lack of voter representativeness in participatory budgets, the authors neglect the technical dimension. This is because their article dates from 2010 and participatory budgeting has since evolved towards digital forms.

The city is becoming smart. Take for the participatory budget of the city of Paris, which requires submitted projects via a designated online platform.[29] Digital technology has not solved the problems already identified upstream about participation in participatory projects. However, digital technology has advantages for such projects. The city of Paris, for example, has seen a steady growth in the number of participants, even though less than a third of votes are cast physically.[30] The solution proposed by the city of Paris is interesting. Knowing that participation bias would be inherent in exclusively online voting, the city offers voters the possibility to participate in person. This does not solve all the problems mentioned in the article by Alice Mazeaud and Julien Talpin, but it does compensate for the flaws of the digital system in terms of the sociology of participation.

The limits of using the devices implemented in smart cities must be put into perspective so as not to slow down their implementation at the expense of inhabitants.

For example, simply because one can address a garbage collection problem via a smartphone application does not rule out calling the town hall. Nor does a dematerialized library or municipal swimming pool card prevent those with a physical card from entering.

Brice Laurent, David Pontille and Félix Talvard have explored the experimental dimension of urban projects. They point out that experimenting is crucial to developing potentially innovative solutions using digital technology."[31] Experimenting with devices would be a mode of governance that encourages the adoption of practices. The authors observe: "The experiments articulate a socio-technical device with demonstration practices with a collective learning objective." Being confronted with technical innovations enables citizens to learn how to use and adopt them.

Exploit data to control bodies in the public space

Let me turn to gathering information on citizen behavior. We first need to distinguish two types of collected data: personal data and other. It is not the same as having surveillance cameras and a sensor that counts the number of bicycles passing in a street. In the first case, the data collected makes it possible to identify a citizen and therefore to link a behavior at a given moment "t" with another at "t+1" so as to potentially know an individual's behavior in its entirety. In the second case, the citizen produces data that is used by the city without it being able to identify him or her and even to create a user profile from other data collected elsewhere.

Since smart cities exploiting personal data is a key element in their development, I will not focus on their use right away. On the other hand, we can return to Foucault to look at the problems potentially posed by collecting (non-personal) data of a city's inhabitants. Indeed, in his *History of Sexuality*,[32] Foucault explains that the state is able to exercise what he calls "biopower," which consists of controlling citizens in how they use their bodies. Data exploitation by the intelligent city confronts citizens with the same problem. Imagine driving in a city with an intelligent parking

284–337. DOI: 10.3917/arco.dauph.2013.01.0284. URL: https://www.cairn.info/risques-et-catastrophes--9782200278427-page-284.htm

[28] Alice Mazeaud and Julien Talpin, "Participer pour quoi faire ? Esquisse d'une sociologie de l'engagement dans les budgets participatifs," Sociologie, 2010, vol. 1, no. 3, 357–374.

[29] Website of Paris participatory budget: https://budgetparticipatif.paris.fr/bp/la-demarche-sommaire.html

[30] The city of Paris only publishes the number of votes cast in person for working-class neighborhoods. These figure might differ among other population segments. https://www.paris.fr/pages/plus-de-200-000-votants-au-budget-participatif-6141

[31] Brice Laurent, David Pontille and Félix Talvard, "La politique des expérimentations urbaines, innovations technologiques et transformations des villes à Singapour et San Francisco," in: Gouverner la Ville Numérique, PUF, 2019.

[32] Michel Foucault, Histoire de la sexualité I, La Volonté de Savoir, Gallimard, 1976.

system. You want to park near the port but the application tells you to go elsewhere because it knows that you will theoretically go faster to find a space and will also leave the city faster by leaving the suggested parking space. In many cases, this will be the best solution. But if you are willing to wait, you could wait until a space becomes available at the port. If you are disabled, you cannot park at the other end of the port. If you want to spend the night parked here, you don't care how easy it is to drive out of the port tonight.

Collecting personal data in the public space doesn't always make it smart

Let's turn to the devices used to collect personal data. These data are not exploited per se, but collected, which raises many issues. Take video surveillance. It allows (human) operators or algorithms to identify suspicious behaviour and, for example, to have the police intervene if necessary. Companies selling solutions where camera analysis is performed by artificial intelligence argue that no human sees the images and therefore cannot divert the cameras from their official use (safeguarding public order). This brings us back to the question of the affordances of a technology. Initially, arguments (often about security) are used to justify installing smart cameras in a city. Once they are in place, their original purpose can evolve. Operators with access to such cameras have no right to identify the citizens they see or to look into homes. They will be sanctioned if they do. But technically, they could. And what about the algorithmic analysis of video surveillance cameras? This could, for example, identify gatherings of people during curfews, which would allow law enforcement to go and see what is happening on the ground. But these cameras could also be programmed to see whether defined populations frequent a certain neighborhood at a certain time or to identify people based on physical criteria (appearance, gender, skin color, etc.). On this point, Antoine Courmont and Patrick Le Galès have remarked: "public or private service managers generally do not know where the data is stored, to whom it is sold and for what purposes it is used once generated by sensors applied to public urban space."[33]

Using technologies developed by private companies raises further questions: Who has access to the data? What about sovereignty, that is, if ensuring a city's security is partly delegated to a private player, its cameras and algorithms? What happens if the company stops maintaining the system or if this malfunctions and stops working? What if the cameras are hacked? These important issues need to be resolved before implementing technologies. This is even truer when these technologies potentially harm personal data. Educating citizens about devices and their uses and establishing transparency seem to be good ways of involving citizens in implementing such devices. Moreover, since the GDPR,[34] European Internet users must consent to their navigation data being used by the visited sites. They do so by completing a form that appears when visiting a website for the first time. In public space, no consent to being filmed is sought, as the state justifies this for security reasons. However, this does not mean that residents want cameras to be installed everywhere in their city. The technical solution is not always the right one. If a municipality has no security problems, installing cameras will not make it smart per se. While technical devices are inherent in the smart city, their implementation does not make a city smart. Rather, devices must serve a justifiable political purpose and meet citizen expectations.

With regard to personal data, cultural disparities also exist in terms of use. One example, as mentioned, is implementing the GDPR in Europe. This reflected the desire of public authorities to have greater control over the use of these data. On the other hand, the relationship to the use of personal data is a cultural construction. In a paper on urban experimentation, the authors quote a scientist who worked on the Virtual Singapore[35] project and who speaks of an "Asian point of view"[36] in describing the relationship of citizens to data. This implies that every territory manages citizen data differently.

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[34]   The General Data Protection Regulation in place since May 25, 2018.

[35]   The platform is expected to enable "users from different sectors to develop sophisticated tools and applications for testing concepts and services, planning and decision making, and researching technologies to solve emerging and complex challenges for Singapore"; see https://www.nrf.gov.sg/programmes/virtual-singapore

[36]   Brice Laurent, David Pontille and Félix Talvard, "La politique des expérimentations urbaines, innovations technologiques et transformations des villes à Singapour et San Francisco," in: Gouverner la Ville Numérique, PUF, 2019.

[33]   Antoine Courmont and Patrick Le Galès, Gouverner la Ville Numérique, PUF, 2019, 19–20.

Opening up data to the public to make public action more transparent and to enable developing innovative solutions

I have mentioned transparency as an important lever for smart cities. Digital technology enables states and local authorities to put part of their activity online, thus enabling citizens to monitor and control data to some degree. More ambitiously, we are talking about open data, that is, making the data collected by local authorities available under an open license. Thus, while there is a monitoring and control dimension, it is also offers communities an opportunity for developing solutions. Take the example of the RATP, the Paris public transport authority, which collects real-time data on public transport. Today, this data is accessible in real time, which has enabled developing Citymapper, an applications that allows integrating this data and providing better information to travellers in the region of Paris. Another example is the data collected by the state on Covid-19,[37] which is also available as open data in several countries. Citizens and businesses are using such data to create predictive models of the pandemic's evolution and to inform and analyze virus circulation, hospitalizations, etc. However, on the other hand, some states are publishing dubious data, which can pose public health problems. In India, for example, scientists are questioning the method used to calculate Covid-19 deaths because it is neither not public nor follows the recommendations of the World Health Organization. Moreover, India is confronted with structural problems that alter calculation. As the country is predominantly rural, many deaths occur outside hospitals (only 21% of deaths are certified by a doctor).[38] There is no testing uniformity: RT-PCR here, antigenic (less reliable) there. Yet India publishes figures on the number of infections. Once again, published data can be questionable depending on collection and calculation methods.

The implementation of technology and digitalization in smart cities enables citizens to participate more actively in their city. In a sense, this makes them more digitally rooted in their territory. On a certain scale, such digital rooting also horizontalizes exchanges within a city as it breaks with how citizens traditionally exchange information with public authorities. Historically, public authorities have transmitted information, while citizens have received it. In the smart city, more information moves from citizens to the city as a public policy actor. And, to return to our starting point on the role of the city in citizen sociability, smart technologies also promote exchanges among citizens.

The intelligent city: being better informed on a defined territory

An interesting element of smart cities is their ability to use digital technology for local and territorial purposes. The Internet has emerged as the advent of globalization through ubiquitous networking. Smart cities, although frequently based on devices emanating from the Internet, have a decidely local interest. As Frédéric Martel has suggested,[39] there is not one Internet but many Internets, which differ strongly according to their territoriality. Thus, the progress made by a city in digitizing itself is proportional to its degree of intelligence (i.e. in the sense of being a smart city). Take mobility: timetables can be made accessible online, in real time on an application, and as open data, enabling companies or start-ups to use these data to offer other solutions to citizens. At the same time, transport and cities can be equipped with connected screens, and parking can be assisted by sensors that direct cars to the nearest parking spaces. Traffic lights can be equipped with an intelligent device that allows blind people to circulate safely. Smart traffic lights do not emit a ringing tone when turning red, and thus help avoid the noise pollution of traditional devices. At night, lighting is optimized and only comes on when needed (vehicle, cyclist or pedestrian passage). This example of mobility shows that implementing technology touches on numerous aspects of a city.

If the devices implemented in a city help root residents in that territory, they also provide a sense of enjoyment that cannot be gained elsewhere. However, this is not about deflecting sociability On the contrary. Smart mobility, for instance, means users lose less time before their journey, and thus are able to enjoy an optimized journey. If local information is available on bus or streetcar screens, residents are better informed about what is happening in their city. Ultimately, they are more firmly rooted in the area and make better use of what the area has to offer.

[37]   Patralekha Chatterjee, "Is India missing COVID-19 deaths?" The Lancet, 5 September 2020 DOI: https://doi.org/10.1016/S0140-6736(20)31857-2

[38]   Op. cit.

[39]   Frédéric Martel, Smart, Flammarion, 2015.

Refocusing citizen attention on the local scale

The popularization of the Internet has brought forth many niche online communities. Forums, for example, have connected citizens with similar interests from around the world. Paradoxically, apart from dating sites, whose purpose is to connect people who are geographically close, these exchanges lead users to take little interest in the citizens around them. The creation of spaces for discussion and territorialized exchanges on a city-wide scale revives the logic of getting citizens to exchange ideas and information with each other. This is even what Facebook says it wants to do: "Online communities are a bright spot, and we can strengthen existing physical communities by helping people come together online as well as offline. In the same way connecting with friends online strengthens real relationships, developing this infrastructure will strengthen these communities, as well as enable completely new ones to form." [40] This is an important public policy issue: in the United States, membership in local communities is estimated to have dropped by 25% since the 1970s. [41] The challenge, then, is to encourage citizens to re-engage with their territory. Smart cities can provide the tools to achieve this goal by implementing technologies that make things happen together, be they political, cultural, professional or other.

What makes the smart city smart is turning people's globalized gaze towards their home territory. The interest in terms of public policy is obvious as implementing smart technologies stimulates exchange in a territory and therefore has positive externalities. To another extent, taking the local into account can lead to important successes on a global scale. Take pollution: the value of making small everyday gestures (sorting, heeding electricity consumption, etc.) is often underestimated insofar as pollution is massive in other more important countries. This comparison is rational, however, since salvation may come from cities, the main sources of pollution. If we are genuinely interested in how our behavior impacts pollution levels in our territory, we will likely take better, that is, more environmentally friendly action. Thus, if cities manage to refocus their citizens' interest on their territory, they will get them to

act on this level. Such action could then become a vector for more global success in fighting pollution. There are positive signs: China, currently the world's biggest polluter in terms of CO2 emissions, is planning to build 500 smart cities to combat the country's environmental problems. [42]

[40]   Mark Zuckerberg, "Building global communities," Facebook, February 2017: see https://www.facebook.com/notes/mark-zuckerberg/building-global-community/10103508221158471/?pnref=story

[41]   Op. cit.

[42]   Rina Chandran, "Tencent's 'smart city' seen as model of post-coronavirus China, Thomson Reuters Foundation, 24 June 2020, https://news.trust.org/item/20200624080235-95zxs

Beyond the Deadlock: On Art, Artists and Artistic Practice in the Smart City

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Beyond the Deadlock: On Art, Artists and Artistic Practice in the Smart City

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To no little extent, it seems, the history of art is also the history of cities. No doubt, from the vantage point of the present, European modernism and its avant-gardes appear unfathomable without the metropolitan centers of twentieth-century Europe; Paris being the obvious instantiation. Across the Atlantic, Robert Motherwell once affirmed that the New York School of the 1950s and 1960s would have been almost unthinkable without the particular place and cultural setting that is New York City (Flam, Rogers, & Clifford, 2015). In fact, much of American postwar art is scantly conceivable without the economic, cultural, and social milieu of New York at the time (cf. Ursprung, 2013). One need only gloss over the density and simultaneity of artistic invention associated with the city to recognize as much – the most conspicuous cases spanning Pop, Minimal, and Conceptual Art. The emergence of new European art from the 1960s and 1970s onwards likewise relied on the continent's urban territories.

Artists working today similarly rely on the qualities of metropolitan centers to make and show their work. Cities constitute specific cultural infrastructures and social arenas for the production and reception of art. Indeed, contrary to the alluring appearance of an ostensibly globalized art world, art happens at a local level, often tied to very specific environs, spaces, and

tightly knit social contexts. Granted, hindsight allows for such apparently straightforward conclusions. The intent, however, is clear – and therein lies the twofold premise of this research memo: first, the seemingly unavoidable intimacy between art, artists, artistic practice, and the city; and second, if the debate on the smart city is a debate concerning the present and future of the city, then it necessarily involves aesthetics and art, and questions of space. These are tied to the materialization of both art and the city.

As such, the main contribution of this memo is to affirm that art and the arts have a substantial claim in producing the city of tomorrow, whether it be "smart" or otherwise. Thereby, the discourse on the smart city might be moved beyond merely technological, economic, political, or even urbanist concerns. Indeed, a truly "smart" city would also encompass highly functional social and cultural systems. Thus, I do not intend to definitively resolve the complexities and questions this involves. Rather, this memo attempts to propose a vocabulary of sorts, one that might aid conceptualizing and researching the art-city nexus. Chiefly, it emphasizes the aesthetic, textural dimensions of cities as they relate both to material transformation, bodily experience, and the stability of public space. Likewise, what follows prioritizes the actual operations and impact of contemporary artistic practices in and across cities. As such, this memo forgoes the somewhat standard conceptualization of artists as initiators of urban transformation, builders of creative neighborhoods, advocates for diversity, political drivers, or urban activists. I instead explore the level of spatial, material, and aesthetic systems.

Circumventing a stalemate

Roughly speaking, the notion of the *smart city* adumbrates a technologically determined urban present and future. Often, the debate on the smart city evokes images of a digitally permeated urban fabric, rendered totally transparent and manageable by the privately owned technological infrastructures of corporate monopolists (e.g. Halegoua, 2020). The idea is tied to visions of data, surveillance, digital media, and the intermingling of virtual spheres with urban space. This tableau perhaps seems just as dystopian as it might be hailed desirably

utopian. Such tales, however, are merely one rendition of what may lie ahead. Indeed, the smart city is but a heterogeneous set of ideas competing amongst others on the stage of the future.

Most likely, the reality of a technologically saturated city is but a continuation and exacerbation of the complexities and contradictions of the modern era. American philosopher Marshall Berman (1982) reminds us that our modernity represents a tangled process of perpetual becoming, in which "everything is pregnant with its contrary" (pp. 16 and 23). He adds that modernity "pours us all into a maelstrom of perpetual disintegration and renewal, of struggle and contradiction, of ambiguity and anguish" (p. 15). This memo suggests that carrying these intuitions forth would serve understanding the consequences of the smart city in its relationship to art and creative work. In keeping with the character of the (late) modern age, the technologically determined city seems fraught with paradox and contradiction, with multitudinous, irreconcilable processes, and with oppositional forces – all impacting divergent strata of urban transformation, be they economic, political, or cultural.

Not least, the smart city narrative might be said to merely continue what has come before. In fact, its discourse seems to slot quite fittingly into the well-known narrative of critique that has aimed to dismantle the planning visions of modernist urbanism based on regimented order and standardization (Berman, 1982; Frampton, 1983; Jacobs, 1961/1992; Rowe & Koetter, 1978). Was it not high modernist architecture and urbanism that in part obsessed over a predictive, programmable city, albeit tied to an apparently social project? The diffusion of digital systems and data-driven virtual technology would appear to rely on precisely such ideologies of order and management, whereby regimented, pre-determined public space is the desired outcome. In this context, the smart city might be seen to continue a homogenizing urban project, although one from which architecture as a discipline is now seemingly and tragically excluded, having ceded its impact to the private powers of giant real estate investors and corporate owners (e.g. Ursprung, 2017).

Whether smart cities are administered by private or public institutions, in that sense the smart city is nothing new under the sun. Indeed, it might be read as a simple continuation of corporate expansionism and of the modern capitalist urban development ambition that has dominated the twenty-first century thus far: a city penetrated by data and digital internet technology is a

city homogenized by the privately desired and publicly administered logic of neoliberal technologies. From this standpoint, it is necessary to acknowledge that considering art and artistic work on the same analytical plane as the technologically permeated city would cry out for confronting these two levels as irreconcilable opposites. A reading of smart city ideas in terms of an extension of the neoliberal regime would certainly provoke such reasoning. And, no doubt, the artistic sphere is part and parcel of this complexity.

Late modern commentators, theorists, and historians have widely concluded that art has surrendered its autonomy, and thus lost its subversive, transgressive character (Bürger, 1974/2017; 1984; 2014; Foster, 1983; Groys, 2016). Whether this abdication of freedom results from the consequences of the late modern capitalist order and the economy of images, or from the advanced development and integration of the art world into modern society (e.g. Chiapello, 2010; Ursprung, 2013), a widely shared view seems to question the radical, aesthetically and societally transformative potentials art may harbor in our age. On the surface, the notion of the smart city as a neo-liberally, technologically determined entity insinuates further totalization of the conditions which have seemingly already rendered the project of modern art innocuous. Consequently, the dominant notion of the smart city may easily be construed as a further attack on the spontaneity of urban space, as much as on the life and creation it enables. Nevertheless, such conclusions are short-sighted and lack nuance. It appears more productive to speculate on how we might meaningfully relate art and the city given the advance of digital realities in urban and cultural contexts, irrespective of a smart city that leads to doom and gloom or one which brings virility and prosperity. Anyhow, what is yet to occur will likely occupy the tension between the two.

Therefore, examining art and the smart city within the confines of a critique of the neoliberal city, and thus within the wake of critical theory, is deemed unproductive in at least several important ways. The endless critique of capital instills the apathetic concession that nothing else is possible. And yet, is it not art per se that shows us that other realities are always possible? (Still, the intuition that the critique of authority is never fully exhausted is likely valid.) Moreover, it is worth considering that art is inherently fragile (Ursprung, 2013). It is an ever-shifting cultural domain that has evolved with the modern age and has certainly not experienced an evolutionary finality that would require the self-directed

dismantling at times advocated for by postmodern criticism. As such, it is a cultural achievement that requires continuous affirmation – and perhaps increasingly so in a technologically, economically dominated city, whose developmental horizon is always open and changing, and deeply related to all that is the modern age, a project as yet unfinished (e.g. Berman, 1982; Habermas, 1983; 1987).

Art and the city through the screen

Beyond such analysis at the level of oppositional societal spheres and broader institutional systems, it seems necessary to consider the aesthetics and experience of the smart city and the associated technological artifacts. A particularly worthwhile investigation involves thicker questioning in terms of (digital) media, imagery, and material space. In this sense, I propose exploring the nexus of art, technology, and the city, whereby the physical body is the surface on which the three constituents of that nexus are interrelated. In other words, the transformed bodily, sensory experience of the city in the age of modern technology strongly suggests that the future of urban topology might at least to some extent be negotiated and created in visual art. Such transformation has been theorized in deliberate terms ever since the onset of the modern metropolis. In fact, German sociologist Georg Simmel (1903/1997) construes the modern city as materially and technologically smoothed. Accordingly, the urban sphere has been depersonalized, homogenized, and levelled first and foremost by money and the accompanying quantitative mode in the modern age. In this vein, digital information technology and the numerical would appear to extend and heighten the flattening effect of the monetary, quantitative conception of reality. Thus, textures are depressed and abraded, while qualitative distinctions between things are eroded, relieving them of their peculiarities and inciting the infinite comparability and exchangeability of things, events, places, people, and time (Simmel, 1903/1997).

Not least, digital media and modern methods of transportation have materially altered the relationship between proximity and distance (Teyssot, 2013). The resulting obsolescence of once necessary physical effort and engagement in navigating modern urban societies is linked to the sensory deprivation of modern cities,

technologies, and media (Sennett, 1994). The discrepancy between lived experience and its mediated representation is further emblematic of this. Such evaporation of physical resistance and textured encounter with physical surroundings also leads to the demise of a unified conception of the city based on the sensory experience of the human body and eye (Sennett, 1994). Thus, in an urban and technological setting built to minimize physical confrontation, the body is rendered passive, and the city is experienced as a mere amalgamation of fragmented, discontinuous destinations (Sennett, 1994). In such an environment, order is presumed where bodies do not risk touching each other, where physical encounter is circumvented (Sennett, 1994). Bodily activity and the physical crowd have been construed as problematic if not threatening by the technocrats of the modern age of media and digital urbanity.

Notwithstanding such technologically and numerically enabled alienation from physical and bodily materiality, the greater concern would appear to lie at the intersection of digital and analog, where the textured and the smooth, the folded and the formless overlap, coalesce, and reciprocally transform materiality and space. The involved oppositions need not remain in an immovable deadlock, nor need they be conflated. Art is able to inhabit this dynamic intersection. Moreover, the insinuated complex of body, technology, media, and the city is involved in straddling the past and the future. It is involved in collective memory and the temporal folds of urban topology. In some sense, the city carries within it various layered contemporaneities that make up the memory of the city and its society. Cities are places of transformation and potential havens for unregimented, open public space. The material emergence of novel spatial configuration and urban texture in this sense is negotiated and permitted at the seeing, touching, reaching body. Art may be its accomplice.

There is further material interconnection between art, the city, and contemporary digital technology. Such connection chiefly originates in architecture, the window, and the screen (Bruno, 2014; Teyssot, 2013), which all harbor material transformation by being surfaces. Historically, the screen came from architecture, erected as a kind of translucent partitioning device that framed and filtered light (Bruno, 2014). Hence, the screen was a domestic object that transformed space, negotiated insides and outsides, and produced privacy and publicity. As such, the screen is intimately related to the window. Is it not peculiar, then, that the screen and the

window are the prime categories and constituents of contemporary digital interfaces?

Crucially, the screen was also a surface adorned with images (Bruno, 2014). Likewise, it is worth recalling that painting emerged on the walls of architecture and only later came to inhabit its own (framed) pictorial plane. In turn, paintings are in part objects of light and projection which structure the human gaze. The portable devices which we carry with us and rely on screens are objects similarly involved in imagery and projection, structuring vision, spatial association, as well as both the lived and represented experience of the city. They are instruments of visibility, exhibition, and visual seduction. As such, the scopic devices central to the digital present are inherently related to visual art, and to urban settings and their architectures (Teyssot, 2013). Screens, images, windows, façades, and the body's skin are interconnected via their surface textures and the material transformations occurring in between.

What extends these considerations of the screen, display, and projection is their inherent incidence in visual art. Since the late phase of the twentieth century, the question of representation in art has been complicated by advanced technologies of media and reproduction, that is, by the "information age" (Foster, Krauss, Bois, Buchloh, & Joselit, 2016). This leads to the question whether the representation of experience actually precedes experience (Foster et al., 2016). Equally, in the context of the city we might ask whether the material city has become a mere residual aftermath of its visual representation (Stierli, 2018). In this vein, art might therefore be directly involved in the material consequences of what modern societies generate as and pronounce to constitute "information." No doubt, if visual (digital) media and the screen structure reality in advance, the consequences for material, physical interaction and spatial becoming seem considerable. This might occur akin to the modernist precedent, whereby painting in part invented and gave rise to the complicated, multifarious spatial relationships produced by and in modern architecture. Inasmuch as art is involved in systems of display, exhibition, visibility, and distribution, it is likewise involved in producing new images and cultures of the visual in a digital media environment and, as suggested, in bringing forth new spatial typologies in the city.

Today, these interrelationships continue to be inhabited by the body, the eye, and the experiencing psyche. Questions of sensation and texture are tied up with the interrelatedness of art, imagery, projection, media, urban texture, and the screen (Bruno, 2014; Sennett, 1994). Transformed spatial typologies and urban configurations in a smart city would seem to arise from precisely this complex intermingling. As such, the viewing and reception of art coalesce with the viewing and reception of the city. The mechanisms and artifacts for exhibition and display in the realms of art, media, and information coalesce in the city (Bennett, 1988). In fact, the city might be construed as a kind of technology of display in that it chiefly makes things visible, produces encounter, and allows alternate social realities to emerge. In turn, the modern spectator, city dweller, or consumer is involved in a continuous process of apperception that thwarts the established patterns and structures of urban, visual, and material systems (de Certeau, 1984). In that art relates space, surface, sensory experience, and modes of visual representation, it is fundamentally involved in materially constituting the future city.

Only recently, renowned Swiss video artist Pipilotti Rist installed a public work of art at Zurich's Heimplatz, a square bordering on the Kunsthaus (the city's main art museum) and the Schauspielhaus (the largest city theater).[1] Rist's work is a video and light installation that relies on a large, sculptural mast adorned with bulbs and a conical head. From this head, projections of light and video emanate onto the façades of the surrounding buildings, becoming visible when darkness sets. During daytime, the mast acts as a kind of figurative, spatial intervention that demarcates the surrounding square at its center. Here, the human body and gaze are activated in their inherent reciprocity and physically situated in the material space of the city. The work evokes the supposed relationships between projection, imagery, representation, media, architecture, the façade, and urban space. Besides, the installation indicates and corroborates the above notion that art forms and makes visible transformed spatial relationships, textural compositions, and aesthetic potentials that could find instantiation in the material and social construction of the city. Finally, one might find that a texture in this context represents a difference, a moment of resistance, a qualitative departure. Above all, art creates difference. It creates eccentricity, form where there is none, a beginning. And it seems to enable repeated beginning in an otherwise flat urban void.

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[1]   www.stadt-zuerich.ch/hbd/de/index/hochbau/kunst_und_bau/werke_kub/kub_werke_kr_1/kunsthaus.html

Working in and on the city

Considering the material reality of artistic creation also seems promising. Art is a form of accessing our relationship to the (material) world, to our cultural and psychological selves, and to our lived experience in and of the city. Let me therefore argue for conceiving the city in material, textural, and aesthetic terms. The history of the modern metropolis as well as the history of modern architecture suggest that the city is in a sense already smart technology par excellence. Modern theory has fathomed the metropolis as an inherently psychological occurrence, an intense emotional experience owing to a relentless tide of stimuli and a thick aggregation of intertwined relationships, things, artifacts, spaces, activities, and events (Simmel, 1903/1997).

Likewise, architects from Le Corbusier to Rem Koolhaas have theorized the city as a kind of technology of density – a materially, spatially, geographically, and socially produced density (e.g. Koolhaas, 1978/1994), indeed an outright *culture of congestion* (Koolhaas, 1977). New York City in general and Manhattan in particular are the prime example: an urban density that induces the simultaneity of lives, a heightened immediacy of events, visual and perceptive complexity, and the skyscraper and its vertical expansion as the ultimate modern technology (Koolhaas, 1978/1994).

Distinct spatial, visual, and material processes remain at the core of today's city. It appears that a city permeated by digital technologies is hardly a virtual city, but more than ever a city constituted by its material conditions. Not only do the infrastructures and devices of digital technology rely heavily on material resources to function, but they also induce processes of material import and consequence. The technologically or digitally determined city doubtless embodies the contradictions of the later modern age in multitudinous processes of spatial, material, visual, social, political, and economic impact. Therefore, the material consequences, debris, leftovers, and superfluous junk of the digital in the city must be anticipated and accounted for (Koolhaas & Foster, 2013). Conceivably, this would involve further spatial transformation, induced by manifold forces: the changed systems of transportation, the increased spatial demands of the logistics associated with online commerce, the storage and flows of goods stemming

from a still augmented speed of consumption (Sigler, 2016). Likewise, the shifted territorial relations between urban centers and peripheries, gentrification, and both heightened spatial homogenization and fragmentation add to the current of change. As ever, chaos and order coalesce in a smart city.

Hence, it also seems urgent to emphasize the fragility of the city as a social and cultural system. Let us suppose that the social potentials of a city arise from its material and spatial configuration, as human bodies move through urban space in relation to its material constituency. As such, the city is in effect also a bodily, sensual category (e.g. Sennett, 1994; Vidler, 2000). Moreover, public space that allows for encounter and spontaneity is first and foremost materially created. Individual efficacy and collective democratic processes likewise necessitate an open urban texture. Artistic practice and cultural activity in a city unquestionably depend on similarly permeable conditions. As such, we might consider the city a performative system of sorts, whereby spontaneity, autonomy, and renewal emerge from the reciprocity between its materials, textures, and the agency of its inhabitants. In the open city, things, beings, and ideas all emerge and appear, demand visibility, and mingle, extinguish and recede.

Art deals and has dealt with this complexity, for example, by examining the visual character of a city, by producing and investigating imagery, by making its social constitution visible, or by redrawing its spaces and forging alternative potentials for encounter, aesthetic experience, and expanded perception. While a long list of artists and their work could be drawn up to instantiate this, a few exemplary cases should suffice to affirm the stake of art in challenging and forging the city in its material, visual, and sensual emergence. Among others, Richard Serra's *Tilted Arc* (1981), a monumental public sculpture, has demonstrated the complexity and controversy of urban space. The impact of this work, installed in Manhattan and later removed due to accusations of ugliness and recklessness, is well documented. Its sculptural ambition in the public arena, and the perceived violence of its incision in urban space, points to the fragility of the city as a material and social complex. Large-scale public artworks, which intervene in and expose a city, have become a highly visible, almost ubiquitous format.

Gordon Matta-Clark (e.g. Urpsrung, 2013; 2017; Wigley, 2018) or Zurich-based artist duo Fischli/Weiss (1993; 2020) have likewise produced significant art concerned with spatial gaps and leftovers, urban transformation,

as well as the material, architectural, social, and economic character of the city. The sculptural work *Haus* by Fischli/Weiss (1987/2016) is noteworthy for how it both metaphorically and physically stands on the threshold between grown urbanity and aligned peripheries. Conversely, several works by Rachel Whiteread extend the mechanisms involved in sculpture inhabiting both public urban space and art institutions in a manner that straddles notions of transformation, negative space, the politics of urban development, relationships between space and materiality, order and chaos. Notable in this regard is her controversial *House* (1993), a full-size cast of a condemned house in East London. In contrast, an artist like Ed Ruscha (e.g. Benezra & Brougher, 2000) has been involved in the visual impact of the city throughout his career, whether fully intentionally or not, at times almost documentarian in approach, at others concerned with the pictorial consequences of the urban scene. Ultimately, artists work both *on* the city and *in* the city – that is, beyond being the *object* of artistic practices and aestheticization, cities are also *sites* of artistic production.[2] Overall, as much as the effects of a smart urbanity might be mirrored and critiqued by artistic forms, the making of art itself may determine the city of the future in a reciprocal, delicately interwoven manner.

The nodes, pathways, and openings of making in the city

Bless is an artist duo whose practice originated in the mid-1990s and was initially involved in the new fashion avant-garde of those years.[3] Their work is revered for its early involvement in the pioneering fashion of Martin Margiela. Crucially, the work has evaded categorization from the outset, to this day spanning art, fashion, and design, while steadily remaining outside both the art and fashion establishment. *Rottingdean Bazaar* is a contemporary art project concerned with an equally

multi-faceted practice across art, fashion, homeware, DIY, editorial, virtual design, and video.[4] It is based in Rottingdean, a village on the south coast of England, and straddles divergent working methods across disparate media and creative contexts. Similarly, Ida Ekblad, a Norwegian artist, makes and exhibits work in a fine art context and whose practice also involves installation, design, writing, publishing, and an independent record label.[5] The artist incisively places her work between varying contexts of creation and relies on modes of working with a certain irreverence towards the established formats and categories of the culture industries.

Bernadette Corporation is an art project of sorts that likewise hails from the 1990s and has been principally based in New York City.[6] Its work spans art, film, photography, fashion, publishing, and even literature. Notable is the group's origin in the 1990s context of corporate empire and surging tech industries. Indeed, the notion of the corporation (hence the name) as an organizational form that lends itself to infinite transformation in adherence to ever-changing products is at the center of this complex of artistic output. By imitating and appropriating the corporate form both ironically and seriously, the group morphs between film studio, fashion house, or magazine, and thereby undermines both normalized expectations about artistic identity and entrenched production systems. Overall, such cases show how artists are involved in formulating and organizing peculiar systems of artistic production, ones involving independently directed approaches to the creation and presentation of imagery, documenting, archiving, and fictionalizing. Therein, constructing narrative and history emerge as meaningful artistic modes, allowing for the alternative inhabiting of material and metaphorical space and for embedding creative practices and identities throughout their urban contexts.

A cynic might construe these practices as exemplifying artistic homogenization and the deepened integration of art into extant societal systems and cultural spheres. On the contrary, I have not chosen the above cases for their artistic quality or merit, but because they might reveal something useful about how the relationship between art and the city might be viewed in the future. Above all, they perhaps represent exploratory

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[2]   Lest we forget that both major and minor artistic achievements of the past draw heavily on technological and economic advancement along with the proliferation of novel potentials for media and techniques originating therefrom.

[3]   https://bless-service.de/

[4]   www.rottingdeanbazaar.com

[5]   www.instagram.com/idaekblad/

[6]   www.bernadettecorporation.com/introduction.htm

attempts to do meaningful work in the cracks left behind in otherwise increasingly professionalized and flattened cities, cultural spheres, and artistic domains. Not just working in multiple media, which modern art has always done, but working across varying systems and infrastructures of creation, both local and global, material and virtual, seems significant here. And so, these preliminary cases suggest that the modes of working and making brought forth by artistic practices are particularly salient in the context of the smart city. This, in turn, raises a broad yet fundamental question: What are the conditions for and the consequences of making art in the (smart) city of the future?

Regardless of the status of art in contemporary society and culture, it seems warranted to affirm that artistic practices rely on continuously and specifically explicating their working methods and production systems. It is not that the specifics of creating, making, and working would necessarily be expected to react to or defy the strictures of a technologically, digitally determined city in some unprecedented manner. It is rather that the smart city is but one facet of the reality that artistic practices work with, in, and against. If the present and future of the city are technologically determined, then artistic creation would be related to these urban circumstances as a matter of course, as a matter of simultaneity. Moreover, if a city increasingly dominated by technology merely continues modern urban development, then making art also occurs on this continuum.

Making a work of art is dependent on the characteristics and requisites of the chosen medium. Art necessitates space, infrastructure, and a multitude of materials, be they tangible or intangible. As such, a city provides access to these necessities. Beyond basic tools (e.g. access to supplies, workshops and facilities for drawing, painting, printing, sculpture, performance, installation, film, photography, and so forth), other critical ingredients include adequate social structures, institutional frameworks, means of gathering audiences, and permeable artistic communities. As such, artistic work moves between a multitude of spaces, contexts, and infrastructures over time. An individual or collective practice may work across studios, move into open public space, temporarily occupy varying workshops, momentarily sediment in certain institutions, oscillate between the material and the virtual, thus emerging in a highly idiosyncratic complex of activity, creation, and reception. Making art in and across cities quite so intentionally amounts to intervention, a thwarting of order and grammability. It also

involves continually redeeming uncertainty, apperceptive doubt, and the unknown. It therefore seems reasonable to suggest that making art in the city necessarily involves deliberately elucidating distinct systems of making that likewise continually challenge and reshape a city in socially and materially meaningful ways.

If the digitally determined city increasingly leads to homogenized space, managed activity, and an ostensible loss of arbitrary occurrence – because accumulating vast quantities of data (e.g. recording habits of consumption and movement) and implementing them in the city at least partly involves steering, governing, and (perhaps covertly) eliminating the unplanned –, then art and its making maintain openness and spontaneity. Thus, the question of art in the smart city is essentially a question of space. Beneath this supposition lies a political dimension. State and city administrators might play an intensified role in securing artistic activity in a digital city. Providing studio spaces for artistic production of all kinds is a highly effective, but wholly underrated form of cultural stimulation. Existing public institutions and cultural policy may enable creating a network of spaces that in turn are conducive to a multitude of artistic practices, which then move across social, institutional, technological, material, and virtual contexts. In a sense, this would involve continuously enabling an intelligent spatial and infrastructural network that might simultaneously work with and against smart urban processes. Urban culture, then, likely flourishes when informal systems of making and creating remain unhindered and can inhabit cracks, gaps, and leftover spaces.

A recent project in the spirit of such cross-institutional and multi-actor activity is *Scalable Skeletal Escalator*, an exhibition and performance staged at Kunsthalle Zurich in the autumn of 2020.[7] The project embodies precisely such an idiosyncratic system of creation that eludes institutional, spatial, material, and technological boundaries. The project was produced by a plethora of artists from varying disciplinary backgrounds (e.g. fine arts, dance/performance, music/sound, fashion), and even included olfactory work. On an institutional level, the work emerged across and between Tanzhaus Zürich (dance), Schauspielhaus Zürich (theater), Kunsthalle Zürich (fine art), and Callie's, a multidisciplinary experimental art institution located in Berlin.[8] Crucially,

[7]   http://kunsthallezurich.ch/en/scalable-skeletal-escalator

[8]   www.callies.berlin/de/about

the work occupied the spaces of Kunsthalle Zürich as an exhibition, only to merge into a performance that continually redrew the boundaries between installation, bodily movement, the work, and the audience. It also extended to the museum basement, where the intermittent production of large-scale paintings, to be transferred up through the building to the exhibition space, took place. These procedures might seem basic and trite, but they demonstrate that art often achieves its efficacy and impact when removed from formal organization. In turn, this makes plain the manner in which artistic production emerges in distinct systems of making, often naturally and spontaneously subverting the order of formalized structures, and achieving a certain spatial intelligence.

Further, Kunsthalle Zürich is part of Löwenbräukunst, [9] a nascent cross-institutional endeavor and as such a kind of experimental setting for art in a smart city. Located between two districts historically more or less separated by industry and roadways, this large art space occupies what was once a brewery in the city center. The building houses an array of divergent art spaces, both private and public, as well as publishing houses and galleries, some belonging to the art establishment, others less so. Overall, this contemporary art center inhabits the city in unforeseen ways, shares audiences among its constituents, realizes untapped formats, and offers new collective programs. This case demonstrates how art finds ways of inhabiting urban space that challenge both the actors involved and the materiality of the city.

Projektraum Dietikon, [10] an art space recently established in the agglomeration of Zurich, points to the importance of spatial leftovers and amateurism. This exhibition space is housed in a building formerly occupied by the public construction office. Here, artistic practice and its exhibition formats occupy the city in a manner that transgresses established systems of making and showing. Naturally, such a space is situated both at the periphery of the art world and at the margins of the city. It attempts to make accessible an interstice (yet) unscathed by the latently oppressive forces of urban planning in major cities. Other formats that similarly occupy neglected spatial openings or urban cavities include *Displays* on Zurich's Weststrasse, [11] or *Kunstkasten* [12] and *Im Grafenhag* [13] in Winterthur.

Of course, the notion of the "offspace" or any independent, rather informal, often temporary artspace is nothing new. Still, in the context of the smart city such modes of operating are becoming increasingly meaningful, as they enable alternative uses of space and cultural infrastructure, and thereby produce necessary shifts in the urban fabric and cultivate uncertain and ambiguous outcomes otherwise seemingly repressed by the digital city. Indeed, it seems more than ever that the potential of art in a technologically determined city lies in cultivating undetermined spaces, that is, with open outcomes. Just as art points to the unknown, and to the notion that an alternative world is always possible, so open, public urban space harbors the uncharted undercurrents of societal, political, and cultural reality. Against notions of technological and digital saturation, a smart city is challenged to purposefully cultivate unoccupied gaps. Art is an ally for doing so, that is, for the unhindered making, inventing, and arranging of the world as the quintessence of a prolific urban culture. The necessary forms of the future are already anticipated in the present.

Local amateurism

Finally, in this informal context, amateurism seems particularly salient. Dominant discourses, exhibition practices, and mediatized activities often suggest that professionalization and all the polished requisites this entails is the standard mode of operating in the arts. In part, this view originates in the strictures of the global art world and in the professional banality associated therewith. Thus, the cultivation of amateurism, that is, artistic activity that does not submit to the categories and working criteria of professional cultural production, is a critical mode of working in the face of the consequences potentially induced by the smart city. The freedom to do bad work, to write bad books, to make bad films, and to stage bad shows is likewise the kernel of artistic innovation and paramount to maintaining its non-instrumentality in the context of smart urbanity.

[9]   www.lowenbraukunst.ch/home.html

[10]   www.dietikonprojektraum.ch/index.html

[11]   www.kunsthallezurich.ch/de/node/98067

[12]   www.kunstkasten.ch

[13]   www.instagram.com/imgrafenhag

Saus und Braus, an exhibition staged in 1980, represents an important cultural moment for Zurich as a city and for the art sphere more broadly (Curiger, 1980; Frey, 1981). Even though some of the associated artists and curators are now sufficiently celebrated and established, the impetus of those involved at the time was characterized by a certain irreverence towards the artistic establishment and by an unwillingness to participate in professional art, even to the extent that voicing any intention of becoming an "artist" was deemed preposterously pretentious. This stance manifested both in the works displayed and in the way in which this small-scale artistic current was organized. The exhibition occupied limited space and relied on informal, inexpensive methods and organization. This might suggest that such art practices are an antidote to the homogenizing, totalizing processes of a city determined by data. Conversely, the digital and its urban embedding might allow art to once again become radically local.

It is undoubtedly a fallacy that contemporary art requires the global stage to emerge, be seen, and enter collective consciousness. After all, art is, at least partly, about what is immediate and necessary. As such, it is bound to very specific local conditions in terms of space, infrastructure, materials, institutions, social networks, journalism, and media. It originates in small communities, partnerships, and audiences. Maybe the smart city provides the opportunity to reinvigorate the small-scale nature of making art. Likewise, such artistic intervention may perhaps be capable of allowing unanticipated public space and encounter to happen in the face of the technological and economic forces that colonize and muddy the purpose of the public sphere in the modern era (Arendt, 1958; Habermas, 1983; 1987). Perhaps art is increasingly charged with elucidating distinctly public spatial typologies in the context of a smart city, while avoiding mere activist and relational formats of making and presenting artistic work.

And yet, such artistic practice and creation are not specific to the smart city. We might instead suppose that these forms might become increasingly impactful as cultural modes that induce permeability, spontaneity, and openness in an otherwise technologically driven city. Perhaps it is less that art mounts meaningful resistance per se, but rather that its manner of making, working, and showing transgresses urban strictures, inhabits spatial and institutional gaps, disregards unchallenged social structures, and transcends established ways of creating aesthetic, cultural, and even economic value. In short, the reinvigorated role of art in the smart city is to engender openings. Clearly, the mechanisms, processes, spaces, materials, and actors involved in such artistic practices need to be further researched.

Nevertheless, the cases presented here demonstrate in a preliminary fashion how cities are already producing a type of artist and a model of creative practice that forge their own territories and build their own systems of making, doing, and thinking that may become increasingly sophisticated and perhaps increasingly salient in circumventing the smart city. Whether such activity lends itself to theorization in terms of artistic movements, revolutions, or counter-cultural tendency seems less important than the reality such work already visibly represents. In fact, the cultivation of subtly orchestrated, spatially, socially, institutionally, and materially dispersed creative practices might represent a way out of the cultural and artistic deadlock that today often relies on ever greater transgression, self-violation, breaching, infraction, and perversion.

Not least, the status of art does not change in the context of the smart city. In European and North American societies, art has largely taken place in interstices and on the margins. Indeed, a contrarious conclusion would likely achieve nothing other than according the digital city greater impact than it currently deserves and conceding that all other forms of progress, be they social, political, or aesthetic, merely assimilate themselves to the interests of technology.

That certainly cannot be the case. And so, cities harboring spaces that allow art to happen already find themselves amidst an adapting, ever-changing artistic landscape. One cannot but uphold the role such activity plays in forging the textures of the future city and in materializing our personal and collective urgencies therein. Artistic achievement and urban conditions are inextricably linked. Art is embedded in the city, and the city is embedded in art. What is still on the horizon will unfold in the spaces and urban constellations already experienced.

Bibliography

Arendt, H. (1958). The Human Condition. Chicago: The University of Chicago Press.

Bennett, T. (1988). The Exhibitionary Complex. new formations 4, pp. 73–102.

Benezra, N. & Brougher, K. (2000). Ed Ruscha. Zürich: Scalo.

Berman, M. (1982). All That Is Solid Melts Into Air – The Experience of Modernity. London: Verso.

Bruno, G. (2014). Surface: Matters of Aesthetics, Materiality, and Media. Chicago: The University of Chicago Press.

Bürger, P. (1974/2017). Theorie der Avantgarde. Göttingen: Wallstein Verlag.

Bürger, P. (1984). Theory of the Avant-Garde (M. Shaw, Trans.). Minneapolis: University of Minnesota Press.

Bürger, P. (2014). Nach der Avantgarde. Weilerswist: Velbrück Wissenschaft.

Chiapello, E. (2010). Evolution und Kooption – die Künstlerkritik und der normative Wandel. In C.Menke & J. Rebentisch (Hrsg.), Kreation und Depression – Freiheit im gegenwärtigen Kapitalismus (pp. 38–51). Berlin: Kulturverlag Kadmos.

Curiger, B. (1980). Saus und Braus. Zürich: Städtische Galerie zum Strauhof.

de Certeau, M. (1984). The Practice of Everyday Life (S. Rendall, Trans.). Berkeley/Los Angeles: University of California Press.

Flam, J., Rogers, K., & Clifford, T. (2015). Motherwell – 100 years. Skira Editore/Rizzoli: Milano/New York.

Foster, H., Krauss, R., Bois, Y.-A., Buchloh, B. H. D., Joselit, D. (2016). Art Since 1900 – Modernism, Antimodernism, Postmodernism (3rd edition). London: Thames & Hudson.

Groys, B. (2016). In the Flow. London/New York: Verso.

Habermas, J. (1983). Modernity – An Incomplete Project. In H. Foster (Ed.), The Anti-Aesthetic: Essays in Postmodern Culture (pp. 3–15). Seattle, WA: Bay Press.

Habermas, J. (1987). The Philosophical Discourse of Modernity (F.G. Lawrence, Trans.). Cambridge, MA: The MIT Press

Habermas, J. (1989). The Structural Transformation of the Public Sphere – An Inquiry into a Category of Bourgeois Society. Cambridge, Mass.: The MIT Press.

Halegoua, G. R. (2020). Smart Cities (The MIT Press Essential Knowledge Series). Cambridge, MA: The MIT Press

Jacobs, J. (1961/1992). The Death and Life of Great American Cities. New York: Random House/Vintage Books.

Koolhaas, R. (1977). Life in the Metropolis or the Culture of Congestion. In K. M. Hays (Ed.), Architecture Theory Since 1968 (pp. 320–330). Cambridge, MA: The MIT Press.

Koolhaas, R. (1978/1994). Delirious New York. New York: The Monacelli Press.

Koolhaas, R. & Foster, H. (2013). Junkspace with Running Room. Widworthy Barton, Devon: Notting Hill Editions.

Fischli/Weiss (2020). Haus. Köln: Verlag der Buchhandlung Walther König.

Fischli/Weiss (1993). Agglomerationen, Siedlungen. Zürich: Edition Patrick Frey/Kunsthalle Zürich.

Foster, H. (Ed.) (1983). The Anti-Aesthetic – Essays on Postmodern Culture. Seattle, WA: Bay Press.

Frampton, K. (1983). Towards a Critical Regionalism: Six Points for an Architecture of Resistance. In H. Foster (Ed.), The Anti-Aesthetic: Essays in Postmodern Culture (pp. 16–30). Seattle, WA: Bay Press.

Frey, P. (1981). Bilder.
Winterthur: Kunstmuseum Winterthur.

Rowe, C. & Koetter, F. (1978). Collage City. Cambridge,
MA: The MIT Press.

Sennett, R. (1994). Flesh and Stone – The Body and the
City in Western Civilization. New York/London: W.W.
Norton & Company.

Sigler, J. (2016). Shelf Life. Harvard Design Magazine,
No. 43. Cambridge, MA: Harvard University Graduate
School of Design.

Simmel, G. (1903/1997). The Metropolis and Mental Life.
In N. Leach (Ed.), Rethinking Architecture – A Reader in
Cultural Theory (pp. 69–79). London: Routledge.

Stierli, M. (2018). Montage and the Metropolis –
Architecture, Modernity, and the Representation of
Space. New Haven, CT: Yale University Press.

Teyssot, G. (2013). A Topology of Everyday
Constellations. Cambridge, MA: The MIT Press.

Ursprung, P. (2013). Die Kunst der Gegenwart – 1960 bis
heute. München: Verlag C.H. Beck.

Ursprung, P. (2017). Der Wert der Oberfläche – Essays
zu Architektur, Kunst und Ökonomie.
Zürich: gta Verlag, ETH Zürich.

Vidler, A. (2000). Warped Space – Art, Architecture, and
Anxiety in Modern Culture.
Cambridge, MA/London: The MIT Press.

Wigley, M. (2018). Cutting Matta-Clark.
The Anarchitecture Investigation.
Zürich: Lars Müller Publishers.

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