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Regimes of Digital Quantification: making data-driven decisions?

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In light of the proliferation of sensors, data and analytics, multiple digital quantification regimes are emerging under promises of a revolutionary change in the way in which decisions are made in areas such as urban planning and government. These regimes present a growing need to differentiate themselves in order to capitalize their data, deploying particular technologies that go beyond the digital. In this paper, we review two digital quantification regimes of urban cycling in Santiago, Chile: the RUBI device and KAPPO smartphone application. Through the study of the design of material and narrative technologies of these regimes, we will show how they try to distinguish their modes of quantifying the cyclists' mobility, configuring particular versions of target users, the city and its forms of government, in order to promote an urban planning driven by data.

digital quantification regimes, data-driven decisions, self-tracking, smart urbanism

1 Introduction: A world made of data?

The digital has invaded the city, and with it, the logics of planning and governing urban spaces. Sensors, networks and microprocessors of all kinds have become part of the urban landscape in increasingly ubiquitous and invisible ways, populating domestic and public spaces, companies and governments. Vast quantities of natively digital data are generated each minute on urban dynamics, and they are beginning to be reoriented for various purposes and decisions. The "datafication" or growing translation of multiple phenomena in the format of computable data has become an exponential process which various authors see as forming a true "revolution" or large-scale "epochal change" for contemporary life (Mayer-Schönberger & Cukier, 2013; Kitchin, 2014b). It is believed that digital devices, data, algorithms and analytics will allow for traceability of the social as never before (Venturini & Latour, 2010) providing what enthusiasts like computer scientist Alex Pentland (2012: 45) describe as a "god's-eye view of ourselves" that would increase the efficiency and responsiveness of a series of processes ranging from the use of public transport to medical exams to bureaucratic processes. In this scenario, data have become highly valued as a new economic asset,

being described as a new “gold mine” or the new “oil” of the 21st century (Schwab, Marcus, Oyola, Hoffman & Luzi, 2011). From this optimistic perspective, the processing (distillation, refining, etc.) of data would provide beneficial and valuable insights to inform or even automate the decision-making of individuals, companies, citizen organizations and governments. In all these areas, one finds the naive belief that more and better data is required to be able to solve and act in a "smart" way, appearing the digital technologies as ideal tools to quantify everyday life and obtain the necessary data for it. As Edd Dumbill (2013, p. 1), the editor of Big Data journal, resume it, “we might compute our way to better decisions.” In this paper, we want to problematise this belief by exploring the diverse modes of quantifying urban mobility and the efforts to justify and capitalize the value of particular devices, data and analytics.

2 The promises and perils of smart urbanism

The idea of making data-driven decisions has permeated local governments through the proliferation of many Smart Cities initiatives around the world. The so-called “smart urbanism” (Kitchin, 2014a, 2014b; 2015; Marvin, Luque-Ayala and McFarlane, 2016) promises that public planners and officials will be able to make better decisions if they quantify and instrumentalize urban space using sensors and smart devices. This would achieve a more holistic vision of the city and more coordinated and efficient management of government resources in order to improve people’s quality of life (Flowers, 2013; Goldsmith and Crawford, 2014).

Three main promises are made to promote data-driven decisions in urban planning from smart urbanism. First, thanks to the algorithmic gathering and processing of digital data, decision-making would be informed and even automatically driven by “objective evidence” or “facts” rather than prejudices, emotions, ideologies or even expert opinions (Esty, 2004, Esty & Rushing, 2007; Kitchin, 2014a, 2014b, 2015). It would be possible to overcome declarative answers and reflect on actual behaviors in a more direct manner (Kitchin, 2015), uncovering “hidden” patterns that cannot be anticipated using traditional methods. In this “dataism” (van Dijck, 2014), it is believed that the data would speak for themselves (Mayer-Schönberger & Cukier, 2013), promoting ideas of empiricist rigor, neutrality or a distancing from the subject of study under an “aura” of objectiveness and certainty (Boyd and Crawford, 2012; Gillespie, 2014). Secondly, it is argued that the gathering and analyzing of digital information would change the time that passes between the measurements and decision-making processes, generating a fantasy of acting in real-time or immediacy (Andrejevic, 2013; Beer, 2016). If before urban planning and government focused on the long-term, the proliferation of sensors, data and analytics in smart cities would turn this into an increasingly ongoing and “immediate” process in regard to the changes experienced (Batty, 2013; Batty et al. 2012). Thirdly, it is promised a new era of citizen participation by experimenting with digital technologies that will bring us closer to a more participatory and open digital democracy (Le Dantec, Asad, Misra & Watkins, 2015) along with greater symmetry or “horizontalization between governors and the governed” (Crawford & Goldsmith, 2014) or a true “democratization of policymaking” that would reduce the government monopoly on decision-making (Esty, 2004; Esty & Rushing, 2007). There is the belief that citizens could turn into sensors of their cities, for example, producing relevant volunteered geographic information about their needs and demands for urban planners and public officials (Burke et al., 2006; Evans-Cowley, 2010; Goldsmith & Crawford, 2014; Goodchild, 2007).

Despite the promises of smart or data-driven urbanism, it is necessary to be cautious and problematise the suppositions, limits and prejudices involved in the introduction of sensors, data, algorithms and analytics into the urban ecology. For example, it has been said that this process could promote forms of surveillance or “dataveillance” that are more invasive, ubiquitous and impossible to anticipate, operating even without a specific target in opportunistic or unsystematic ways (Andrejevic & Burdon, 2015; Bauman & Lyon, 2013; van Dijk, 2014). Instead of empowering the people through data production, government agencies and companies now can exercise power over

people through processes of regulating urban environments with sensors and algorithms (Gabrys, 2014; 2016). Instead of horizontalization, new digital divides and structural asymmetries are increasing between a majority that generates data (voluntarily and involuntarily) on a daily basis and a minority that concentrates the ownership and the necessarily skills and infrastructures to process the data, exploiting and subjecting the data producers to new economies of data (Andrejevic, 2014; Andrejevic & Burdon, 2015, Boyd and Crawford, 2012; Tenney & Sieber, 2016).

Along with methodological questions about the quality, replicability or representativity of the data, the performative and political nature of digital quantification has been called into question too, specifically in regard to the "dataist" belief in digital data as factual, neutral or objective evidence and excessive trust in the independence and integrity of the agents that accumulate and trade data (Boyd and Crawford, 2012; van Dijck, 2014). The data will never merely be a "reflection," "mirror" or immediate "doubles" of exterior physical counterparts. They are always produced by and embedded within a combination of diverse forces, logics and interrelated social entities –companies, academics, government agencies- that mold what they seek to measure through specific designs, interests and ideological agendas (Kitchin, 2014b; 2015; Lupton, 2016). There wouldn't be "raw data," but rather data that are always already cooked to provide the basis for a rhetoric or action determined in a interested manner, which means that they are always inscribed with a series of expectations and purposes, interpretative frameworks and normativities, privileging and marginalizing certain ontologies over others in the process (Boyd and Crawford, 2012; Gitelman, 2013; van Dijck, 2014). In this way, quantification involves an operation that politically and ethically impacts on the ways of knowing, governing and practice power in urban space.

3 The info-glut and the struggle between digital quantification regimes

Beyond these problematizations, it is necessary to consider that the extraordinary production of data also has made evident an excess of information that is increasingly difficult to process and manage, which Andrejevic (2013) has called the infoglut. The digital has increasingly made us aware of this excess and the impossibility of fully absorbing the vast amount of information that is available in our time. In this regard, given the multiple recording and measurement systems that function in parallel to one another in the city, it is increasingly important to manage techniques, algorithms and analytics that allow us to identify the most "representative," "valid" or "valuable" records for decision-making. The multiplicity of data collection technologies in the city thus do not necessarily lead to smarter and more precise decisions, but could also increase the sources of uncertainty and difficulty, forcing us to choose among many "data doubles" of the cities. As a result, the various sensors, databases and analytics available to quantify similar phenomena increasingly enter into competition with one another. It becomes more and more difficult to convince key stakeholders (companies, public institutions, etc.) that data are "important", "valuable" or "true" and how to process them and visualize them in order to obtain their promised "hidden value." This is why data-brokers seek out different channels for positioning themselves and gaining legitimacy within this smart or data-driven urbanism.

In this paper, we argue that the proliferation of modes of digitally recording and tracing the life of individuals, spaces and organizations has led to the simultaneous emergence of various records of similar social dynamics, increasing the plurality of existing quantification regimes. As Deborah Lupton (2016) has said, when developing a sociology of self-tracking, there are diverse ways of quantifying daily activities that would range from commercial exploitation to individual self-knowledge. This suggests that we cannot take as a given a sort of singular and homogeneous "datafication" process. Instead we must start to consider the idea that quantification processes can present multiple purposes and meanings which can only be addressed on the basis of their particular contexts of realization (Espeland and Stevens, 2008). To that end, we propose to start exploring in the multiple digital quantification regimes that run parallel to one another in contemporary societies, presenting varied directions and modes of quantifying social life. We must begin to study

the various assumptions, rationalities and scripts that these regimes establish in their diverse spheres of action and designs (Akrich, 1992). Each digital quantification regime is pushed to differentiate itself and present a special configuration, valorisation and justification for the data that they gather, which makes it important to explore how the spokespeople for these regimes (data brokers, designers, engineers and others) perform their sensors, analytics, algorithms and data under specific goals and driving principles, define special types of "users" or "clients" and promote particular visions of the city and its government. Establishing public-private agreements with municipalities or ministries, selling data to third parties and/or promoting the use of data for social changes are arduous achievements that involve a material and discursive effort to persuade relevant actors so that certain digital quantification regimes gain value and can position themselves over other pre-existing sources of quantification. This work of justification has not been examined in the literature and may be more difficult and complex than the data production process itself.

4 Digital quantification regimes of cycling mobility

In order to explore this phenomenon, over the past few years we have been studying cases on digital quantification of urban cycling. Thanks to the benefits for health and the environment and the reduction of urban congestion, bicycle use has been characterized as a "green" and "sustainable" form of mobility over the past few decades that is highly valued by cities around the world. Under this trend, urban cycling has been increasingly quantified, monitored and augmented by various sensors and self-tracking apps included in smart cities projects (see Fundación Telefónica, 2011; Viechnicki et al. 2015). However, in spite of the growing digital device and analytics industry for urban cycling, there are few studies that explore the implications of the intersection of smart devices, cyclists, data and cycling practices (Tironi and Valderrama, 2017; Barratt, 2016; Sumartojo et al. 2016; Taylor, 2016). Moreover, there is hardly any literature that explores how these new cycling tracking technologies are designed and programmed to guide decision-making processes for topics related to urban planning and government (Le Dantec et al., 2015; Powell, 2014).

In this paper, we analyse and compare the development of two digital quantification regimes of urban cycling in the city of Santiago, Chile: the RUBI device and the KAPPO smartphone app. These cases will reveal how modes of quantifying and knowing the urban through the digital are being promoted by experiments, bottom-up initiatives and start-ups based on the imaginary of smart urbanism. As we will see, both regimes openly seek to allow public officials to make better and data-driven decisions about infrastructure planning and construction for cyclists. However, they present different stories and specificities that go beyond the chosen digital technology. They establish different ways of justifying their use, positioning themselves above the other quantification regimes in the market and legitimating their data as the best for urban planning decision-making.

We conducted semi-structured in-depth interviews with the spokespeople and creators of these tracking devices, ethnographic visits to the places in which the sensor and app were designed and produced and events linked to the initiatives, and a secondary source review that included videos, news coverage, websites and official documents of the two technologies. In this paper, we will focus on the material technologies (inputs, interfaces, designs, development processes, operation and maintenance of these regimes) and narrative technologies (discourses, presentations, rhetoric and pitches to make themselves known and convince specific stakeholders) that these digital quantification regimes deploy to achieve a valorization and capitalization of their data and promote a "data-driven change" in urban planning and government.

4.1 RUBI: "Let the bikes speak"

The first case analyzed is RUBI, which emerged in 2013 as part of the bottom-up project Stgo2020. Inspired by the idea of smart cities, this project promoted that urban cyclists' knowledge and practices must be incorporated into urban planning of Santiago because they are most familiar with the problems and needs of cycling infrastructure. With this goal in mind, Sebastián, a young engineering student, developed a small prototype for self-tracking called Rubi, the Urban Bike

Tracker, as his undergraduate thesis. This allowed him to record the routes taken by each cyclist in a georeferenced database that was later processed on a web platform (RubiApp) to obtain metrics and visualizations of the user's activity.

RUBI gathered data from over 100 volunteer cyclists, and the information was aggregated to generate graphs, tables and heat maps on their routes. This information was shared with the Transportation Office, hoping that public officials could make smarter decisions about future cycling lanes using more data. But the RUBI device went beyond the thesis project focused on the city of Santiago. During 2016, it lost its bottom-up nature and was scaled up to other cities using new business formats. Sebastián founded the company RubiCo and reached agreements with local governments and international consulting agencies like the Inter-American Development Bank in the area of urban mobility. In the process, RUBI was offered as "a powerful and innovative way to analyze urban cycling" (https://rubico.org/) that challenges the status quo and allows cyclists to act as "co-designers" of their own city.

RUBI's entire development was based on a strongly scientific narrative due to its academic origin. The Stgo2020 project was born out of the assessment that there was a "lack of data" on the routes taken by cyclists in major cities. According to Sebastián, local governments have focused exclusively on gathering data through cyclists' origin-destination surveys. It was still unclear what happened in between those two points, which routes cyclists chose and how fast they traveled and there was no data on other variables that would be key for analyzing the demands and infrastructure needs of cyclists. Given that need, Sebastián decided to design a hardware that could quantify, capture and gather "precise", "objective" or "accurate" data on bicycle use that then could be used by public planners and officials to make decisions.

> *More and more people are cycling and are more interested in it. Like every new thing in this digital age, we need data to make decisions…. in order to be able to say that you made informed decisions, in order to have a justification in case you make a mistake, and that is very scientific, very healthy (Sebastián, interviewed on January 13, 2016).*

In this sense, the decision to design hardware was not random. For Sebastián the major problem of other available technologies on the cyclist tracking market like wearables or apps is that they require a human user with enough economic resources to have a smartphone or the appropriate data plan. The user also must be attentive enough to turn the self-tracking system on and off when necessary. Mistakes would muddy the sample and it would not be a "faithful reflection" of cyclists' mobility. The RUBI device would thus be differentiated from the apps and gain value by generating "a sample that is clean, pure and scientifically correct" (Sebastián, interviewed on January 13, 2016).

This scientific narrative marked the design and materiality of the RUBI. The first prototypes, which were made using candy boxes, were large, fragile and very much dependent on the human user in several respects. In fact, Sebastián playfully drew a human face on the first prototype. Several problems emerged with these first versions. The initial prototypes had an on/off switch, and users continually forgot to turn it on or off when necessary, reducing battery life and capturing erroneous data. In response, the engineer added a three-axis sensor to the device to measure acceleration so it could automatically turn on and off when the bike started to move and when the bike stopped for more than 35 seconds. This change completely marked the orientation of the device towards a design focused on the characteristics of the bike: "It is really oriented towards the bike. It doesn't have buttons because bikes don't have hands." (Sebastián, interviewed on January 13, 2016). In Sebastian's view, this change gave the device greater autonomy and intelligence. Second, the first versions of RUBI required the volunteer cyclists to upload the routes stored in the device's memory to the project platform. This was particularly problematic because some users did not know how to upload the information or lacked the adaptors or cables necessary to complete this step. The device was thus again redesigned so that the data would automatically be uploaded through a connection of an open Wi-Fi signal and then through the Bluetooth connection to the cell phone. Third, the

device underwent a literal “blackboxization.” Given that the first prototypes boasted visible LED circuits and lights, the likelihood that they might be stolen or get wet or suffer a bump were high. The size was thus reduced and the device was wrapped in an opaque, resistant box, ensuring as little interaction with the cyclist and their environment as possible. Making it smaller and more difficult to see made it even more important to make it more automated or “smarter” and increase its connection to the bike.

But it was not only the device design that underwent changes. The processing of the data also became more sophisticated. Cyclists’ routes were initially reviewed manually to identify any anomaly in the measurement, imagining mundane stories to make sense of errors. However, RubiCo subsequently developed an algorithm that weighs the properties of each route (such as speed, variability or distance) and automatically determines whether it is a bike trip, an “uncertain” trip or a trip completed using a different mode of transportation (for example, in a car), including only the first ones in the final sample. This algorithm also made it possible to identify poorly measured routes due to GPS problems or poor satellite calibration, increasing the “smartness” of the digital quantification regime in regard to justifying its sample as one that is as bias-free as possible.

In short, the development of RUBI clearly shows how the efforts in implementing a scientific narrative completely impacted the material design of the device used to quantify. RUBI went from being eye-catching, friendly and even “humanized” to opaque, automated and oriented towards the actions of the bike. For Sebastián, the human user is viewed as an agent that is prone to errors, forgetting and multiple contingencies that could contaminate the data so it became necessary to make the device could work autonomously. As such, giving the device “true intelligence” was a “solution” to these possible errors, and also added value and solidity to the regime compared to the competition. In contrast to other self-tracking technologies (apps, wearables, etc.), RUBI controlled the biases and noise of the sample on cyclists’ mobility, constituting RUBI interaction with the bike as an authentic “moving laboratory” -in Sebastian’s words- that would capture georeferenced data precisely and objectively. As a news piece about Stgo2020 exaggeratedly said, the RUBI device would allow bikes to speak for themselves (Araus, 2015), reducing cyclists’ interference in the measurement.

4.2 KAPPO: More than a game

The second case starts from a similar spirit of making Santiago more bicycle friendly, but uses different materialities and narratives. In early 2014, four Chilean entrepreneurs spent around three months developing a social game for smartphones called KAPPO that sought to have success similar to games like Candy Crush Saga or Angry Birds while increasing bike use in Chile. The app currently has over 50,000 active users in over 200 cities around the world, and Chile is home to the largest number of users.

Since its inception, KAPPO was structured around levels in which each trip on the bike wins the user rewards, virtual coins and experience points (XP). The highest level of the game is “Capo.” The app measures the routes using variables such as time, speed, weather and jumps during the trip, offering special bonuses if certain thresholds are crossed. It also offers a series of challenges and rankings for competing with friends or other KAPPO players. The developers had to read and learn about “gamification,” analyze the rules of competition and design a bonus structure that would be attractive enough to hook the user so that he or she would continue to play the game until the end.

Though this materiality of gamified design, KAPPO puts together a narrative focused on its ability to “provoke,” “motivate” or “create the habit” of regularly using a bicycle and improving the user’s health. KAPPO claims to help build a virtuous circle that will increase the number of cyclists in the streets of a certain city –for example, promising that if KAPPO is disseminated in Santiago de Chile, the city will have the same level of bike traffic as Holland or Denmark within five years. This narrative also identifies a specific target user. According to the spokesperson, Iván, the company was not looking to reach high performance cyclists who want to improve their times and be faster for

competitions. They would have created another type of app or a self-tracking wearable for the market, which would be quite costly and "not very accessible" in his opinion. KAPPO focused instead on "casual urban cyclists," people who were starting to try out the bike as a mode of transportation and who could encourage others to get on a bike. In order to reach this audience, the algorithms, reward structures and rankings in the app would be design to motivate them. For example, the rankings were configured so that all users reach the top spots, restarting the rankings each week and including parameters other than high speed or distance traveled. The company also sought to create a "non-competitive atmosphere" among users, but one that would motivate them enough so that the indecisive cyclist would begin to cycle regularly. "They will be motivated because it is designed for that" (Iván, interviewed on January 10, 2017).

But KAPPO has sought to position itself as "more than a game" for smartphones, seeking out different ways of capitalizing the app and the data generated through its use. For example, KAPPO developed "Health and Wellbeing Programs" for companies that promise to improve productivity and workers' mood and health by increasing bike use through the app. They also organize a competition held twice each year called "Cool Places to Bike" that involves varied organizations (universities, state entities, companies) that pay a subscription to KAPPO to see which organizations are most encouraging bike use among their members, using the app for the measurements. KAPPO have sought clients in local governments too, by the development of KAPPO Insights, a web platform which allows users to process and visualize anonymized routes tracked by the app to help public planners and officials to make decisions.

> *With this analytic platform, we provide more than hard data, right? We also process that information and give it to them in a fairly attractive visual format so that anyone, expert or not, can reach some conclusions based on the data they are looking at (Iván, interviewed on January 10, 2017).*

This narrative for capitalizing the analytics and databases is particularly relevant because it creates a contrast between traditional ways of conceiving of and planning the city and the "new" opportunities provided by KAPPO. For Iván, governments invest large sums of money in infrastructure for cyclists, but "the problem is that they do it thinking the way that they did 20 years ago" using fairly limited, expensive and involved traditional methods to gather data such as traffic studies or origin-destination surveys. Like Sebastián of RubiCo, for Ivan those methods could not quickly and cheaply capture the "real demand" for cycling infrastructure. In spite of this, they continue to be preferred to following a status quo in city planning, over valuing certain standards and requirements such as the procurement of representative samples for urban planning even though that implies an excessive disbursement of resources and can take a long time. For Iván, the city would be an entity that is constantly changing, which means that smart government should intervene and improve the urban space in micro way, in the short term and experimentally. The sample obtained by KAPPO presents important biases and lacks representativity, so instead of emphasizing the scientificist goals of the RUBI case, an important part of the narrative technology deployed by KAPPO is convincing the public officials on three aspects: an inexpensive method that captures data in real time and allows for participatory citizen involvement that encourages bicycle use. Citizens are again invoked as protagonists of the changes in the city:

> *If today you tell your community, 'Look, we are going to test new ways of building new things in which I will really know what you want using this application or whatever, so that it isn't difficult for you, I will start to obtain information and will improve my way of building things,' the citizen will say, 'They finally listened to me! I am finally part of the city planning process!' (Iván, interviewed on January 10, 2017).*

In sum, the KAPPO analytics and flow maps acquire value, accordingly to its spokesperson, because they would help make smarter decisions and modify the city in a more experimental, fast-paced manner guided by the "real" movements of cyclists gathered in a non-declarative way. KAPPO thus

does not seek to measure and quantify cyclists' mobility representatively like RUBI, but seeks to intervene directly by encouraging and causing greater bike use, presenting bicycle use increase statistics biannually in order to legitimate this digital quantification regime.

5 Conclusion

In the context of multiple regimes and modes of quantifying contemporary social life, it becomes important to note how new agents have entered the design of cities, agents that did not exist prior to the invasion of the urban space by digital technologies and that are capitalizing on the smart cities imaginary in particular ways. Here we focus on two regimes of digital quantification that are framed by the smart urbanism discourses and the promises to change how urban planning decisions are made.

Comparing these two regimes, it is possible to see that they are not simply different because of their interfaces (app and device), they design and develop particular material and narrative technologies (summarized in Table 1) in order to set themselves apart and defend their devices, databases and analytics as the most convenient, objective or adequate for knowing, planning and governing the city in a data-driven or smart way. These technologies become important because they justify the design of their inputs, target users, versions of the cities and the modes of quantifying it, and at the same time they allow the persuasion of important audiences and clients. We did not only find differences between the two regimes, but also the spokespeople for those regimes insisted that they are different also from other methods and quantification devices of the competition, both digital and analogue, invoking limitations and biases of them. In a word, capitalizing digital devices, analytics, algorithms and data requires a complex effort to justify and communicate them that should not be taken for granted and that goes beyond the production of data.

Table 1. Summary Table

	RUBI	KAPPO
Narrative technology	Achieve an objective representative sample	Encourage bike use and citizen involvement
Material technology	Automated device oriented towards bikes	Gamified app oriented towards casual urban users

The differences show that the promises of smart urbanism reviewed above do not necessarily follow a homogeneous and stable development over time. As we have seen, the KAPPO regime exacerbated areas such as the participatory or citizen nature under commercial logics from its inception. By contrast, the regime of RUBI started out emphasizing participatory and bottom-up elements but was decanted by more automated designs in which the agency of cyclists for obtaining objective and representative data was displaced (for a more in detail examination of the displacements occurred in the development of RUBI, see Tironi and Valderrama, 2017). As such, in both cases design plays a key role in how the cyclists are called on to participate in these initiatives but from different programs, either seeking to capture "pure" data or looking to "provoke" changes in user's habits. These discrepancies between the cases reveal the complexities of the collection, justification and capitalization of data in front of other competing quantification regimes. It becomes evident that the exaggerated promises of some authors about the "new" possibilities of gathering more objective, real-time and participatory data thanks to new digital technologies, tend to underestimate the practices, trajectories, economic interests and the multiple specificities of each digital quantification regime. This suggests the relevance of how the materialities and narratives of these kind of regimes are tested and adjusted to promote certain promises -instead of others- for data-driven decision-making.

But despite the discrepancies between the cases analysed, we note that both cases start from a relatively common socio-technical imaginary of data-driven city governance. From this imaginary, opening and sharing data on the mundane practice of riding a bicycle is invoked as a means of citizen involvement with the capacity to make the city smarter and more bike-friendly. However, this imaginary lead, first, to a reconfiguration of citizen participation towards more passive, invisible an unnoticed versions of participation that are free of true effort, in which this is seen as an exchange of data and is capitalized for the benefit of certain stakeholders with interests that go beyond democratic ends (Gabrys, 2014; 2016; Powell, 2014; Tenney and Sieber, 2016). Rather than turning cyclists into "co-designers" or "participants" in city planning, they act only as data producers without ever being informed of the real use of the data generated in a government decision or other use by third parties.

Second, urban planning using digital data also opens up the discussion of how notions of "expertise" and the "political" are developed. The digital quantification regimes analysed here do not seek to gain authority based on exclusive technical knowledge, as in other previous regimes. In fact, both spokespeople identified themselves as non-experts on urban transportation and planning. As we saw, through the development of the narrative and material technologies, these quantification regimes are seeking to overcome a distance between the "real" and "immediate" behaviour of cyclists and decision-makers. They believe and promote that "anyone", without necessarily being an expert on the topic, could make a "smart" decision in a technical manner or could be driven by the numbers of "real" citizens' behaviour and not by "hunches," ideological differences or party pressures. The political is enacted by these regimes as an obstacle, something that must be eradicated through the gathering and processing of data on people's behaviour. This politics of technifying decision-making is nothing new. As Morozov (2014) has written, the idea of an algorithmic regulation evokes the old technocratic utopia of politics without politics: "Disagreement and conflict, under this model, are seen as unfortunate byproducts of the analog era – to be solved through data collection – and not as inevitable results of economic or ideological conflicts." In this sense, smart urbanism would not only carry old and naive belief in an objectivity or immediacy of data, but also would create new distances (Porter, 1995) by promoting a depoliticization of urban planning and government in favour of more technocratic and automated decision-making systems (Vanolo, 2014). It becomes necessary to analyze in future studies how decision-makers are interpreting these digital quantification regimes and the actual role of "the political" in decision-making that these regimes seek to eradicate by promoting urban governance increasingly driven by automatisms and behavioural data.

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