A CITY IS NOT A GAME
URBAN DEVELOPMENT APPROACHES AND CHALLENGES BY VIDEO GAMES AND SMART CITIES

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UNE VILLE N'EST PAS UN JEU, APPROCHES ET ENJEUX DU DEVELOPPEMENT URBAIN PAR LES JEUX VIDEO ET VILLES INTELLIGENTES

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Video games have become an essential media. Urban development simulations called city-builders designed to model more and more sophisticated cities are amongst the most popular. Many put forward strong criticism concerning their vision of urbanism. These criticisms echoes various fears related to the development of smart cities. This concept promulgates a conception of cities based on intensive use of information and communication technologies. Actively promoting a convergence between digital information and the physical world, its design reveals a large number of key issues to reconcile sustainable development and urban quality of life through better management of infrastructure and natural resources. However, the smart cities and city-builders are often accused of sharing a stereotyped and uniform vision of urban development as well as a certain disregard of the individual. The algorithms on which these two domains are based reflect an absolute and optimized image but may be unfair and skewed when their processes are opaque. Recent work on city-builders and smart cities emphasizes these similar critiques separately. This article aims to highlight the close ties between these two fields, to describe the sources of inspiration and the development of city-builders then to confront them to the ambitions of smart cities and to conclude about the similarities of the fears and criticisms raised by both fields.

Keywords : *Smart city, Algorithmic urbanism, City-builder, SimCity, Procedural generation, Procedural rhetoric, Systems theory, Smart citizens*

1. INTRODUCTION

Video games have become the leading entertainment industry in the world, surpassing television, cinema, and music. They also represent the primary mass cybernetic medium (Amato, 2014). Regardless of rules, category, or gameplay, video games are based on communication between the human and the machine, whether a computer or a game console. This interaction takes place in virtual worlds that are largely automated, resulting from procedural generation, allowing for large-scale level creation responding to a sum of rules characterized by algorithms. Another category of video games that has gained popularity and sophistication is that of city-builders, an anglicism designating management games focusing on the construction and management of a city.

The intersection of these two categories of video games can establish a close link with smart cities, also called digital cities, designating cities relying on an intensive use of information and communication technologies. Actively promoting a hybridization between digital information and the physical world, its design reveals a large number of key issues for reconciling sustainable development and urban quality of life, thanks to better management of infrastructures and natural resources (Picon, 2013).

Nevertheless, city-builders and smart cities are sources of regular and similar critiques: an excessive focus on certain algorithmic optimizations that can lead to an underestimation or even an omission of their negative effects; a stereotyped urban development ignoring alternative models as well as the risk of prescribing ready-made solutions without sufficient and relevant consideration of existing conditions. Also, although the term "algorithm" refers to a mathematical notion giving an absolute and optimized image, the latter are often opaque, misunderstood, or biased by various private interests. These numerous analogous critiques regarding these two domains have been elaborated separately. This article therefore wishes to highlight the great similarities that city-builders and smart cities can share. The sources of inspiration and the development of city-builders will first be described before being subsequently confronted with the concept of smart cities. Finally, a critical look will be taken in the conclusion at the resemblances of the fears and critiques raised by the two respective fields.

2. THE URBAN PLANNING APPROACH OF CITY-BUILDERS

2.1. From Systems Theory to City-Builders

The use of computer urban simulations in education dates back to the early 1970s (Dupuy, 1972; Minnery et al., 2014; Haahtela, 2015) with "participant-observers" inserting themselves into a "dynamic visual model of an urban environment by means of a visual simulation system" (Kamnitzer, 1972). These simulations were notably used from the 1990s onwards to teach urban geography as well as urban planning concepts (Adams, 1998). The video game SimCity, published by Maxis in 1989, quickly became the most famous example. Maxis was founded by Will Wright and Jeff Braun, based on what the company describes as a long-standing interest in simple systems giving rise to complex behaviors.

The architect and mathematician Christopher Alexander constituted a first key influence for the development of SimCity. As early as the 1960s, his work advocated a detachment from modernist models, which then promulgated a top-down approach. Alexander proposed what he called a universal method of design and development, based on the logic of interrelations between humans and the city. He notably denounced in his work A City is Not a Tree cities that fit into a semi-lattice scheme, where overlapping sections induce a redundancy of functional systems. This research is the result of a mathematical model of interrelations and coexisting functions as well as an idealized interpretation of the basic elements of architecture. His theories applied to the latter suggest finding universal principles applicable from the construction of a house to the organization of the entire territory. The more these principles prove abstract and timeless, the more it seems possible,

according to him, to reconfigure them to create beautiful and varied cities. Nevertheless, behind a universal appearance, his work primarily highlights modern North American urban development. The book A Pattern Language: Towns, Buildings, Construction, in which Alexander also participated, represents another major inspiration for SimCity. It describes no fewer than 253 interdependent human behavior models considered by the authors to be universal, with solutions ranging from the construction of buildings to the layout of streets.

The second major inspiration for Maxis was the original work of Jay Wright Forrester, a computer pioneer and systems theorist, notably analyzing how complex systems change over time. Forrester was a professor of management at the Massachusetts Institute of Technology and an outsider to the field of urban planning. He laid the foundations of modern computer simulation in his work Urban Dynamics published in 1969, in which he attempted to refute the popular conceptions of the time regarding the reasons for the deterioration of cities. Instead of simple intuitions on urban policy treating symptoms rather than the causes of urban decay, his work advocated a multi-variable evaluation of existing conditions and their fluctuation according to the evolution of the establishment of new businesses, low-income households, or professional training. His original proposal did not succeed due to the proliferation of hypotheses, making a complete modeling of the different behaviors difficult with the rudimentary computing capabilities of the time. Furthermore, Forrester applied his statistical model to the city as a whole rather than dealing with more localized problems. The model applied to policing, for example, takes into account the ratio between the number of police officers employed in the entire city and the total number of crimes, instead of concentrating on differences in police coverage and crime trends between certain neighborhoods. Forrester also wrote World Dynamics with the ambition of proposing a modeling of the entire planet. Regardless of his scale of work, Forrester's theories reflect similar beliefs. According to his work, it is possible for us to better understand evolving systems by studying any relevant variable from the perspective of the free market principle, by determining how the evolution between supply and demand can produce different results; this principle became the basis of SimCity management. His work contributed greatly to early research on the finiteness of natural resources in conflict with exponential economic and demographic growth, notably with The Limits to Growth published in 1972, also known as the Meadows Report, relying on computer-modeled system dynamics.

These two inspirations, Alexander and Forrester, reflect a major problem of the SimCity urban simulation: urban planning based on infinite resources and abundant space. Inspired by North American development, it is based on an initial consumption of resources and undeveloped land through laissez-faire in a desire for unlimited economic and urban growth.

2.2. Computer Simulations and Urban Planning Instruction

The use of SimCity in an introduction to urban planning entails several advantages and disadvantages (Lauwaert, 2007). The daily use of a computer allows students an initiation into complex systems, the development of creativity in planning and anticipation, as well as an improvement in problem-solving skills. Also, developing a global grasp of the interaction between the different components of a city helps cultivate an understanding of the short- and long-term effects of different urban decisions (Minnery et al., 2014). SimCity also allows for a general reinforcement of critical and adaptive reasoning for more targeted problem resolution.

The most commonly cited negative aspect of SimCity is the unrealistic power of the mayor embodied by the player, which does not reflect institutional and political structures. The game does not address the complex and intrinsic elements of an open society and some of its contemporary problems, such as citizen participation, voting rights, financing, or corruption (Lobo, 2005). The creators of SimCity never claimed to have designed a realistic simulation but rather a construction game; its use, however, can mislead users in

their understanding of a genuine urban environment. A simplification, condensation, and hierarchization of the reality of the city is often necessary in its teaching; different urban aspects are divided into courses on legislation, history, sociology, or transport. However, the simplification in SimCity, often qualified as exaggerated or even outrageous, can lead to a "technophilic and empiricist fantasy according to which the complex dynamics of urban development can be abstracted, quantified, simulated and managed" (Friedman, 1999). These simplifications can mask the complexity of cities and their long-term planning from urban planning students, preventing a proper grasp of the interactions and policies between the systems that constitute them.

2.3. An Obsolete Game for Obsolete Urbanism?

Beyond the top-down approach and the great simplification or even omission of numerous urban elements, the budgetary constraints of city-builders are far less present and complex than in reality. Coupled with a great ease in destroying, changing, and redeveloping land use at will, this can lead to certain fantasies of the ideal city, the new town, or even the ghost town, where the entire built environment is completed and sometimes even sold before the arrival of the first inhabitant. This malleable land use is nevertheless juxtaposed with a very caricatured vision of urban planning in SimCity: zoning segregated into only three categories: industrial, commercial, and residential zones. Each offers several levels of density and added value respectively. Leisure spaces and sports facilities are segregated into a separate category. This notion of city planning and construction dates back to the Athens Charter edited in 1933 under the aegis of Le Corbusier, which subsequently defined a substantial part of urban planning from the 1950s to the 1980s. Since then, a large number of urban planners have tried to propose alternatives, notably with more mixed-use development, by diversifying activity in commercial and industrial spaces or by avoiding dormitory towns. These more contemporary lines of reasoning are strictly embryonic in urban simulation games, even the most recent ones. Also, major sources of pollution such as power plants can easily be installed in the corners of the given virtual terrain, without taking into account any impact on neighboring territories despite trade possibilities with them. The virgin terrain made available to the player is furthermore supposed to be fully exploited. Building a city of substantial size ex nihilo amounts once again to the idea of the new town or the ideal city. In reality, most large international megalopolises are palimpsest territories (Corboz, 1983), recounting successive constructions and destructions, of which all historical layers have imprinted a unique identity on the cities known today.

The omnipresence of the road network is another testimony to a certain obsolescence of urban thought (Dupuy, 2006). The road predominates in city-builders and proves to be absolutely indispensable: no residential, commercial, or industrial construction can emerge without direct automobile access. There exists a hierarchy of roads from the simple lane to the highway, passing through different boulevards and tree-lined avenues, but the discrimination between thoroughfares and streets as public space does not exist. Public space is then solely automobile circulation. City-builders remain the opposite of efforts accomplished in numerous countries to move away from this car-centricity that defined urban planning for more than half a century, notably by prioritizing pedestrian spaces, public transport, or cycling, in correlation with a physical or financial discouragement of car use. Moreover, the construction of the road network in city-builders was for a long time done solely according to a grid plan on a North American model, leaving no chance for the development of another urban form.

The simplification of the first city-builders could be explained by major technical limitations, with computers and monitors having reduced computing and display capabilities respectively, yet providing a sufficiently convincing aspect to be judged problematic (Friedman, 1999). As the creation of urban simulations requires specialized programming skills, the developers of such software are neither urban planners nor geographers. Recourse to advice from urban planning

professionals has nevertheless become recurrent, but one of the main assets of the latest city-builders comes from their respective communities, thanks to the democratization of the Internet initially and the multiplication of "mods" subsequently. Mods are add-ons, official or otherwise, that are added to the original game, sometimes transforming it profoundly (Yiannoutsou, 2014). Cities: Skylines, published in 2015 by the publisher Paradox Interactive, quickly became the most popular city-builder by offering complete and intuitive gameplay. Cities: Skylines is not exempt from flaws, however; its vision of urban development falls into most of the same pitfalls, but numerous extensions and mods allow the software to improve noticeably over time. While some mods are purely cosmetic, others stem from advice from urban development professionals. The latter allow for significant changes to content by introducing, among other things, pedestrian zones, the creation of dense and traffic-calmed historical centers without automobile circulation, restrictions on heavy goods vehicles, or even a consideration of bicycles. This represents only a small step towards a genuine awareness of contemporary urban issues, but it will nevertheless be interesting to study the impact that these initiatives may have on future generations of urban planners, most of whom will in turn create an interest in urban development through these video games.

2.4. More Contemporary Approaches

Other video games attempt to counter the simulations of ex nihilo city construction. Let us cite The Architect: Paris, which proposes redeveloping the French capital with restraint, based on the current state of the city and its contemporary constraints. Nova Alea proposes addressing various current issues such as gentrification. Behind the minimalist interface is revealed a committed message depicting "a city that for its inhabitants was a mixture of shelters, bonds, memories, desires, but which for its masters was a matrix of financial abstractions," thereby resonating with the problems that the renewed attractiveness of certain working-class neighborhoods can pose. Block'hood is a neighborhood design simulation that asks the player to consider economic, social, and ecological factors (Sanchez, 2015). By creating an environment where the player must find a subtle balance between the different components of a building, the game can lead to decay and abandonment in the event of poor design. Block'hood thus seeks to educate its audience on the complexity and delicacy of building a neighborhood.

The Block by Block program is another example of the potential of the intersection between urban planning and video games. Wishing to redevelop public spaces in developing countries, the United Nations Human Settlements Programme (UN-Habitat) gathered ideas and points of view from inhabitants. To this end, they gave access to the game Minecraft, published in 2011, to members of different communities, thus offering them real potential for contribution in the design of places they would then naturally take ownership of (McDaniel, 2018). Minecraft is a game composed of blocks representing different materials with which it is possible to create an infinity of structures; the player can modify their environment at will by adding or removing these blocks, building structures with infinite freedom (Duncan, 2011). Using Minecraft, participants in UN-Habitat's Block by Block experiment modeled the spaces and structures they wished to see in their respective communities. Different teams of architects then considered them within a professional approach. This flourishing program has been implemented worldwide, from Mexico to Indonesia, via Kosovo and Lebanon. This initiative, although based on a video game that is not a city-builder, addresses another problem posed by the latter: metropolization, a territorial organization reinforcing the power of metropolises, often to the detriment of smaller cities with a decrease in the allocation of their resources. It also allows for concerted and informal development, effective even in urban fabrics such as favelas or slums, often victims of total disregard by urban authorities. The quality of citizen consultation regarding major urban development projects is thereby greatly improved (Douay, 2018).

2.5. Procedural Generation

This specific use of the video game Minecraft for collaborative purposes is to be contrasted with

the automated procedures promoted by certain visions of the smart city. The latter can, however, be paralleled with the very design of Minecraft: procedural generation. Procedural generation video games offer environments created in an automated manner, allowing for large-scale level creation responding to a set of rules characterized by algorithms (Shaker et al., 2016). They allow the creation of vast universes via a particularly lightweight program, depending only on a few algorithms and not on a large sum of manually coded operations. Minecraft is probably the most well-known and popular procedural generation game to date, allowing players to evolve in a coherent world of substantial, quasi-infinite size. These games allow for the creation of homogeneous and immersive worlds thanks to simple mathematical processes, far from the artisanal work represented by the manual fabrication of worlds in other games. Many are nevertheless regularly criticized for their repetitiveness, offering similar, bland, and tiresome worlds, far from the design mastery of certain games where every detail is thought out to optimize the gaming experience and gameplay. These critiques may resonate with the fears raised by the concept of the smart city, which is liable to homogenize urban design by blurring or even erasing all cultural and social considerations.

2.6. The City as a Playground?

A player is encouraged to have fun and win. Solving a game is supposed to induce pleasure (Koster, 2005). Even in so-called open-ended video games without clear objectives, players are challenged by emergent problems and are thus determined to define their own goals to make the game more fun or more complex (Rufat et al., 2012). A player cannot do everything; their scope of action is limited by objectives and rules. Video games often offer complex worlds that nevertheless possess relatively simple rules compared to the real world, providing reference points and a soothing sensation to most players (Tisseron, 2009). The player must not decide the rules but simply apply them judiciously in order to achieve objectives and win the game (Juul, 2011). Whatever decisions are made, they will therefore always be under the authority of established rules. Behind the advice promulgated by city-builder manuals often hide obligations, with the success of the game being linked to various rules or algorithms. The reduction of fire risk and crime will depend solely on the number and location of police stations and fire stations, directly impacting land value and population density. Fiscal policies encourage ever-lower taxes to retain as many residents as possible, tacitly promoting a certain economic vision. The neutrality of the simulation and the freedom of the player thus seem to be merely illusions, with political and urban alternatives being circumscribed by the rules. The infinite possibilities touted by the various creators of city-builders seem to be only a multiplication of paths towards the familiar destinations previously cited: dormitory towns, urban sprawl, and car-dependency. This observation has raised critiques from across the political spectrum, with some perceiving the game as an ersatz dictatorship with centralized authority, and others pointing to the fiscal policies and rationalization encouraged as a purely liberal conception of the city.

Vincent Ocasla is a player who, in 2009, reached the limits of the title SimCity 3000, published in 1999 (Sterry, 2010). Then an architecture student, he managed to handle the game skillfully by studying its code for nearly three years, thereby achieving several objectives such as zero crime thanks to numerous police stations, or reaching a population of six million inhabitants, a number far superior to that of a city created by an experienced player and potentially the maximum possible (Eilers, 2014). Most of these accomplishments were maintained at their optimal level for several millennia of simulation. His city, named Magnasanti, is composed essentially of medium-density residential buildings, which are particularly repetitive. He ignored health or education, omitting fire stations, hospitals, or schools, while placing libraries which, according to the game algorithm, allow for an increase in population capacity. His major inspiration was Koyaanisqatsi, an experimental feature-length documentary released in 1982 illustrating different aspects of the relationship between man, nature, and technology. The film notably proposes a sequence between an aerial view of a megalopolis and a

photograph of microprocessor circuits, suggesting that the urban population has as much freedom of action as electrons in a microprocessor. The individual may be considered free, but society is not totally so, or is not programmed to be. Vincent Ocasla has always considered his city Magnasanti as a work of art; a sentiment evidently shared since its acquisition by the Museum of Modern Art (MoMA) in New York, whose curators analyze the work in these terms: "Ocasla highlights a brutal dichotomy: hidden under the illusion of order and grandeur lies stifling pollution, high unemployment, no fire stations, schools, or hospitals, a regimented lifestyle—this is the price that these citizens pay for living in the city with the highest population. As the debates over the legacy of architects like Le Corbusier attest, it is difficult to separate the benevolent from the coercive when planning an ideal community, on paper or in digital form." (Arida, 2014). The analysis of the game's various algorithms for maximum growth allowed Ocasla to optimize distances between different resources, the energy grid, and transport infrastructures in order to build the most densely populated city possible. This success, achieved at the price of totalitarian control and severe social repression, was only digital. The quality of life of the inhabitants was not the sought-after goal; only technocratic efficiency was. The idea was to propose a critique of the game's optimal development hypotheses and the paradox of a certain powerlessness of players, who cannot go beyond the conditioning of the dictated objectives and rules.

The objectives and rules specific to each game oblige players to make choices, inducing them to learn and accept the model. They are consequently sometimes considered executors rather than actors (Rufat et al., 2012). As with understanding a complex model, two gaming methodologies present themselves: experimenting with all possible actions, observing results, and collecting data empirically, or studying what other players have realized and discovered beforehand. The rules of the game can lead the player to optimize the model, to master it, but neither to improve it nor to question it. This decision-making process is the very essence of a simulation game.

3. SMART CITIES, PROCEDURAL CITIES

3.1. Technological Expertise, Digital Determinism

This decision-making process can be paralleled with the concept of smart cities, designed by experts with technical training using methods based on a certain technological determinism. Awareness of social sciences in civil engineering curricula is embryonic or even absent, leaving room for professionals who swear only by various learned mathematical calculations (Antić et al., 2003). Arbitrariness and informality are then often perceived as parasitic elements. The smart city concept is among the most popular technological methods for most engineers, who prefer to rely fully on different equations and algorithms.

In the span of just a few years, the smart city has moved from the status of scientific research to that of an omnipresent and ubiquitous reality. Numerous projects, sometimes monumental in scale, are emerging all over the world, regardless of the existing mode of urban development or the standard of living of the inhabitants (Douay, 2018). These future smart cities will include a large amount of integrated computing power, promoting an improvement in urban living conditions through efficient control of physical resources and the integration of data generated by new information and communication technologies. These technologies allow for the visual representation of virtual information generated from an integrated computer network, much like the graphical user interfaces of city-builders. These tools, interfaces, and representations of smart cities and city-builders both adopt the principle of procedural rhetoric.

3.2. Procedural Rhetoric

Rhetoric is a means of debating or expressing ideas in different forms. Procedural rhetoric is the use of processes and systems to formulate arguments or express ideas (Bogost, 2007). This term finds relevance, efficiency, and compatibility with the complex systems that are city-builders and smart cities. Indeed, it proves necessary to be able to describe how computers function and thus

understand the processes underlying the technologies with which we interact. This rhetoric can also establish links between the perception of systemic problems and the way we express them. Speech and writing are our primary means of expression, but they often prove insufficient to describe a complex system composed of numerous moving internal parts within which a change can have multiple repercussions. Procedural rhetoric also allows for the creation of a relevant link between the problem, the reasoning, and the medium, and also for the development of a new type of support and services based on the concept of play. Finally, its persuasive and impartial nature allows it to effectively combat biased and oriented human attitudes and behaviors. The combination of procedural rhetoric and computer technologies can be a relevant tool for integrating virtuality into the real world in an immersive manner. Such a more transparent immersion is crucial for bringing nuances or even new definitions to a smart city concept that is sometimes imposed and opaque.

3.3. New Definitions of the Smart City

Numerous works dedicated to smart cities have proposed different definitions and critiques. Major polarities in the different interpretations have appeared, between institutional and non-institutional actors or between open and closed systems (Picon, 2013; Greenfield, 2013; Townsend, 2013). Identifying these polarities has allowed for an initial maturation of the perspective held by the social sciences on the phenomenon. Far from expressing a certain technological enthusiasm or, conversely, mistrust or even condemnation, the objective of this new social research is to critically examine the situation. Early works diametrically opposed top-down approaches, inspired by a cybernetic movement based on integrated and high-performance systems, to bottom-up approaches with more collaborative ambitions. New works distinguish four new underlying trends: "rational urbanism thanks to algorithms, post-strategic urbanism supported by new actors of the digital economy, citizen urbanism thanks to communicational resources offered by the web, and a more collaborative institutional practice of urbanism thanks to the renewal of sociotechnical participation mechanisms" (Douay, 2018). These trends represent different incarnations of the smart city concept. They express complementarity rather than contradiction, thus translating a certain diversity of possible articulations and convergences at different scales. Institutional, citizen, private, and technical actors are considered, illustrating a more sophisticated intersection of digital effects on the urban and the practice of planning. One can cite, for example, young companies such as ForCity, which aim to popularize advanced notions of urban planning and urban policies by making data that is sometimes difficult to interpret accessible to the general public.

These four underlying trends can be put into perspective with the Cities in Motion Index (CIMI), created to examine 96 factors distributed across 10 domains of urban life: human capital, social cohesion, economy, governance, environment, mobility, urban planning, international outreach, and technology (Berrone et al., 2019). This comparative analysis studies 174 cities in 80 countries and highlights great disparities regarding the consideration of different institutional actors and citizens. Major cities such as London, Paris, New York, or Tokyo share the top positions, but more modest ones like Amsterdam, Vienna, or Reykjavik prove that size is not a necessary prerequisite for a relevant smart city in the ten judged domains. The report also expresses the complexity of balance and the stability of processes. Very few cities show good results in all categories; the majority of them fail to reconcile the different imperatives, like American cities which perform well in the technological aspect but are mediocre in their environmental considerations. Let us also cite Asian cities, which for the most part show interesting economic performance to the detriment of social cohesion. Singapore, Hong Kong, or the Songdo project in South Korea indeed seem capable of significantly improving their economic power, at the price of unequal and unjust economic distribution. Often stemming from corporate strategies like those of Toshiba, IBM, Hitachi, or Cisco (Languillon et al., 2016), these projects can lead to a certain number of evident tensions and conflicts in different strata of these respective societies. It will be essential for them to understand the relations and

interactions between the different urban dimensions as well as to identify the best compromises with the aim of solving these problems in a creative and unique way.

In a context marked by a tendency toward the privatization of services, individualism, and an "uberization" of many professions, infrastructures often transform into platforms, making the redefinition of the urban planner and public bodies necessary. This issue is addressed through three major aspects: processes, actors, and methods. In the era of the victorious and ubiquitous digital, safeguarding urban planning ideals that are both rational and democratic seems more crucial than ever. Let us focus on one of the hypotheses put forward: that of rational urbanism via algorithms.

3.4. Transparency of Urban Algorithms

An algorithm has several definitions. It can be described as a set of rules precisely defining a sequence of operations of a program, computational or otherwise. A program is generally considered an algorithm if it eventually terminates (Stone, 1971). Most studies on algorithmic decision-making, whether enthusiastic or wary, apply to complex but static systems; automated decision-making is, however, a dynamic process. Algorithms are tasked with estimating the quality of complex problems using proxies, computer software components acting as intermediaries between two hosts to monitor or facilitate their exchanges (Bambauer, 2018). They then attempt to modify their behaviors to suit the system or to protest against it. These behavioral changes can sometimes induce automatic corrections in the algorithm, thus creating various significant movements regarding the efficiency and fairness of a decision-making process. These movements can be structured in an open, public, and fair manner, or in a more opaque manner for private and biased purposes. Checks and balances are an integral part of any decision-making system, algorithmic or not. Algorithmic decision-making systems promote a certain autonomy and fairness but can, on the other hand, lack precision, revealing themselves to be insensitive to particular cases and the collateral damage of certain decisions. These opacities and insensitivities do not pose major problems when it comes to entertaining a player. However, contemporary society witnesses many fields tending toward gamification—namely, relying on game mechanisms to create complex systems in reality, such as the job market, social networks, or even new social credit systems. In such a context, it is appropriate to make value hierarchies more transparent in order to be able to contest them when the compromise does not correspond to democratic expectations or common sense, and so that the law can evolve more coherently internally.

The opacity and bias of algorithmic systems therefore represent one of the main concerns regarding urban decision-making. New questions regarding algorithmic ethics are emerging (Leszczynski, 2016; Coglianese et al., 2018). With values embedded in artificial intelligence and big data analysis increasingly replacing human decision-making, many indeed fear that an algorithmic society is too opaque to be able to publicly account for its behavior (Rouvroy et al., 2013). A person may be refused a bank loan, fired, or rejected for a job for reasons they will never know. The opacity of algorithmic decision-making is particularly problematic in the public sector and in urban and political decisions. Such decisions can indeed have serious consequences when taken without sufficient knowledge or understanding on the part of public institutions. This dangerous impenetrability of algorithmic processes was recently highlighted in the field of criminal justice, where predictions proved sometimes unjust or even erroneous. Algorithmic transparency is necessary to understand the processes. To do this, the public deployment of algorithms can only happen if: political bodies generate appropriate data on their objectives regarding algorithmic processes; contractors reveal sufficient information to the public body on how they developed the algorithm; public bodies and courts consider claims regarding trade secrets as a limited exception to public disclosure imposed by law (Brauneis et al., 2018).

4. CONCLUSION

The influence of architecture on the establishment of public space, its politics, its nature, and its

control is often considered to be waning in contemporary society. The primacy of urbanization and its developers has led to a certain abandonment of the ideals of the city, considered the main cause of this erosion of the meaning of architecture (Aureli, 2011). The city as urbs is only the physical environment of the urban; the city as polis, on the other hand, defines in a broader sense the social and political aspects, the social relations that are the basis for the appearance of this materiality. The urbs and the polis overlap without necessarily sharing the same perimeter (Prato, 2015). City-builders propose the creation only of the built environment, a city without specific social or political relations. The politics of the urban whole respond only to the injunctions of the player and their omnipotent top-down approach. The urbs thus disregards the polis. Only architecture and urban development count; there is no interest in individuals (Rancoeur, 2013). The goal of the game is to build a city according to the clichés of the big city, by making skyscrapers, highways, and monuments spring up.

The technical limitations of computers during the publication of the first city-builders did not allow for an individual representation of citizens. The citizens, called Sims in the SimCity series, were initially represented only in the form of data tables. Now represented individually in the latest SimCity or Cities: Skylines, published respectively in 2013 and 2015, the inhabitants are nevertheless devoid of any personality. They own a house, hold a job, and take a defined route to get there, but the possibilities for interaction remain very limited. They have randomly generated names; their behavior and situation are summarized by only a few succinct statistics. The individual does not exist; they are merely a simple increment to a set. The latest installments of city-builders boast possible actions on each individual, but these follow a precise logic only to answer the rules and objectives previously defined by the game: inhabit, move, work, procreate. The Sims remain simple sets of data, without specific social relations or family ties. Their role is to produce data which is then transmitted and centralized on the player's interface. City-builders furthermore suggest a permanent redefinition of simulated cities, entailing urban destruction or remodeling without sentimentality or affective bond with any individual.

The situation of these virtual citizens should be put into perspective with the new experiments with the social credit system in China (Raphaël et al., 2019). The Chinese government is indeed experimenting with a system aiming to establish a national reputation system for its constituents. Each citizen is assigned a score called "social credit," elaborated from data available to the authorities regarding their respective economic and social statuses. The system relies both on mass surveillance tools like hundreds of millions of security cameras but also on technologies linked to smart cities, with advanced computer data analysis. Mainland China and Hong Kong are also experiencing very rapid smart city development, a recent phenomenon which, according to the authorities, falls primarily within a context of energy and ecological transition, but also of the financialization of the city and its services (Douay et al., 2016). Through strong supervision by local and central powers, Chinese smart city policies account for urban production. These data show how the digital is also becoming an important frame of reference for territorial policies.

This parallel development of smart cities and the social credit system reveals very clear relations with city-builders regarding their political, economic, and urban mode of functioning and the reduced place reserved for citizens in the very near future. Deep ties exist between city-builders and smart cities, considered as sets of events capable of being optimized for citizens who are themselves becoming rationalizable "smart citizens." This lies not only in "the temptation to reduce the problems one faces to a question of piloting" but also in the fantasy of being able to summarize the extremely complex systems that are cities into simple algorithms (Picon, 2013). The urban fabric promoted by the development of smart cities may prove dangerously homogeneous and stereotyped, resulting in similar cities across the globe, disregarding local notions of architecture, urban planning, culture, or common sense. The representation of the citizen

and democratic consultation in smart cities and city-builders will also become central questions.

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