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### *The Internet of Things in the Smart City: a discourse-analytic approach*

#### **1. Introduction**

The article sets out to provide a discourse-analytic account of the smart city discourse and the related concept of the Internet of Things (IoT), looking at how they are both constructed in media discourse in English. Currently “enjoying a rising discursive hegemony” (Wolfram 2012: 172), the smart city debate extends over the ambitious axiological map of the so-called Third Industrial Revolution, which is said to be characterised by a new convergence of energy and communication regimes (Rifkin 2010). Within this framework the smart city is not only associated with new manufacturing and smart appliances but also with sustainability, social inclusion and active citizenship.

Though not as new as one would imagine<sup>1</sup>, the Internet of Things is also currently catching public attention and is expanding, rapidly connecting the physical with the virtual world. To put it simply, the IoT describes a variety of objects that are able to interact with each other and cooperate with other objects through wireless and wired connections, thus collecting and harvesting big data and feeding them to other devices. Driving major changes across industries from marketing to renewable energy, the IoT scales up to include smart cities.

Since they heavily impact contemporary society, these two interconnected themes are featured prominently in the media, together with city planning and urban governance. Though the ‘smart city’ concept has rapidly moved to the centre of the debate on participatory urban governance, it still remains a controversial notion and a byword for urban utopias and dystopias in political discourse and the media. What is especially problematic in “smartmentality” (Vanolo 2014) is that current investigations of these two highly popular concepts tend to be heavily expert-dominated by ICT, software engineers and computer scientists, as well as by the commercial research and development agendas of technology mega-corporations to the detriment of a fuller understanding of the social, cultural and democratic phenomena involved in producing smart technologies and achieving informed participation. Despite the fact that the cultural changes are argued by smart city enthusiasts to be unprecedented, there is currently little crosstalk between ICT experts, designers and computer scientists on the one hand and social scientists and humanities researchers on the other. As a result, the risk is to focus on ICT design and underestimate the social, ecological and political dimensions of ‘smart’ urban development. In particular, the issue of who will control big data collected through connectivity is open, showing how the boundaries between private and public have become a site of constant negotiation and struggle, political as well as discursive (Thompson 2011).

#### **2. Methods and data set**

A cultural gap in user, discursive and policy research is perceivable, as the ‘smart city’ literature is dominated by high-level digital economy planning, software engineering design, mobilities and user research on small studies, urban planning documents, interface design and economic transformation frameworks. This is illuminating but leaves the field open for research projects which prioritise linguistic, discursive and social science approaches and are thus willing to investigate how knowledge in society is acquired, circulated and justified by means of language and discourse. In the new media age, besides, knowledge production should be measured not only against the relevance of the themes treated, but also against the accessibility and participatory nature of its communicative formats, especially in the public sector.

Moving from the awareness of the social construction of reality and the discursive turn in social science, the chosen methodology prioritises a discourse-analytic approach that addresses the making of urban imaginaries, knowing that “any given urban intervention is embedded in a linguistic representation (and at times a visual one)” (Jensen 2007: 218). In the effort to describe how ‘city smartness’ migrates from being the somewhat esoteric possession of expert communities to popularised knowledge shared by lay people, the news media are identified as the privileged context of analysis, since they are still the route epistemic communities must travel in order to raise public attention. Therefore, media representations of the smart city and the Internet of Things are taken as an opportunity to delve into the ways in which new knowledge is constructed, shared and then enacted in actual societal practices<sup>2</sup>.

To this purpose this article selects a global information hub – the Guardian Cities – the homonymous newspaper’s section, launched on 27 January 2014, which is “devoted to sharing ideas, reporting and discussions

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<sup>1</sup> “The smart city concept arguably dates back at least as far as the invention of automated traffic lights, which were first deployed in 1922 in Houston, Texas” (17.12.2014). The ‘Internet of Things’ was first coined by the British executive Kevin Ashton in 1999 to describe how Internet-connected devices would change our lives.

<sup>2</sup> “Although much if not most knowledge is acquired by interpersonal and public text and talk, even the more empirical (cognitive, social, cultural) approaches in epistemology have largely ignored the role of language and discourse in the acquisition, diffusion and justification of knowledge” (van Dijk 2014: 6).

about the future of cities around the world” (Guardian Cities on Facebook). Supported by the Rockefeller Foundation, it is among the media world’s leading publications on future-oriented urban policies<sup>3</sup>.

After collecting a thematically relevant textual selection from the *Guardian* website<sup>4</sup>, the relationship between language, discourse and policies is investigated. A main critical objective is to identify the discursive framing of the smart city and the Internet of Things, the actors or issues currently excluded from their formation, and the points for inclusive and democratic expansion of the current frame.

### 3. Text analysis

Against the backdrop of the ongoing ‘smart city’ debate and throughout the selection, the analysis focuses on multiple textual dimensions, from lexical items and discursive strategies to rhetorical stance. What is easily observable are recurrent patterns in figurative language. In particular, a main isotopy is that of the city as a living and rapidly growing organism and, at the same time, a computer in open air whereby, for example, neurons and the nervous system become “sensors”<sup>5</sup>. Several occurrences of this kind of metaphorical representation are summarised below.

(1) The city’s brain/a city dense with sensors, cameras and drones/a flow of circulation/a ‘smart city’ whose roads and water, waste and electricity systems are dense with electronic sensors/Cities are complex entities, like cells/They are made up of technical, social and physical systems that interact like a human body or an ecosystem/A beating heart and a robot brain.

What can be inferred from the above textual evidence is that the smart city concept tends to act as a buzzword, an empty, context-dependent signifier that may correlate positively with notions of sustainability, active citizenship and social inclusion and negatively with loss of democracy, surveillance, digital enslavement and marginalisation. We observe that this set of tensions is often expressed through recourse to antithesis.

(2) utopian/dystopian; sensible/sinister; order/urban chaos; responsive, networked/disconnected; secure/highly hackable; high-end infrastructure/social enclaves, social apartheid; smart cities/shadow cities, white elephant ghost towns.

The resulting stance is that of citizens being engaged with the smart city concept, but also critical and slightly fearful of it, an attitude that is also perceivable in the discussions on the IoT and its uses, especially as regards big data, too often seen as a good in itself. However, if the “data-driven city” working like an open-air computer ends up using predictions based on current consumption practices, the question is raised as to who controls the programming. This is the reason why, with its devices and systems that “talk” to each other, the IoT is tagged as a “technological juggernaut”, accused of “ubiquitous surveillance” and of being a “creepy”, “sinister” and ultimately “dystopian” “all-seeing Internet” that may threaten “privacy and security”<sup>6</sup>.

(3) As citizens stumble into a future where they will be walking around a city dense with sensors, cameras and drones tracking their every movement – even whether they are smiling [...] or feeling gloomy – there is a ticking time-bomb of arguments about surveillance and privacy (17.12.2014).

(4) Connected devices will likely creep into most businesses. [...] It could take on a dystopian shade (6.5.2015).

(5) Can your smart TV spy on you? [...] There are a wide variety of devices that can be used to listen in, and some compound devices (like cars) that have enough hardware to form a very effective surveillance suite all by themselves. [...] There’s no getting around the fundamental creepiness of the little pinhole cameras in new smart TVs (28.6.2016).

Visual regimes, however, change over history and the paradox of digital and data surveillance (“the invisible systems of data”) is that it is not immediately perceived by people<sup>7</sup>. Besides, we may assume that the IoT will not have a primarily normalising intent like Bentham’s panopticon, but definitely a marketing one: the “deluge of data won’t only be passed back and forth between objects but will most likely wind its way towards corporate and government reservoirs” (5.7.2016). “With every byte the invisible city swells” and “the swelling mass of big data” ultimately becomes a political issue<sup>8</sup>. Even if citizens succeed in monitoring that data will not be unduly collected and exploited, the IoT too often means the real-life issues of smart cities are being defined futuristically by

<sup>3</sup> On the day of its launch, the Guardian Cities editor Mike Herd announced that “we’re determined to reveal the fresh thinking, new technology and community initiatives that can make a real difference to the quality of all our urban lives” (27.1.2014).

<sup>4</sup> The textual selection was retrieved from the online edition of the *Guardian* from the launch of the Cities section to date, in particular, but not exclusively, from the Cities and Technology sections, since the two topics interweave with a number of cultural, political and economic issues and, therefore, are not limited to these dedicated sections. The selection comprises a heterogeneity of text types: comment articles, blog posts, stories, interviews, discussions and user feedback.

<sup>5</sup> That this set of representational strategies and the underlying imaginaries are derived from literature and film shows the constant circulation of discourses across different levels of culture (fiction, science, politics, media...).

<sup>6</sup> This collation of phrases, which can all be found in the textual selection, aims to convey the gist of the overriding media narrative.

<sup>7</sup> “In the panopticon the occupants are constantly aware of the threat of being watched – this is the whole point – but state surveillance on the internet is invisible; there is no looming tower, no dead-eye lens staring at you every time you enter a URL” (23.7.2015).

<sup>8</sup> “There are two cities. There’s a city of people and cars, and a city of ones and zeros. This second city, this invisible city, grows with every tap-in, opt-in, jump-in, check-in, sign-up and tick-off. Every added location, pinned photo, Uber ride, Twitter post, every Tinder date builds up the city’s roads, nodes and alleyways” (20.8.2015).

governments and computer scientists. An example of this kind is provided by the 'driverless car' or 'connected car', which is designed to solve traffic congestion.

(6) A woman drives to the outskirts of the city and steps directly on to a train; her electric car then drives itself off to park and recharge (17.12.2014).

Cultural adaptation issues like public reactions to the loss of the control fundamental to a person's civic sense – in this case that of 'driving responsibly' – are rarely canvassed, except in deterministic or governmental ways. Instead, "people are happier when they have control" (10.6.2014).

In other words, what is clearly perceivable in the smart city discourse is the existence of two narratives yet to be reconciled. On the one hand, we find technological determinism, which sounds threatening (examples 7, 8 and 9) and is often rephrased in evolutionary discourse, whereby the smart city becomes a self-organising system. On the other, emphasis is placed on social construction processes in technology appropriation and use on the other, which promise an even greater degree of citizen empowerment but need to be implemented with great vigour (examples 10 and 11).

(7) Who sits in the control room? (27.1.2014)

(8) the dumber the city, the better it works (10.6.2014).

(9) the wrong idea pitched in the wrong way to the wrong people (18.12.2014).

(10) The standout smart cities [...] did not leave the evolution of the city to the market (6.8.2015).

(11) City governments must stop being patsies to the IT giants and start to think, from first principles, what technology would look like if it served the people (25.10. 2015).

Since the risk is to focus on ICT and underestimate the social, ecological and political dimensions of smart urban development, this is why a new paradigm of governance is repeatedly invoked and one that will implement integration policies.

(12) As every part of traffic, water, energy and waste systems become direct generators of data they raise new questions of governance (6.10.2014).

(13) It's only appropriate to consider the ways in which [networked] technologies might inform decisions about urban land use, mobility and governance (22.12.2014).

(14) When you invest so much without thinking about services and low-cost housing and governance, then you will end up creating enclaves that keep out the poor (7.5.2015).

The discursive tension detectable between the goals of the technological agendas and the role of social and cultural urban practices explains why planning (and planners), two other keywords, are regarded with suspicion, as responsible for enforcing a normative approach that avoids genuine engagement.

(15) Town centres are increasingly looking to the shopping mall as the model for function, *planning* and management, the out-of-town retail complex standing as an idealised closed loop of contained, predictable systems (27.1.2014).

(16) a new social order that [...] takes *urban planning* dangerously away from the public domain (7.5.2015).

(17) Smart cities can provide *planning departments* a lot of very value information for better city living – but it could also be a big vector for fraud unless properly secured (13.5.2015).

Healthcare is also a key concern. The smart city may improve standards of living, facilitate the circulation of medical knowledge, provide better assistance to the most vulnerable citizens but it also evokes fears of eugenics and privacy breaches.

(18) Healthcare is one area where more data has the potential to save lives, by preventing disease, monitoring it and by analysing it to create new treatments. *However*, our health is also one of the most sensitive areas of our lives, so privacy and security will need a bit more preventative medicine first (6.5.2015).

Here, as in the two examples that follow, stance is realised by the use of contrastive sentence connectors (*but*, *however*). The underlying assumption seems to be that the chains of public goods, and how citizens perceive their value, are not sufficiently explored or protected.

(19) City authorities must overcome numerous hurdles as they seek to create these utopian smart cities of the future. *But* they have to ensure they don't accidentally create a dystopia in the process (20.8.2015).

(20) Technology is transforming global cities. *But* we need to think hard about who controls a system where all people and things are tracked, all of the time. [...] Smart cities represent a genuine and potentially massive new market for the private sector, breathing economic life into the old structures and patterns of cities. *But* if faced with somnolent and uninformed local governments, the results are going to be chaotic and unwieldy systems, and an erosion of democracy. (25.10.2015).

In all likelihood this same discursive tension is the main reason why "mainstream digital city research now usually includes at least some form of a 'disclaimer' in terms of technological determinism", though "its basic positive assumption that ICT usage will improve a city's performance in the policy areas addressed [...] has largely been maintained" (Wolfram 2010: 174). Such disclaimers are also received and rewritten in media discourse.

(21) Smart cities are about people not technology (3.8.2015).

(22) As ever with digital technology, there's an underlying rationality to lots of this. The IoT could make our lives easier and our societies more efficient (6.12.2015).

Quite understandably, user feedback mostly echoes all these concerns, reproducing the same kind of ideological deadlock. When you read comments carefully, however, you may also notice that some bright insights are suggested and later incorporated in the ongoing debate. In other words, user feedback vitally contributes to bringing back city smartness to politics and policies in less emotionally charged ways and through a bottom-up perspective.

(23) I like the idea of smart cities. Unfortunately they are all too often designed with only half a vision in mind, and leave out things like aesthetics, or efficiency, or built-in resilience (you mention a central command centre – what happens if that fails). I'm not convinced that people want the mess and stuff that goes along with "real life" (as if this were somehow made of separate material). I just don't think people have really had a viable shot at it yet (*name deleted*, 6 Dec 2012, 20:36).

Humour also works as a familiarising strategy, as in these few comments on the Internet of Things, the 'smart fridge' (examples 24 and 25) and the 'smart' heating system (26).

(24) I dread the day my fridge gets smart. It will probably report me to social services (*name deleted*, 6 May 2015, 11:16).

(25) I am pretty sure my smart fridge has been looking at hardcore pornography (*name deleted*, 6 May 2015, 13:25).

(26) I wondered why I was so cold. Turns out somebody's broke in and nicked my phone (*name deleted*, 6 May 2015, 12:08).

To sum up, the discursive struggle over city smartness, which involves municipalities and citizens, private companies and media, "is performative, because it shapes the imaginaries and practices of a myriad of actors concretely building the city" (Söderström et al. 2014: 307).

#### 4. Concluding remarks

As 'smart urbanism' has gained momentum in policy debates among experts, the popularisation of the smart city concept and the Internet of Things has equally obtained visibility in contemporary global media, which are main actors in knowledge dissemination among lay people. Nonetheless, an in-depth critique of the smart city as a disciplinary strategy is still in its infancy in discourse and media studies. Capturing a widespread unease with regard to smart city protocols and big data management, the research is inspired by an urgent epistemological need to ask questions about who controls the technological agendas for a population's cultural adaptation to 'smartness' and for what assumed outcomes.

The discourse analysis of the textual selection here investigated, taken from the Guardian Cities website, a digital platform committed to treating urban issues from a globalised perspective, shows that the smart city and the IoT still remain controversial notions in political discourse and the media, with competing attitudes polarised between uncritical enthusiasm on the one hand and skepticism, doubt and fear on the other. At the same time, an appreciable attempt to decouple the notion of city smartness from ICT surveillance of citizens' future needs is detectable, which also invokes more inclusive and flexible knowledge frameworks that find their articulation in and through discourse. In this evolving scenario in which, admittedly, citizens have so far had a limited understanding and experience of 'smartmentality', the impact of user feedback will hopefully gain strength and acquire greater incisiveness.

According to Carlo Ratti, director of the MIT Senseable City Lab in the US, the real novelty of the smart city concept is that new technologies are entering not just the physical but the public space. This new relationship invokes a collective redefinition of agency, governance and urban policy, that is, a reframed social contract. Digital media, which play a key role in turning new discourses and practices into socially shared knowledge, are main actors in the reshaping of society. If apparently "no one likes a city that's too smart" (Sennett 2012), then translating city smartness into meaningful policies and viable actions through citizen empowerment can be legitimately taken as a long-term political objective that the discourse of global media helps set in a pivotal position.

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