



Beyond techno-utopia and its discontents: On the role of utopianism and speculative fiction in shaping alternatives to the smart city imaginary

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ABSTRACT

In recent years, the 'smart city' has become established in policy and planning discourse, embedding visions of an urban future where ubiquitous technology offers efficient solutions to the pathologies of the contemporary city. In response, a rapidly growing social-scientific literature is critically exploring how the smart city imaginary (SCI) promotes 'techno-utopian' fantasies, ignoring the risks of a technologically determined future. In this paper we begin by considering SCI as emblematic of the colonization of contemporary (urban) futures by vested interests, arguing for the need for diverse and plural imaginaries and thus for a re-engagement of the social sciences. We explore how critical social scientific contributions to shaping futures might be deepened through further engagement with utopian theory and speculative fiction, two traditions of future-orientated thinking that seek to combine critique with constructive thinking about alternatives. We therefore contribute to '50 + 50 Theme 2: Framing Futures in 2068-the limits of and opportunities for futures research' by 1) extending critique of contemporary claims about (smart urban) futures, and; 2) exploring how utopianism and fiction can expand ways of thinking, imagining and knowing futures.

1. Introduction

Urban Futures have made a significant return to the top of policy agendas, academic and public debate in recent years. Whether spurred by hopeful declarations about the triumph of cities in a 'new urban age' or more critical diagnoses of the dynamics of 'planetary urbanization' (Brenner & Schmid, 2014), the futures of life on earth are now widely linked to the need to transition towards just and sustainable *urban* development in the Anthropocene (Elmqvist, 2018). There is a sense of urgency to this renewed concern too (UN-Habitat, 2017; WBGU, 2016). Our urban futures are literally being built in the here and now as today's actions and inactions lock us onto ever more unsustainable pathways, deepening inequalities and dangerously stretching environmental limits (Elmqvist, 2018; Simon, 2016).

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In response to these challenges, what Cugurullo (2018a) calls ‘Smart city imaginaries’ (hereafter: SCI²) have become established in policy and planning discourse, promising urban futures where ubiquitous technology offers efficient, big-data driven solutions to the pathologies of the contemporary city, ushering in a new era of productivity, competitiveness and sustainable growth (Ahvenniemi, Huovila, Pinto-Seppä, & Airaksinen, 2017; Kitchin, 2014). Emerging research is increasingly investigating the empirical realities of ‘smart’ developments as they move from slick corporate sales pitches to become new urban realities, highlighting the performative power of SCI – this is an imaginary being actively drawn upon to construct futures (Cowley, Joss, & Dayot, 2018; Cugurullo, 2017; Datta, 2015; Vanolo, 2016).

A rapidly growing social-scientific literature has emerged that critically questions both the promises made by advocates of SCI and the urban worlds they are producing; exploring how they promote ‘techno-utopian’ fantasies of wholly new or partially renovated cities that bear little resemblance to contemporary urban realities, overlook the contradictions of capitalist urbanization and ignore the risks of a technologically determined future in which political agency is marginalized (Kitchin, 2014; Urry, 2016; Vanolo, 2016; Watson, 2014; Wiig, 2015). This critical literature positions SCI as a paradigmatic example of the ‘colonizing of futures’ by market-orientated and technocratic ways of knowing and governing, perpetuating unsustainable patterns of uneven urban development.

Building on these lines of argument, in this paper we start from the position that the contemporary power of SCI also raises a series of important questions about the strengths and limitations of contemporary social scientific engagement with futures, in particular when faced with the need to move beyond a purely deconstructive critique of the dangers of techno-utopianism towards the exploration and construction of alternatives (Hollands, 2015; Leontidou, 2015; March, 2016; McFarlane & Söderström, 2017).

The relationship between critique and construction poses foundational challenges for futures studies, and social sciences more broadly. Tensions between understanding and imagining futures are deeply inscribed in dominant epistemologies that frequently neglect, or fail to explicate the normative commitments underpinning both the critique of prevailing approaches (Sayer, 2009) and construction of alternatives (Miller, 2007; Urry, 2016; Voros, 2001). However, if the search for an objective social science led away from the utopian desire to change the world that motivated much early social research (Adam, 2009), the recovery of such a desire seems essential to the transformative worldmaking needed at this historical juncture (Brown, 2015; Göpel, 2016; Vervoort, Bendor, Kelliher, Strik, & Helfgott, 2015), marked as it is by the crises of industrial civilization and technological/consumerist society, and a widespread search for transformation towards sustainable futures (Levitas, 2017; Miller, 2018b; Morgan, 2015). A social science that privileges (critical) understanding over imagining of futures (Futures Journal, 2018) may therefore risk limiting creativity in the framing of pressing contemporary problems and our responses to them (Vervoort et al., 2015).

Critique of SCI as ‘techno-utopian’ invokes long-standing cultural fears about the effects of industry/ technology on society which have generated a wide range of ‘images of the future’ that tend decisively towards the dystopian (Polak, 1973). In this paper we therefore seek to explore whether and how social scientific critique of the *techno-utopianism* of SCI might be deepened and extended through engagement with utopian theory and speculative fiction, two established alternatives to social-scientific traditions of futures thinking (Son, 2015, p. 122) which each bears a long association with the urban through representations of ideal (but also dystopian) cities (Abbott, 2016; Harvey, 2000).

Our approach and method is purposefully cross-disciplinary and qualitative. Drawing on these two traditions we seek to explore ways of moving beyond critique of the techno-utopianism of SCI; exploring the *heuristic* potential of utopianism as an analytical method for also engaging with the construction of alternatives (Abensour, 2008; Levitas, 2013). Through an analysis of 57 culturally significant fictional representations of technologically-driven futures, we examine how the urban worlds they construct both corroborate but also potentially deepen existing social scientific critique of SCI. Drawing on heuristic utopianism, we go on to argue that the fictional texts can also extend the social scientific critique of SCI by offering a series of insights into fugitive glimmers of hope from which (utopian) alternatives might be recovered.

Our aim is to reveal synergies across multiple perspectives on how we think about (smart) urban futures. In doing so, the paper makes three linked contributions: 1. *Critically*, we diagnose and seek to address limitations to critique of the techno-utopianism of SCI, arguing that this risks channeling prevailing anti-utopianism and, by failing to explore alternatives, reproduces significant limitations in social scientific engagement with futures; 2. *Substantively*, our review of fictional representations points to ways of deepening and expanding understandings of SCI through identification of what social science critique overlooks, including a focus on sources of hope for the construction of alternative futures by reconnecting to self, others and nature; 3. *Methodologically*, drawing on utopia as method and speculative fiction to move beyond critique of the techno-utopianism of SCI provides a powerful illustration of the ongoing need to pluralise and diversify ways of thinking and knowing, as a precondition for expanding our capacity to imagine and understand transformational futures.

The paper is structured as follows. After this introduction, in Section 2 we develop the theoretical and analytical lens’ through which we seek to explore and understand the limits of techno-utopian critique of SCI and how utopian theory, speculative fiction and future studies might be combined to transcend them. In Section 3 we review and map the main dimensions of social science critique of SCI as techno-utopian. In Section 4 we introduce our analysis of how technologically driven urban futures have been imagined in speculative fiction, bringing this into dialogue with the insights resulting from our analysis of the critique of SCI to consider the potential for moving beyond critique towards the construction of alternative future imaginaries. In Section 5 we return to the literature discussed in Section 2 to assess the value of utopia as method and speculative fiction as ways of both extending understanding of SCI and facilitating the (re)engagement of social sciences with futuring. Finally in Section 6 we conclude by discussing

² In what follows we view SCI as visions of future urban worlds where digital technologies are central to the governance and development of urban life. Imaginaries more generally are the ways in which different knowledge communities imagine and construct the world.

how these results enrich SCI critique and respond to the call of Anniversary ‘Theme 2’ for diversity and pluralism in how we think and know futures.

2. Utopia, fiction and the social sciences

2.1. Utopia as heuristic method: from anti-techno-utopianism to the education of desire

Son (2015), points to the utopian tradition as one of the earliest expressions of modern futures studies, developing normative and preferred narratives, capable of exploring our desires, hopes, and future possibilities. As Raven (2015) argues, however, utopianism has often been marginalized within mainstream futures studies. SCI are a recent expression of the long association between utopian thought and urban imaginaries (Cowley, 2016; Cugurullo, 2018b; Vanolo, 2016) drawing inevitable comparisons with, for example, the urban utopias of Ebenezer Howard, Le Corbusier and Frank Lloyd-Wright that shaped the planning of twentieth century cities (Datta, 2015; Fishman, 1982). However, descriptions of the smart city as ‘utopian’ typically invoke pejorative meanings of the term (Cugurullo, 2013, 2017; Greenfield, 2013; Söderström, Paasche, & Klauser, 2014; Wiig, 2015). This can connote a hopeless fantasy that will never be realized (e.g. Watson, 2014) or an ideological one that obscures the real interests shaping urban development (e.g. Wiig, 2015) and their actual implications for urban spaces (Cugurullo, 2017). In drawing on such negative connotations, scholarship evokes prevailing strands of anti-utopianism, the belief that the desire for utopia is itself dangerous, where the effort to realise a brave new world leads inexorably towards dystopian rather than utopian outcomes.

Descriptions of smart cities as ‘techno-utopian’ in particular invoke long-standing concerns about the hubris inherent in attempts to remake the world through science and technology (Kumar, 1987). For Lewis Mumford (Mumford, 1965), the dangers of the techno-utopia could be traced back to the very origins of both the city and the idea of utopia itself:

‘For it is at the very beginning of urban civilization that one encounters not only the archetypal form of the city as utopia but also another coordinate utopian institution essential to any system of communal regimentation: the machine. In that archaic constellation the notion of a world completely under scientific and technological control, the dominant utopian fantasy of our present age, first becomes evident.’

The symbiotic relationship between *genuine* urban utopias, and the fantastical (and for Mumford, distinctly dystopian) spectre of technological determinism represented by the machine, can therefore be considered central to the utopian tradition. However, a purely anti-utopian or dystopian reading of SCI risks reproducing what Baeten (2002, p. 148) diagnosed as the ‘political mediocrity’ of critical urban research which ‘ails to crystalize in a convincing political project that would provide a credible alternative for the poverty-generating capitalist shaping of today’s city’.

Capable of being read either as *ou-topia*, meaning no place, or *eu-topia*, good place, the meanings and possibilities of utopia have always been subject to what Miguel Abensour (2008, p. 412) calls a ‘war of language’. Belief in utopian transformations has long been countered by anti-utopian concerns that the desire for utopia itself is inherently flawed, leading not towards emancipation but the imposition of totalitarian blueprints. Utopia and dystopia have always therefore been intimately connected. Prevailing scepticism about the possibilities of utopian transformations have shaped a common-sense anti-utopianism that reflects wider questioning of faith in progress and societal capacity to intentionally shape better futures through the application of scientific reason. The dialectics of the linguistic war over utopia have therefore mirrored the negative dialectics of modernity itself (see also Levitas, 2013).

In response, Abensour (2008) argues for a deliberately agonistic conception of utopia as a heuristic for debating how we live and might live differently. Rather than offering programmatic visions of a transformed world, *heuristic* utopianism focuses instead on the ‘education of desire’, a phrase first used by Abensour in the 1970s, that points to a realm of social practices (literary, political or lived) where we might explore and learn about the possibility of alternative worlds.

Building on this insight and Bloch’s (1995) reading of the utopian traces immanent to all aspects of life, a significant strand of utopian theory has come to stress the function of utopia as a critical *method* for systematic critique and the education of desire in order to ‘open a way to aspiration, to ‘teach desire to desire, to desire better, to desire more, and above all to desire in a different way’ (Thompson, 1977, p796 citing Abensour).

Drawing on Abensour and Bloch, Ruth Levitas (2010, p. 542) argues utopianism can be a potent form of speculative sociological thought, capable of enabling both critical analysis of social desires and the reconstruction of alternatives:

‘... by thinking about utopia as a method, and specifically in thinking about it as a method rather than a goal, we can think more effectively about alternative futures... a capacity for the education of desire that only utopia can offer.’

Levitas (2017) therefore considers the ‘Utopian approach’, core to the pursuit of radical and transformative change, ‘allow[ing] us not only to imagine what an alternative society could look like, but...to imagine what it might feel like to inhabit it, thus giving a greater potential depth to our judgments about the good’.

Contemporary utopian theory therefore offers an analytical *method* for extending prevailing approaches to the analysis of urban imaginaries like the SCI, moving beyond common-sense anti-utopian critiques or denunciations of techno-dystopias, to explore the dialectics of utopia and dystopia, critique and construction. In the next section below, we introduce the value of speculative fiction to futures studies before going on to explore how fictional representations of future urban worlds, read through the lens of heuristic utopianism might inform and extend critical understanding of the SCI.

2.2. Fictional representations and the extension of social scientific critique

As SCI illustrate, the ways we think about futures are capable of framing and shaping the development of societies and settlements in their names. Since, following [Graham \(2016\)](#), then there can be no straightforward binary between the “fictional” and the “factual” city, urban scholars have long explored fictional and imaginary representations of the city and urban life and their roles in shaping urban change ([Abbott, 2016](#); [Bassett, Steinmueller & Voss, 2013](#); [Dunn, Cureton, & Pollastri, 2014](#)).

Fictional representations are equally widely acknowledged to have important roles in future studies, whether by conveying future ‘possibilities’ and ‘warning signals’ or embodying, imagining and symbolizing futures ([1993, Bergman, Karlsson, & Axelsson, 2010](#); [Miles, 1990](#); [Popper, 2009](#)) that can provide alternative views on how the future is being understood and framed ([Lawler, 1980](#); [Miles, 1990](#)). Fiction in future studies provides essential diversity and multidimensionality in ‘ways of knowing’, which are, by their very nature, ‘imaginary’ ([Stableford, Clute, & Nicholls, 1993](#)): ‘Sensing and making-sense of fictional worlds covers not just the physical or institutional contours of imagined tomorrows but also the emotions, colours, sounds, tastes, etc’ ([Miller, 2018b, p. 28](#)).

Fiction is also seen as a means to tap into often unconsciously held assumptions ([Miller, 2018a](#); [Slaughter, 1998](#)) and the ‘implicit understandings that lay beneath the surface of society, and even our scholarship’ ([Abbott, 2007, p. 123](#)). Fictional representations of future worlds may therefore illuminate not-yet imagined or realised possibilities and trajectories for change offering a means of interrogating existing social scientific imaginaries and prompting deeper reflection on the present.

In the rest of the paper we therefore go on to explore the potential benefits of bringing critical social scientific analysis of the techno-utopianism of SCI (Section 3) into conversation with utopianism and speculative fictional representations of techno-futures (Section 4): in doing so, we seek to assess the potential contribution that both might make towards a simultaneously critical *and* reconstructive reading of SCI, examining both the desires they project and how we might come to ‘desire in a different way’. We thus seek to illustrate the value of both utopia as method and speculative fiction in contributing to an expanded, multi-disciplinary approach to the education of desire for SCI (Section 5).

3. Social science critique of SCI: an overview and assessment

Our analysis of the social-scientific critique of the techno-utopianism of SCI is based on a systematic review and categorization of existing literature. To conduct the review we performed a search (first in 2017, followed by an update-end of 2018) through ‘science direct’ and ‘google scholar’ using a range of keywords: ‘smart city’, ‘smart urbanism’, and ‘smart planning’, which were then combined with qualifiers arising from the literature, including: ‘big data’, ‘technology/ ICT’, ‘urban development’. We identified and selected texts according to their relevance to the overall theme, including peer-reviewed articles, book chapters, and documents by major ICT companies. Additional texts were then identified by following up relevant references found within the original sample. In total we examined 42 sources. The range of Journals includes: *Cities*; *City*; *Dialogues in Human Geography*; *Environment and Planning A & D*; *Futures*; *GeoJournal*; *International journal of urban and regional research*; *Journal of Cleaner Production*; *Journal of Urban Technology*; *Nature*; *Urban Research and Practice*; *Urban Studies*. Content analysis was used to identify and define key categories through a simultaneous process of reviewing data, coding and analyzing ([Glaser & Strauss, 2017](#)).

The analysis of existing social scientific critique is presented in [Table 1](#): it reveals two broad dimensions of focus on the techno-utopianism of SCI, providing an overview of the categories identified in the SCI literature, including selected authors we consider representative of each constituent part and impact type.

First, critique can be organized into *three parts* considered constitutive of the techno-utopian approach to urban development and management:

- 1) *Technological solutionism, and the economization of urban life*: refers to configurations of technological with neoliberal visions of urban management. The Smart city, and the use of ICT, are not just answers to urban problems, but propose a new paradigm of urban development centered around core values of efficiency and productivity ([Caprotti, 2015](#); [Haklay, 2013](#)). Allied to the fetishisation of technology ([White, 2016](#)), is a hegemonic corporate strategy and rhetoric that presents the SCI as an ‘obligatory passage point’ for urban development ([Söderström et al., 2014](#)). This raises three core concerns about: the limits to technological solutionism and determinism ([Söderström et al., 2014](#); [White, 2016](#)); the prioritization of technology that ensures profit ([March, 2016](#)); and the smart city as an expression of entrepreneurial economic development strategies and neoliberalism ([Caprotti, 2015](#); [Greenfield, 2013](#); [Kitchin, 2014](#); [Wiig, 2016](#)).
- 2) *Quantitative universalism and reductionism* refers to socio-technical configurations that reduce urban phenomena into the purely quantitative ([Bell, 2013](#); [Haklay, 2013](#)). The SCI is built on the monitoring of urban systems through extensive networks of data collection, processed by algorithms and mathematical models ([Kitchin, 2014](#)). Through this approach the rich complexity of urban life is reduced to narrow quantitative and unitary languages, big data systems and management replace wider urban expertise, and technocratic management replaces democratic policy-making and politics ([Chandler, 2015](#); [Söderström et al., 2014](#)).
- 3) *The illusion of political neutrality of smart technology* refers to socio-political configurations of technocratic regimes in which ‘urban affairs are framed as an apolitical matter’ ([Söderström et al., 2014](#)). The smart model is promoted as optimizing urban management, through ‘standardized processes for decision-making’ ([Joss, 2016](#)) that prioritizes efficiency over political action, entrenching a belief that there are ‘no alternatives’ to techno-managerialist urban governance, where conflict and dissidence are neutralized (reinforcing a post-political condition) ([Vanolo, 2014](#)).

In addition to these three parts, critical scholarship also identifies and documents a range of significant social, political and

Table 1

Constituent Parts and Impact Categories of Social Science Critique of SCI as ‘Techno-utopian’.

3 Constituent Parts of Social Science Critique	Selected authors representing each constituent part	Detailed themes in Social Science Critique
1) Technological solutionism and the economization of urban life	(White, 2016); (Kitchin, 2014); (2016, Vanolo, 2014); (Söderström et al., 2014); (Hollands, 2008, 2015); (Wiig, 2016); (Caprotti, 2015); (Greenfield, 2013).	<ul style="list-style-type: none"> • Technological solutionism and determinism; • Prioritizing technology that ensures profit through efficiency gains; • Conflict of interests of private stakeholders; • Smart city as an expression of entrepreneurial economic development strategies and neoliberalism; • The problematic link between public and private interests.
2) The quantitative universalism and reductionism	(Haklay, 2013); (Bell, 2013); (Söderström et al., 2014); (Chandler, 2015); (Kitchin, 2014).	<ul style="list-style-type: none"> • Numerical, reductionist approach to urban life through unitary language; • Governing through code: big data systems and management replace knowledge; • Functionalist visions: technocratic management of the city (a machine) replaces policy-making and politics; • Epistemological and ontological issues associated with quantitative monitoring, ‘datafication’ and ‘evaluation of society’.
3) The illusion of political neutrality of smart technology	(Söderström et al., 2014); (Kitchin, 2014); (Vanolo, 2014); (Joss, 2016).	<ul style="list-style-type: none"> • Urban concerns as apolitical matters; • Prioritisation of efficient management and functionalism sees political action as impediment; • Post-political dimension of ‘smart’ suggests a ‘no alternatives’ scenario.
4 Impact categories associated with SCI	Selected authors representing each impact category	Details of each impact category in Social Science Critique
A) Impacts on privacy, citizenship and freedom	(Greenfield, 2013); (Townsend, 2013); (Kitchin, 2014); (Nissenbaum & Varnelis, 2012); (Cardullo & Kitchin, 2018); (Hollands, 2015); (Kitchin & Dodge, 2011).	<ul style="list-style-type: none"> • Power, control, surveillance issues; • Risk of individual rights violation (e.g. privacy issues); • Citizens play a subaltern role (no democratic participation); • Vulnerabilities of smart (e.g. cyber-security).
B) Inequality and marginalisation	(Hollands, 2008, 2015); (Grossi & Pianezzi, 2017) (Kitchin, 2014); (Peck, 2005); (Smith, 2005).	<ul style="list-style-type: none"> • Deepening social inequalities; • Ignoring social needs; • Marginalization resulting from the use of technology.
C) The “new” urban experience	(Sennett, 2012); (Bingham-Hall, 2013); (Bell, 2013); (Vanolo, 2016); (Gabrys, 2014); (Lindner, 2013).	<ul style="list-style-type: none"> • Loss of spontaneity: choices are previously determined (and ability to make sense out of the spatial experience is troubled); • A functional and reductionist view of humans and actions (e.g. digital-citizens; citizen-sensors); • Acceleration of urban lives.
D) Environmental costs of smart	(Cugurullo, 2013); (Ahvenniemi et al., 2017); (Hollands, 2008); (Williams, 2011) (Chancerel et al., 2015).	<ul style="list-style-type: none"> • Limited attention to sustainability concerns; • Environmental impacts of ICT’s development and implementation (‘Jevons Paradox’); • Pledging sustainability as marketing strategy.

environmental implications of SCI that our review organized into four ‘impact categories’:

A

A Technocracy versus Democracy - the functionalist city and its impacts: Pervasive use of technology in the smart city raises serious governance concerns. Big data collection and the so-called ‘internet of things’ promote technocratic and managerial approaches to urban governance, raising a range of issues related to power and control (Greenfield, 2013; Kitchin, 2014; Kitchin, Lauriault, & McArdle, 2015; Townsend, 2013; Vanolo, 2014). Joss (2016) argues this is a regressive return to a modernist rationalism, ‘where urban affairs are framed as an apolitical matter’ (Söderström et al., 2014, p. 317), democracy is subordinated to technical expertise and the governments and private corporations who control ubiquitous technology govern ‘by code’ (Söderström et al., 2014, p. 315). Within this managerial model, conflicts are already settled, citizens play a ‘subaltern role’ (Vanolo, 2016, p. 26) and there is no real democratic participation (Gabrys, 2014; Hollands, 2015; Joss, Cook, & Dayot, 2017; Morozov, 2014; Viitanen & Kingston, 2014). This leads to related concerns about privacy and the freedom of citizens in urban environment that are continually surveilled and tracked (Caprotti, 2015; Kitchin, 2014; Nissenbaum & Varnelis, 2012; Poole, 2014; Sennett, 2012).

B Inequality and functional differentiation: critique links extensive use of ICT to the risk of deepening inequalities and social divisions both between and within cities in so far as it may isolate ‘the unskilled and IT illiterate sections of the local poorer

population...' (Hollands, 2008, p. 312). Rather than raising standards of living for all urban dwellers, information technology has been shown to deepen social divisions inside the city (Grossi & Pianezzi, 2017; Kitchin, 2014).

- C *The 'new' urban experience*: the resultant urban experience of 'the overabundance of new techno-informational tools of surveillance, connection, mobility, and exchange has a deadening rather than liberating effect on everyday urban life' (Lindner, 2013) as citizens become mere 'sensing nodes' (Vanolo, 2016) or 'consumers of choices' (Sennett, 2012, p. 2). Reduced to a functional vision, as Sennett states the, 'smart city would (...) become a stupefying smart city' (Sennett, 2012, p. 1) and '...a powerful tool for the production of docile subjects' (Vanolo, 2014, p. 883).³
- D *Environmental costs of Smart*: techno-centric development paradigms are closely associated with themes of environmental crisis. Existing social scientific critique of the SCI questions the limited overall attention to sustainability questions within smart city thinking (Ahvenniemi et al., 2017). and points towards the significant contradictions that result from promoters simultaneously promising to reduce ecological impacts whilst creating new, resource intensive markets (Cugurullo, 2013; Ahvenniemi et al., 2017; Hollands, 2015). In this way, critique has centered around the ways SCI seek to transform sustainability into a 'new branch of capitalistic opportunity' (Hollands, 2008, p. 313) without acknowledging that strictly technology-driven transitions are not truly sustainable and that 'in an economy based on continuous growth rooted in technological progress, the opposite can be true' (Williams, 2011, p. 357).

This mapping of the social scientific literature provides an anatomy of the techno-utopian critique of SCI -outlining a range of important critical concerns and 'warnings' about the urban futures being created in its name. To explore concerns that a purely critical analysis of SCI as 'techno-utopian' may limit engagement with the exploration and construction of alternatives, we now seek to bring the social scientific imaginary of SCI into conversation with wider cultural representations of technologically driven urban futures. In doing so, we aim to explore ways of both deepening and extending existing critique of the SCI in order to illustrate the value of a more pluralist approach to knowledge creation, building on alternative traditions of future-orientated thought better attuned to combining critique and construction (Son, 2015).

4. Exploring Fictional representations of future urban worlds

To bring social scientific critique of the techno-utopianism of SCI into conversation with speculative fiction, we draw on a sample of 57 culturally significant fictional representations of future urban worlds arising from a database developed as part of the EU project FLAGSHIP⁴, which sought to explore fiction as an alternative source of imagined futures. Within the broad and prolific field of speculative representations of future worlds FLAGSHIP focused on work that has had a significant and lasting impact on the public imagination. A search on various online databases of film (IMDB, LUMIERE, Cineuropa and the National Film Preservation Board) and literature (librarything, goodreads, and isbnndb), led to the identification, classification and ranking of films and novels (hereafter texts⁵) about the future. The subsequent selection process involved the definition of indicators of quality (e.g. award nominations) and influence (number of editions and or languages of publication/ release), weighted to ensure some regional diversity and historical spread as well as a more qualitative appraisal of key themes, including urbanization.

The final selection included 37 films and 27 novels spread over 150 years, 57 of which referred to urban themes (see Table 2). Texts were then subject to a two-stage analysis involving a content analysis to identify relevant themes, and an interpretive analysis of key themes related to future urban worlds represented in the texts.⁶

Over the period selected, fictional representations of technologically enhanced urban worlds within mainly English language cultural settings frequently reflect two foundational dimensions of Mumford's 'machine' critique of techno-utopianism. The first of these is a strong strand of anti-urban sentiment, where cities and urban life in extreme, technologically advanced societies are frequently represented as sites of alienation, contrasted to the Arcadian communities that proliferate in bucolic rural idylls (Abbott, 2016; Williams, 1975).⁷ Most of the films and books in our corpus to some extent reflected classical anti-urban themes, where cities stand as symbols of oppressive governmental or corporate power that are both socially and environmentally alienating.

The second, as noted above, is a powerful dystopian impulse that tends to read future cities, and particularly the possibilities of technological transformation, in often profoundly pessimistic terms (Kumar, 1987). Whilst there are historical periods where certain types of utopian literature flourish (socialist utopias in the late nineteenth and early twentieth centuries, ecological and feminist utopias from the 1970s onwards), the relation between the production of utopias and dystopias is frequently symbiotic (and noted techno-utopian authors like H.G. Wells also wrote dystopias whilst more recent utopias often reflexively incorporate elements of anti-utopian critique to present more ambivalent and nuanced images of the future). Within our sample, the majority of the texts can be considered to offer distinctly pessimistic accounts of the effects of technological transformation whilst only 8 offer optimistic, or even

³ We note however that the debate about citizen's participation in 'smart' models is still subject to controversy among scholars: while some point to the importance of 'citizen-centric' approaches (e.g. Joss et al., 2017, referring to the 'British Smart City Standard'), others still identify 'pragmatic' and 'instrumental' discourses in what concerns citizens participation in public agendas (e.g. Cardullo & Kitchin, 2018).

⁴ https://cordis.europa.eu/project/rcn/108144_en.html

⁵ In keeping with practice in cultural studies, we use the term 'text' here to refer to both film and novels.

⁶ Further details of the methodology adopted for the sampling and content analysis can be found in Bina and colleagues (Bina et al., 2017).

⁷ Abbott (2016) suggests that science fiction as a genre has often reflected this wider cultural reflex, remaining surprisingly incurious about the urban settings it imagines, and often viewing the city as little more than a crude symbolic setting for a technologically transformed society, rather than a rich site of social exchange and difference in its own right.

Table 2

List of 64 analysed texts: films (F) and novels (N).

Novel/ Film	Title	Author	Original year	Country
N	Paris in the Twentieth Century	Jules Verne	1863	France
N	The Time Machine	H. G. Wells	1895	UK
F	Le tunnel sous La Manche	Georges Méliès	1907	France
N	The Machine Stops	E. M. Forster	1909	UK
F	La police en l'an 2000	no credits	1910	France
F	Verdens Undergang aka The End of the World	August Bloom	1916	Norway/Denmark
N	We	Yevgeny Zamyatin	1921	Russia
F	Metropolis	Fritz Lang	1926	Germany
N	Brave New World	Aldous Huxley	1932	UK
F	Things to come	William Cameron Menzies	1936	UK
N	1984	George Orwell	1949	UK
N	The Space Merchants	F. Pohl and C.M. Kornbluth	1953	USA
F	On the Beach	Stanley Kramer	1959	USA
N	A Clockwork Orange	Anthony Burgess	1962	UK
F	La Jetée	Chris Marker	1963	France
F	Alphaville	Jean-Luc Godard	1965	France
F	Fahrenheit 451	François Truffaut	1966	France
N	Stand on Zanzibar	John Brunner	1968	UK
N	Do Androids Dream of Electric Sheep? /Blade Runner	Philip K. Dick	1968	USA
N	The Lathe of Heaven	Ursula K. Le Guin	1971	USA
F	Solaris	Andrei Tarkovsky	1971	USSR
F	Soylent Green	Richard Fleischer	1973	USA
N	The Tomorrow File	Lawrence Sanders	1975	USA
N	Z for Zachariah	Robert C. O'Brien	1975	USA
F	Logan's Run	Michael Anderson	1976	USA
N	Ender's Game	Orson Scott Card	1977	USA
N	The Stand	Stephen King	1978	USA
F	Dawn of the Dead	George Romero	1978	USA
F	Mad Max	George Miller	1979	AUST
F	Blade Runner	Ridley Scott	1982	USA
N	Neuromancer	William Gibson	1984	USA
F	The Terminator	James Cameron	1984	USA
N	The Handmaid's Tale	Margaret Atwood	1985	Canada
F	Brazil	Terry Gilliam	1985	UK
F	RoboCop	Paul Verhoeven	1987	USA
F	Total Recall	Paul Verhoeven	1990	USA
N	The Giver	Lois Lowry	1993	USA
N	The Diamond Age, or A Young Lady's Illustrated Primer	Neal Stephenson	1995	USA
F	Twelve Monkeys	Terry Gilliam	1995	USA
F	Waterworld	Kevin Reynolds	1995	USA
N	Infinite Jest	David Foster Wallace	1996	USA
F	Escape from L.A.	John Carpenter	1996	USA
F	The Fifth Element	Luc Besson	1997	France
F	Gattaca	Andrew Niccol	1997	USA
F	Matrix	Lana e Andy Wachowski	1999	USA
N	Feed	M.T. Anderson	2002	USA
F	Minority Report	Steven Spielberg	2002	USA
F	28 days Later	Danny Boyle	2002	UK
F	Code 46	Michael Winterbottom	2003	UK
N	Cloud Atlas	David Mitchell	2004	UK
N	The Swarm	Frank Schätzing	2004	Germany
F	Appleseed	Shinji Aramaki	2004	JAP
F	The Day after Tomorrow	Roland Emmerich	2004	USA
N	Uglies	Scott Westerfeld	2005	USA
F	V for Vendetta	Lana e Andy Wachowski	2005	USA
N	The Road	Cormac McCarthy	2006	USA
F	Children of Men	Alfonso Cuarón	2006	UK/USA
F	Vexille	Fumihiko Sori	2007	JAP
N	The Windup Girl	Paolo Bacigalupi	2009	USA
F	District 9	Neill Blomkamp	2009	USA, NZ
F	Avatar	James Cameron	2009	USA
N	The Passage	Justin Cronin	2010	USA
F	Hunger Games	Gary Ross	2012	USA
F	Elysium	Neill Blomkamp	2013	USA

utopian, visions. In this regard, our corpus corresponds to powerful dimensions of a wider cultural imaginary recognized in literary and cultural theory, which is related in complex and broadly complementary ways to prevailing social scientific imaginaries.

4.1. Deepening critique of SCI through fiction

Fictional representations of the lived realities of a technologically transformed city have the potential to play a range of roles in relation to the existing social scientific critique of the techno-utopianism of smart cities, reinforcing ‘warning signals’ about SCI and enabling creative exploration of the implications of techno-utopian developmental pathways. Whilst social scientific critique often thinks about the ‘what’ and ‘how’ of smart urbanism, fictional representations are typically more concerned with the ‘who’, potentially bringing SCI critique ‘to life’ and allowing us to consider human life in extremely advanced technological environments.

Analysis of the 57 texts identified a range of themes and impact categories that can be brought into conversation with our map of critical social scientific engagement with SCI. Table 3 below, shows considerable overlap in the impact categories identified in social scientific critique of SCI and those present in fictional representations.

As presented in Section 3 above, existing social scientific critique of SCI portrays a technologically determined and therefore reductionist approach that ‘is blind’ to the political, social and human complexity that characterizes the city and the environmental consequences of the urban futures it imagines. Table 3 shows that this vision finds powerful parallels in fictional representations of the dystopian prospect of extreme techno-scientific urban societies. Fiction can therefore help us to visualize the resulting urban experience and its extreme consequences. In doing so, fictional representations of urban futures potentially offer a vivified portrait capable of bringing to life the troubling visions and warning signals suggested in critical social scientific research by depicting the ‘emotions, colours, sounds, tastes’ (Miller, 2018b, p. 28) of future urban worlds.

As an example of how fiction can bring SCI critique categories to life, we can look at: ‘1) Impacts on privacy, citizenship and freedom’ (Table 3). As social scientific literature stresses, pervasive use of technology in the smart city raises serious governance concerns, which are well illustrated by speculative fiction. The dystopian consequences of elite rule through advanced technology and the imposition of a strictly rational and controlled social order are pervasive features of the future urban worlds imagined in fiction. Fictional cities are frequently marked both by this functionalist vision and an obsession with the maintenance of (oppressive) order. The sacrifice of individual freedoms and privacy to technologies of surveillance as part of the imposition of totalitarian social controls is vividly depicted in 12 texts: for instance in *Soylent Green* (1973), *The Dawn of the Dead* (1978), *Brazil* (1985), *Twelve Monkeys* (1995), *Children of Men* (2006) or *Minority Report* (2002). In a slightly different way, Jean-Luc Godard’s 1965 film *Alphaville*, portrays a mechanical and computational order, mirrored in the uniform functionalism of the city, representing a technocratic regime where creativity, spontaneity and emotions have been submitted to a dream of complete logical ordering Table 3.

Table 3
Mapping of Speculative Fiction vivid illustrations of Social-scientific critique of SCI.

Impact categories of SCI	Impact categories in Smart Critique	Vivid illustrations by Speculative Fiction
1) Impacts on privacy, citizenship and freedom	<ul style="list-style-type: none"> ● Power, control, surveillance issues; ● Risk of individual rights violation (e.g. privacy issues); ● Citizens play a subaltern role (no democratic participation); ● Vulnerabilities of smart (e.g. cyber-security). 	<ul style="list-style-type: none"> ● Elite rule through advanced technology (<i>The Space Merchants</i>, 1953, <i>Uglies</i>, 2005, <i>Gattaca</i>, 1997); ● Individual freedoms and rights to privacy have been sacrificed (<i>Fahrenheit 451</i>, 1966; <i>Hunger Games</i>, 2012; <i>Minority Report</i>, 2002); ● Technologies of surveillance are ubiquitous (<i>Soylent Green</i>, 1973; <i>Dawn of the Dead</i>, 1978; <i>Twelve Monkeys</i>, 1995; <i>Children of Men</i>, 2006; <i>Minority Report</i>, 2002); ● Imposition of a strictly rational and controlled social order (<i>Alphaville</i>, 1965; <i>We</i>, 1921); ● Functionalist vision and an obsession with vigilance required to sustain order (<i>Minority Report</i>, 2002; <i>Fahrenheit 451</i>, 1966); ● Cyber-security and the threat of hacking (<i>Brazil</i>, 1985).
2) Inequality and marginalisation	<ul style="list-style-type: none"> ● Deepening social inequalities; ● Ignoring social needs; ● Marginalization through the use of technology. 	<ul style="list-style-type: none"> ● Technologically-enhanced urban settings become a visual representation of profound social differentiation (<i>Soylent Green</i>, 1973, <i>Brazil</i>, 1985, <i>Hunger Games</i>, 2012); ● Profound social inequalities are underpinned by ubiquitous and unequal access to technology (<i>Elysium</i>, 2013); ● Architectural expression of oppressive, highly-polarized and often vertically segregated urban forms (<i>Metropolis</i>, 1926; <i>Blade Runner</i>, 1982; <i>Matrix</i>, 1999); ● Social inequalities are made explicit through the use of physical barriers (<i>Soylent Green</i>, 1973; <i>Brazil</i>, 1985; <i>Hunger Games</i>, 2012; <i>Elysium</i>, 2013).
3) The “new” urban experience	<ul style="list-style-type: none"> ● Loss of spontaneity: choices are previously determined (and ability to make sense out of the spatial experience is troubled); ● A functional and reductionist view of human actions (e.g. digital-citizens; citizen-sensors); ● Acceleration of urban lives. 	<ul style="list-style-type: none"> ● Technocratic regimes where creativity, spontaneity and emotions have been submitted to complete logical ordering (<i>Alphaville</i>, 1965).

Below, however, rather than focusing on the role of fiction in *deepening* existing social scientific critique of the SCI, we seek to focus more on two further potential functions of fictional texts for extending analysis of techno-utopian urban futures:

- 1 How fictional representations draw attention to potentially overlooked implications of the techno-utopianism of smart cities (Section 4.1);
- 2 How fictional representations understand potential sources of resistance or redemptive possibilities, pointing beyond critique towards the construction of alternatives (Section 4.2).

Our aim is therefore twofold. First, to explore how the themes and impact categories in our fictional corpus may provide novel insights that are absent, overlooked or not fully imagined in social scientific scrutiny of SCI. Second, to focus on the challenges of moving beyond critique of techno-utopianism by drawing on the *heuristic* potential of utopianism to consider how fictional representations can strengthen imagination and exploration of alternatives to techno-dystopian readings of SCI.

4.2. Uncovering underexplored implications of SCI techno-utopianism

In addition to an illustrative function, fictional representations of urban futures, as a ‘way of knowing’ the city, can also draw attention to aspects of the urban experience that existing critique has been less quick to capture or which extend beyond the speculative horizons of empirically-oriented social science (see Table 4). By way of illustration, in this section we explore how fiction might expand social scientific imaginaries of smart urban environments.

Within social science critique of SCI, information technology has been shown to deepen social divisions within the city: this is also a core theme in 11 of the fictional texts we studied, with technologically enhanced urban settings often becoming a visual representation of profound social differentiation. Some texts represent parts of cities purposely built to provide luxurious conditions, comfort and high-tech devices to an elite, while the majority lives in abandoned and poor neighborhoods (slums, underground spaces and/or underdeveloped areas). These features are frequently translated into what (Graham, 2016, p. 28) calls ‘vertical noir’ where profound social inequalities are underpinned by ubiquitous and unequal access to technology, frequently finding architectural expression in oppressive, highly-polarized and often vertically segregated urban forms. Fritz Lang’s *Metropolis* (1927) and Ridley Scott’s *Blade Runner* (1982) are archetypal examples of this aesthetic, reflecting the confrontation between ‘two opposing yet complementary worlds: the brain trust of the corporate state dominating from above, and the multiracial, multigenerational mob swarming below’ (Friedman, 1993).

‘Vertical noir’ is a core feature of 22 texts that depict extreme density or ‘total’ urban environments, raising significant concerns about the effects of extreme urbanization. Whilst often reflecting deep-seated cultural anti-urbanism, such depictions also explore the dystopian environmental consequences of techno-utopianism. Often working in the background, such settings are frequently central to the hostile, oppressive or absurd social systems in which action unfolds.

Extreme urban environments are also frequently products of fragilities created by human technological developments that have left societies reliant on overly complex systems, a central weakness and anxiety for contemporary societies in the Anthropocene (Homer-Dixon et al., 2015). This is most paradigmatically represented in depictions of cities under glass domes, cut off from their exterior whether to protect or contain their inhabitants from a hostile world (e.g. *Logan’s Run*, 1974; *Cloud Atlas*, 2004).

Our chosen fictional texts also consistently explore how the pervasive use of technology inside such totalizing urban environments contributes to the creation of oppressive spaces marked by the spectre of social collapse, the violation of individual freedoms, loss of rights and citizenship. Ultimately, the city becomes a space of social and subjective distress, promoting alienation and individual isolation, instead of participation and personal wellbeing (e.g. *Soylent Green*, 1973; *Alphaville*, 1965; *Blade Runner*, 1982; *Brazil*, 1985).

Extreme urban environments are frequently portrayed as degraded landscapes, a theme strongly represented in 14 texts, including cases where entire cities or urban areas are completely destroyed by natural or man-made disasters (*Waterworld*, 1995; *Escape from LA*, 1996; *Cloud Atlas*, 2015). In 15 texts, pollution is also a major issue: often as a result of the disruption of natural support systems due to extreme technological development (*The Machine Stops*, 1909; *Avatar*, 2009; *Stand on Zanzibar*, 1968), therefore people are frequently consigned to live in artificial or technologically controlled environments to sustain life, and access the most basic needs, such as light, air, and food (*Blade Runner*, 1982; *Brazil*, 1985; *Twelve Monkeys*, 1995; *The Fifth Element*, 1997; *Soylent Green*, 1973; *Elysium*, 2013).

Another aspect of the urban experience that we can observe in fiction concerns the consequences of the techno-scientific dream of humanity’s dominion over nature. 25 texts we analysed portrayed different aspects of the complex relationship between technology, humans and nature. 5 of those texts are marked by a complete absence of natural elements: in such cases humans are completely alienated from nature.

Echoing contemporary debates about the consequences of ‘planetary urbanization’ (Brenner & Schmid, 2014), a key theme found in seven texts is the total eclipse of the rural or natural world. *Soylent Green* (1973), *Brave New World* (1932) and Zamyatin’s *We* (1921) are good examples of this. In the latter, the barriers between the urban and the rural are presented as ironic symbols of the ‘triumphant human purpose’ over the wild and irrational dimensions of the natural world.

One of the earliest and most striking examples of these themes is E.M. Forster’s short story, *The Machine Stops*, where people live in an underground city-like network of private cells without direct contact with others or the open air. The machine provides for their every need for entirely sedentary lives, becoming the only source of meaning. Similar themes of alienation and vulnerability can be found in works as diverse as *Brave New World* (1932) or *The Matrix* (1999), frequently functioning as cautionary tales, warning of the

consequences of placing too much faith in technological development.

Reliant on artificial environments, the urban inhabitant becomes completely alienated from natural rhythms and cycles, their spatial and temporal dimensions. This profound sense of human fragility by virtue of alienation from the 'natural' explores and extends what Borgmann (2009) calls the 'device paradigm', where life comes to be lived instrumentally through the one-dimensional logics of technology.

Techno-centric development paradigms are intimately interlinked and closely associated with themes of environmental crisis, and collapse that have become increasingly culturally significant over recent decades. As described above, existing social-scientific critique focuses on the environmental impacts of SCI implementation and the (im)possibility of market-led sustainability transitions. Fictional texts, however, take these themes further, by exploring the extreme environmental consequences that may follow from the utopian desire to control and dominate nature through technological means. In addition, fiction helps expand and deepen concerns about the relationship between humans and extreme urban environments into imaginative reaches only suggested by existing social scientific critique. Asking what it means to be a human subject under extreme technological circumstances and portraying in *extremis* the physical, emotional, and existential dimensions of completely artificial and ubiquitous technological environments, contributes alternative ways of knowing the city. Identifying what we do not desire can be a first step towards rethinking our futures.

In this section we have explored the implications of smart urbanism in relation to fundamental features of modern techno-utopianism. In particular, we have argued that fictional representations powerfully explore the dystopian consequences of the dream of dominium over nature and the resultant production of extreme, oppressive and unstable environments, animating and extending a range of warnings that existing social scientific critique often touches upon but has not fully imagined or explored Table 4.

Table 4

Mapping of Speculative Fiction new insights compared with Social-scientific critique of SCI.

Impact categories of SCI	Impact categories in Smart Critique	New insights by Speculative Fiction
3) The "new" urban experience	<ul style="list-style-type: none"> ● Loss of spontaneity: choices are previously determined (and ability to make sense out of the spatial experience is troubled); ● A functional and reductionist view of human actions (e.g. digital-citizens; citizen-sensors); ● Acceleration of urban lives. 	<ul style="list-style-type: none"> ● Oppressive, extremely dense urban environments (Blade Runner, 1982; The Fifth Element, 1997); ● Existing barriers between the urban and the rural (Soylent Green, 1973); ● Eclipse of the rural space (Soylent Green, 1973; Brave New World, 1932; We, 1921); ● Promotion of alienation and individual isolation (Soylent Green, 1973; Alphaville, 1965; Blade Runner, 1982; Brazil, 1985).
4) Environmental costs of smart	<ul style="list-style-type: none"> ● Limited attention to sustainability concerns; ● Environmental impacts of ICT's development and implementation ('Jevons Paradox'); ● Pledging for sustainability as marketing strategy. 	<ul style="list-style-type: none"> ● Degraded landscapes: urban areas are destroyed by natural or man-made disasters (Waterworld, 1995; Escape from L.A., 1996; Cloud Atlas, 2004); ● Failure of wider natural support systems triggered by technological development (The Machine Stops, 1909; Avatar, 2009; Stand on Zanzibar, 1968); ● Complete absence of natural elements (entirely artificial or tech. controlled environments (Blade Runner, 1982; Brazil, 1985; Twelve Monkeys, 1995, The Fifth Element, 1997); ● Humans are alienated from nature (The Machine Stops, 1909).

4.3. Beyond existing critique: alternatives and redemptive possibilities

We have argued that analysis of fictional representations of technologically-driven urban futures can animate and expand social scientific critique of the SCI. Earlier, we also argued for the importance of moving beyond critique into a more constructive mode of engagement, seeking to explore how smart urbanism might be reworked to avoid the dystopian warnings posited by existing critique (March, 2016; McFarlane & Söderström, 2017).

At face value, the dominant pessimistic tone of much fiction, particularly since the First World War seems to reinforce not challenge the critical pessimism of contemporary urban scholarship. Moreover, of the 8 texts in our corpus that can be considered broadly utopian, several include powerfully critical treatments of scientific rationalism and techno-utopianism (e.g. Ursula Le Guin's 1971 novel *The Lathe of Heaven*).

Drawing on Abensour, Raymond Williams (1978) argued that systemic utopian thinking, the imagination of desirable alternative worlds, tends to arise either as dreams of escape from a hopeless situation or as expressions of the confidence of a rising class, projecting the futures it will create. In contrast he sees 'heuristic' utopianism and the education of desire, as a means of exploring responses that work against the grain of dominant social forces. For Williams neither systemic nor heuristic utopianism are necessarily superior, rather the function of each needs to be critically assessed to determine whether they are promoting *concrete* political possibilities or *abstract* escapism. In reading fictional texts this requires not just an assessment of particular texts or the *context* in which they were produced but also that in which they are being received and their meanings recovered, requiring a critical hermeneutic practice attuned to assessing expressions of desire and considering what might be learned from them.

Williams therefore argued for a reading of the 'grammar of desire', focusing attention on the complex dialectical relationship between the utopian and dystopian and suggesting the possibility of uncovering the fugitive glimmers of hope or redemptive values

that frequently reside in all dystopias. Below we therefore explore the multiple representations that can be found in our fictional texts of residual hopefulness working ‘against the grain’ of the dominant techno-utopian forces colonising the future.

Through this hermeneutic exercise we seek to contribute to the reworking and expansion of SCI by identifying signs of counter-discourses able to feed alternative images of the future where strictly techno-utopian views are balanced – if not replaced – by the purposeful pursuit of redemptive values. In what follows we focus on signs revolving around three dimensions of ‘connectedness’.

4.3.1. *The promise of connectedness: cultivating humane and collective relations*

Existing social scientific critique of smart urbanism portrays technologically determined and therefore reductionist approaches to the city that overlook urban human and social complexity, therefore creating the conditions for new forms of social control, increased social inequality and marginalization (Grossi and Pianezzi, 2017; Hollands, 2008; Kitchin, 2014). Speculative fiction also portrays stories of oppressive and unequal societies or situations of human desperation, caused by environmental disruption or social collapse; however, many of these texts also enable us to see glimpses of hope for change through the potential of cultivating humane and/or collective relations. In these situations what allows people to hope and provides the tools and strength to transcend present situations are human relationships and the possibility of rebuilding social bonds that restore human dignity. This can take multiple forms, whether the ability to connect with others in more intimate and emotional ways – through love, friendship, compassion, and trust (e.g. *The Road*, 2006; *Blade Runner*, 1982; *Stand on Zanzibar*, 1968; *On the Beach*, 1959; 1984, 1949), or through values of community building – like solidarity, cooperation, sense of justice and equality (e.g. *Elysium*, 2013; *Cloud Atlas*, 2004; *Hunger Games*, 2012; *Metropolis*, 1927).

4.3.2. *Re-socialization of technological society: promoting awareness and self-determination*

As discussed above, many fictional texts describe situations marked by manipulative and oppressive social control, often aggravated by technological means and leading to inhuman and alienating urban social configurations. The social science critique too focuses on the ‘deadening effects on everyday urban life’ (Lindner, 2013, p. 17) of the SCI and its functionalist vision that reduces citizens to ‘sensing nodes’ within the extensive apparatus of permanent vigilance and monitoring of ICT networks and ultimately leads to the production of ‘docile subjects’ (Vanolo, 2014). Beyond the dominant technocratic view of SCI emphasized by social science critique, however, speculative fiction also presents a common trope of individual and/or collective struggle to overturn techno-utopian control by regaining (self-) awareness about the conditions people are actually living in (*The Machine Stops*, 1909; *The Matrix*, 1999). These are situations in which the assumption of human emotional, conscious, and creative dimensions has a redemptive power both for individuals but also in pointing towards possibilities for social reconstruction beyond principles of strict logical validity, rational ordering, predictability, and social homogenization, towards more hopeful and desirable futures rooted in human dignity (e.g. *Uglies*, 2005; *The Handmaid’s Tale*, 1985; *Logan’s Run*, 1976; *Alphaville*, 1965; *We*, 1921; *V for Vendetta*, 2005). The Wachowski brothers *The Matrix*, is a good example of this, with fugitive glimmers of hope found by regaining self-awareness as a means of recovering human dignity and building a different community based on values of freedom, self-determination, and reflexivity.

4.3.3. *Humans and nature: from alienation to redemption*

If we zoom outwards, from the social and more intimate effects of socio-economic and political regimes depicted in fiction, we can find further seeds of hopefulness in the natural world. The possibility of rediscovering psychological and emotional connectedness to nature in the face of urban techno-alienation is frequently presented as a potential route to redemption. Whilst existing social critique warns exclusively about the environmental impacts of extensive use of ICT implementation for urban management (Chancerel, Marwede, Nissen, & Lang, 2015; Williams, 2011) and the primacy given to market strategies under the rhetoric of sustainability (Hollands, 2008), representations of human and non-human nature within speculative fiction are much wider and more complex. Although in some cases access to natural, living systems and wildlife acquires a symbolic dimension of power and privilege (*Blade Runner*, 1982; *The Space Merchants*, 1952) in many others remaining nature is represented as a source of redemption. Nature is frequently depicted with an aesthetic and spiritual dimension (e.g. *The Machine Stops*, 1919; *The Passage*, 2010; *Uglies*, 2005; *Soylent Green*, 1973) and qualities that empower people to move beyond alienated, technological ‘ways of understanding being’ (Hanks, 2009, p. 100). In these accounts, nature is valued not only as a provider of goods and services but as an end in itself, with intrinsic value, a source of hope, inspiration and creativity (*The Road*, 2006; *Twelve Monkeys*, 1995; *We*, 1921; *The Space Merchants*, 1952). In texts where social and physical contexts are characterised by control, distress and oppression, nature offers a space for community rebuilding, and is sometimes envisaged as a source of psychological harmony and individual freedom (e.g. *Cloud Atlas*, 2004; *Fahrenheit 451*, 1966; *28 days later*, 2002). The possibility of reconnecting with living systems that embody beauty and balance, belonging and interconnectedness, leads to an enriching of existence, both in terms of meaning and purpose (e.g. *Avatar*, 2009).

4.3.4. *Alternative futures: spaces of resilience and rebellion*

Despite their significant differences (e.g. *The Machine Stops*, 1919; *Fahrenheit 451*; *Uglies*; *Matrix*; *Cloud Atlas*; *Children of Men*, *The Handmaid’s Tale*; *Logan’s Run*), many of our texts are united by the sense that no social transformation is possible without: 1) connectedness with others, building more humane, collective relations; 2) connectedness with the self, promoting awareness, freedom and self-determination; and 3) connectedness with nature, recognising the aesthetic and spiritual value of living-systems and recovering a capacity for human embodied experience. These three forms of connectedness often combine in representations of

spaces and resilient communities rebelling against the forces of the established social order, held together by motivations, values and aspirations with transformational potential. These three forms of connectedness link to what Scharmer and Kaufer (2013) call the three divides - ecological, social, and spiritual-cultural -, which need to be faced to address the pathologies that characterize our current systems for inner, social and ecological transformation. In this regard, they provide resources for the reconstruction of dominant techno-imaginaries.

As such they represent glimpses of hope, counter-discourses that can expand our imagined futures and the terms of our relationship with urban landscapes beyond the constraints (and reductionist traits) of techno-utopian urban imaginaries. As examples they are, of course, far from an exhaustive catalogue of the representations of resistance, political, social, humane (and ecological) alternatives to techno-utopianism that exist in speculative fiction. For present purposes, however, they illustrate the ways in which fiction can frequently reflect prevailing dystopian orientations whilst still holding open and exploring the possibility of alternatives existing in and against hegemonic social relations. In this regard, fictional explorations have a sophisticated capacity to combine critique and construction in ways that critical social science often struggles to realise (e.g. Sayer, 2009; Urry, 2016).

As a result, fiction may provide a means not just of reinforcing the warning signals that dominate critical social scientific accounts of the SCI but can also supplement emerging imaginaries of resistance to techno-utopianism, exploring seeds of transformative social change and contributing powerfully to the education of desire for alternative ways of knowing, living and being.

5. Conclusion: beyond techno-utopia and its discontents

A rich body of social scientific critique warns that SCI, based on techno-utopian ways of knowing and governing, are colonizing contemporary futures in highly problematic ways: promoting technologically determined and therefore reductionist approaches to urban development that are blind to the political, social and environmental complexity that characterizes urban life (see Section 3 above). Given the imperatives of shaping more just and sustainable urban futures, this paper started from the premise that the power of SCI also, however, raises important questions about the limitations of critical social scientific engagement with futures and the need to move beyond critique to explore the construction of alternatives to dominant imaginaries.

In response, we have explored how social scientific critique of the techno-utopianism of SCI might be enriched and extended by engaging with two alternative traditions of future-orientated thinking: utopianism and speculative fiction. In doing so, the paper has made three linked contributions to understanding of the SCI, each of which has wider resonance for ongoing debates in Future Studies about the challenges of combining critique and construction and understanding with imagination, and the need to embrace more plural and diverse ways of knowing futures.

First of all, we have sought to critically engage with the critique of SCI by arguing that a purely deconstructive approach to the analysis of SCI as 'techno-utopian' risks reproducing both prevailing forms of anti-utopianism and long-standing limitations in mainstream social scientific approaches to futures. Through a deeper engagement with the utopian tradition, we have argued for a reading of urban imaginaries attentive to the necessity of both critique and construction in 'educating desire' for alternative urban futures. This entails a more dialectic, agonistic and reflexive reading of the utopianism and dystopianism inherent to all urban imaginaries (both dominant SCI and urban fictional representations), thus addressing the potential dangers that critical deconstruction may lead towards a purely anti-utopian, and therefore "politically mediocre" (Baeten, 2002) response to the SCI.

Secondly, our analysis, whilst far from comprehensive, has generated substantive empirical insights by illustrating how 57 fictional texts can both complement and supplement existing critical accounts of the techno-utopianism of SCIs in three key ways:

- i) by bringing to life key 'warning signals' in the social scientific literature including the dangers of technocratic regimes supplanting democracy; increasing inequality and social differentiation and the alienating effects of heightened surveillance and control on citizenship (see Section 4.1/Table 3).
- ii) by extending the imaginative horizons of empirical social science to explore the extreme implications of technologically determined urban futures (Section 4.2/Table 4). To illustrate this we have drawn attention to a range of fictional warnings about the effects of dense, vertical and oppressive urban environments, marked by decay and degradation and a profound alienation from nature. Our analysis suggests that future work on SCI critique might productively seek to further explore the environmental dimensions of the SCI, and, following others including Abbott (2016) and Graham (2016) the value of engaging with imaginative projections of extreme urban environments.
- iii) Drawing on the idea that utopia can be mobilized as an heuristic method to "educate desire" by exploring the values and practices from which alternative, future possibilities might be imagined (Section 4.3). Challenging too literal a reading of predominantly dystopian fictional texts as symbols of despair, we have highlighted that it is possible to identify traces of hope and the seeds of alternative imaginaries within all 'social dreams' (e.g. Sargent, 2006; Urry, 2016). Extracting these possibilities in order to educate desire for alternative urban imaginaries requires the development of a careful, critical reading practice attentive to the 'grammars of desire' expressed in fictional texts. To illustrate this we identified the persistent presence in fictional texts of redemptive qualities related to three forms of connectedness: to others, to self and to nature. We have argued that these heuristic insights can be a powerful means of stimulating debate and imagining alternatives to the dominant forces of capitalist techno-rationalism shaping SCI.

Thirdly, our analysis of fictional representations of future urban worlds illustrates the value of expanding dominant disciplinary approaches to the study of urban futures, our approach therefore generates methodological insights which support calls to embrace more plural and diverse ways of knowing futures. This does not entail a naïve call to embrace the speculative 'facts' generated in

fiction but instead requires a hermeneutic practice attentive to the ways in which fiction can ‘educate desire’, contributing to the expansion of prevailing urban imaginaries. Social scientific worldviews, fictional representations and processes of socio-technological change like urbanisation, do not develop in isolation from one another, and are always linked by complex, mediated relations (cf. Bloch, 1995; Sargent, 2006). Despite such connections, however, increasing disciplinary specialization still too often leads mainstream social scientific scholarship to close itself off from the possibilities of inter- and trans- disciplinary knowledge production (Klein, 2004; Polk, 2015).

Whilst fiction does not offer a better way of knowing the future than critical social science, we have illustrated how imaginative representations of extreme technologically-driven urban transformations can contribute to social scientific understandings of the SCI that is currently reshaping urban environments around the world. Re-engaging social scientific scholarship with utopian traditions and the arts and humanities may therefore offer one productive route beyond anti-utopian critique of SCI in response to the urgent imperative to remake our urban futures in more just and sustainable ways.

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