

## Envisioning Urban Futures as Conversations to Inform Design and Research

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**Abstract**

Recognising that cities provide the context for, and are often the direct beneficiary of, much civil engineering design and construction, it is essential that the future aspirations of city stakeholders are understood, and accommodated where possible. Without this, engineering is likely to prove inefficient at best and potentially ineffective. Developing visions for future cities is essential for all urban design, engineering, and planning projects. However, there is a tendency for future visions to be produced in the later stages of research and design processes.

Moreover, future visions usually focus on communicating a selection of alternative and coherent scenarios, rather than the complexity of their formation and context.

This paper proposes that processes of envisioning urban futures can be designed as conversations among different actors. The resulting visions articulate the multiplicity of perspectives that emerge from such conversations, rather than presenting possible solutions. Drawing from research conducted as part of the Liveable Cities programme, alongside contributions from the Foresight Future of Cities project and Urban Living research, the paper will reflect on how participatory design and information visualisation methods can be adopted to engage participants in developing visions for future cities that articulate complexity and criticalities.

**Keywords chosen from ICE Publishing list**

Design methods & aids; Social impact; Town & city planning

## 1 Introduction

2 Developing visions of urban futures is an essential part of all urban design, engineering, and  
3 planning projects. All design activities, in fact, take place in what design historian Victor  
4 Margolin (2007) defines as “a dialectical space between the world that is and the world that  
5 could be”, with the ultimate aim of shaping this potential world through material and immaterial  
6 interventions. Engineers are trained to create predictions and projections, which seek to convey  
7 what the world might look like if the new intervention is in place, and, crucially, all behaviours  
8 stay the same. Yet, this latter point is important since in many situations behaviours change in  
9 direct response to the new intervention, for example a new road built to ease congestion may  
10 lead to an increase in traffic, but it is also useful to remind ourselves that people and indeed  
11 their behaviours also change over time. The role of visions as communication devices for future  
12 city interventions belies this inherent characteristic i.e. that they assume a constancy and  
13 predictability of behaviour. On the contrary, long-term visions that depict potential (but not  
14 necessarily probable) futures can bring about novel and radical ideas for how cities might  
15 develop. By escaping the trajectory set by trend analyses, such visions can challenge rational  
16 predictions.

17 Exploring and understanding possible scenarios for the far future of UK cities was at the core of  
18 the Foresight Future of Cities project (Gov.uk, 2013). More specifically, the report *A Visual*  
19 *History of the Future* (Dunn, Cureton & Pollastri, 2014) examined over a century of visions for  
20 urban futures, and identified patterns that have emerged and those visions for future cities that  
21 have endured. The report also demonstrated both the power and agency of different visions and  
22 also their relationship to the social, economic and cultural concerns of the era in which they  
23 were produced and to which they are inextricably bound.

24 Creating visions for urban futures has often been dismissed or viewed as an inconsequential  
25 activity. With the increasing complexity of urban environments it is, however, clear that there  
26 need to be better ways for understanding cities and the plurality of ideas and the various,  
27 sometimes competing, perspectives we have on them. It is here that the value of longer-term  
28 visions can be argued for. As Neuman and Hull (2009) state, "if we cannot imagine, then we  
29 cannot manage". The practices of conceptualisation, envisioning and performing urban futures  
30 is vital to our ability to deal with increasing urban complexity. So, whilst images that depict

31 visions for urban futures are crucial as they enable a future-orientated society to have a  
32 conversation across different communities and with the public, they may be less relevant in  
33 supporting the complex interrelationships of different actors that have to collaborate or contest  
34 across ideas that lead to the formation of such a vision. In *What is the Future?* John Urry  
35 explained that the various methods for envisaging futures, visions and the role of imagination  
36 can have powerful consequences and are a major way of bringing the state and civil society  
37 back into the collective dialogue about futures. Indeed, he concludes thus, "a planned future  
38 may not be possible, but a coordinated one may be the best show in town" (2016: 191). This is  
39 the important and typically overlooked value of visualising for positive change, by enabling  
40 engineers, planners, stakeholders and the public to develop suitable ideas to help guide the  
41 forces and complex situations of urban development and restructuring whilst keeping alternative  
42 options as open as possible. Ache (2017: 1) provides further emphasis, "vision-making  
43 processes become very important in such a context, in the best case creating open political  
44 horizons interested in becoming and the 'midwifing of futures'." Therefore, it is vital to shift the  
45 attention from the production of visions to an ongoing process of visualising, since this explicitly  
46 acknowledges that such processes deal with wicked problems and complex networks of  
47 heterogeneous actors, and are therefore far from straightforward. Furthermore, it is not only  
48 visions of futures, but also futures themselves that will not be homogeneously distributed.  
49 Multiple futures will coexist and –just like the present– will be experienced differently by  
50 communities and individuals (List, 2005; Sardar 2010; Savransky and Rosengarten 2017).  
51 Including multiple perspectives in processes of future visioning is therefore crucial not only to  
52 devise a wide range of possibilities, but also to explore the way in which different actors may  
53 cohabit the envisioned cities.

54 This paper proposes an approach to the design of processes of envisioning urban futures as  
55 conversations between multiple actors, and to the visualisations of the future scenarios  
56 emerging from such conversations as artefacts articulating multiple perspectives.

57

## 58 **2. Rethinking an approach: from 'visualisations' to 'visualising'**

59 Efforts to map the plurality and subjectivity of the city experience have proliferated in the fields  
60 of Art, Design, and Humanities since the 1950s. Such practices were largely inspired by several

61 contemporary cross-disciplinary studies and texts reflecting on the relationship between urban  
62 environment and the social practices, actions and emotions of its dwellers (e.g. Simmel, 1903;  
63 Chombart de Lauwe, 1957; Lynch, 1960; Jacobs, 1961).

64 Early and well-known examples of subjective city visualisations include the maps and visual  
65 essays based on personal impressions from city walks that have been developed within the  
66 Situationist movement (e.g. Ralph Rumney's *Psychogeographic Map of Venice* or Guy Debord's  
67 *The Naked City*, both 1957). These city maps were seen at the time as radical explicit attempts  
68 to disrupt conventional representation processes (Pinder 1996), with the ambition of rethinking  
69 urban planning and design disciplines (Debord 1981). This approach later inspired and  
70 influenced a wide range of psychogeographic practices. Most of these practices focus on  
71 visualising the collective and individual multi-sensorial experiences of cities, experimenting with  
72 collaborative processes, graphic means, and technologies (e.g La Pietra, 1977; Kate McLean's  
73 SmellMaps, 2017; Christian Nold's Biomapping, 2004). Processes of mapping the subjective  
74 experience of urban environments have also been utilised by activist groups, with the aim of  
75 unveiling and communicating through the map urban features of oppressions (Mogel and Bagat  
76 2008; Iconoclasistas, 2013).

77 While differing in their aims and objectives, what all of these examples share is a shift in focus  
78 from city visualisations as artefacts to processes of visualising. Such processes largely  
79 determine the characteristics of the visualisations, and are therefore usually presented explicitly  
80 within or alongside the artefact itself (see for example Iconoclasista's *Manual of Collective*  
81 *Mapping* (2013)).

82 Processes of representation play a particularly important role in visualisations that are created  
83 collectively, rather than individually. Here, design can play a significant role in enabling such  
84 processes through the design of spaces, generative tools, and methodologies to facilitate  
85 creative conversations between multiple actors presenting diverging perspectives (Di Salvo,  
86 2010; Sanders, 2000). Furthermore, visual design and information visualisation techniques can  
87 be adopted to represent such conversations visually, through graphic means that can capture  
88 and articulate their inherent pluralism.

89 However, while much has been written on ways of visualising the multiplicity of urban  
90 experiences, and visual methods for exploring and tackling complex issues of urban planning

91 have been developed (see for examples [gameforcities.com](http://gameforcities.com) or [Chora.org](http://Chora.org)), how to develop  
92 pluralistic visions of longer term, speculative futures is a much less explored topic. To be exact,  
93 while some examples can be found in contemporary and historical design practice (Pollastri et  
94 al., 2017), there are no established methodologies or tools that are directly transferable or  
95 applicable.

96 The following section presents an experiment in designing processes and artefacts for the  
97 pluralistic visualisation of possible urban futures.

98

### 99 **3. Envisioning urban futures of liveable cities: a design experiment**

100 The research presented in this paper was conducted as part of a larger interdisciplinary  
101 programme called Liveable Cities. Between 2012 and 2017 academics from a very wide range  
102 of disciplines from four UK universities (University of Birmingham, Lancaster University,  
103 University College London, and University of Southampton) combined to investigate methods of  
104 designing low carbon, resource secure, wellbeing-focussed UK cities. The objective of the  
105 programme was to devise tools and guidelines for policy makers and practitioners that would  
106 enable them to transform the engineering of cities. These tools and guidelines were to be  
107 informed by an in-depth analysis of indicators (or performance parameters) on how cities  
108 operate and perform in terms of their people, environment and governance, taking into account  
109 wellbeing and resource security (see Leach et al., 2017).

110 From the very early stages and throughout the duration of the programme, it became clear that  
111 the disciplinary and cultural diversity of Liveable Cities' researchers, investigators, and doctoral  
112 students was reflected in the pluralism of methods, epistemologies, and research directions that  
113 each team undertook. Within this complexity of identities and approaches, any attempt to reach  
114 consensus over a shared vision of what a *liveable* city would be appeared problematic. For this  
115 reason, rather than resolving this pluralism by a negotiated synthesis, dedicated Future  
116 Visioning research activities were planned specifically to articulate these controversies.

117 One such activity consisted of a series of Future Visioning workshops, in which experts and  
118 practitioners in various sectors were invited to discuss possible futures for UK cities through the  
119 co-creation of scenarios. The purpose of this workshop series was to further Liveable Cities'  
120 research on possible futures, by integrating it with sector-specific visions that could question

121 assumptions on what a desirable urban future might be. The objective of this research activity  
122 was to capture common issues and key differences between visions developed in the 9 Future  
123 Visions Workshops, each one involving between 8 and 24 participants from one of the following  
124 sectors:

- 125 • retail
- 126 • transport and mobility
- 127 • environmental and natural sciences
- 128 • heritage, culture, and archaeology,
- 129 • education,
- 130 • information technologies (IT)
- 131 • utilities
- 132 • ageing
- 133 • architecture and urbanism

134 The workshops took place between February 2014 and March 2015, although a series of pilot  
135 events to test and refine the methodology took place between November 2013 and January  
136 2014 (the design process of the workshop tools and methods is described in detail in Pollastri,  
137 2017).

138 Each workshop was to answer to a central question: “What would the future of your sector be in  
139 the city of 2065?” This was then further specified through three sub-questions to be investigated  
140 in each workshop:

- 141 • What are the trends in your sector? (How has your sector changed/how is it changing?  
142 How does this evolution change the city?)
- 143 • What are the radical changes that could happen in the future in your sector?
- 144 • What infrastructure is needed to support these changes? What will the city look like?

145 In order to explore the three areas covered by these questions (historical changes, future  
146 expectations, urban form and infrastructures) the workshop was divided into three parts and four  
147 activities:

- 148 • Introduction and warm up. The participants were asked to introduce themselves and  
149 think about what has significantly changed in their sector in the last 50 years.

- 150       • Imaginary futures. Two activities engaged participants working in pairs or groups of  
151 three and discussing and mapping fears and aspirations about possible futures.
- 152           ○ Negative scenarios. In this activity participants were asked to discuss the worst  
153 possible things that might happen in the future, and write their thoughts on  
154 sticky notes. At the end of this activity all of the sticky notes were collected in  
155 the “box of doom” and taken out of the room, to encourage participants to focus  
156 on constructive ideas.
- 157           ○ Imagining futures in the city. For this activity the team prepared a deck of  
158 “thinking cards”, each one presenting a future-focussed finding from Liveable  
159 Cities research (e.g. “artificial intelligence”, “smart environments”, “health and  
160 chronic diseases”, etc.) in a synthetic way. The cards were designed both to  
161 ground the conversations within the body of research already developed by  
162 Liveable Cities, and to help participants to think beyond their assumptions or  
163 expectations about the future. The cards were used during the workshop as a  
164 generative tool (Sanders, 2000) to facilitate and structure creative  
165 conversations about possible urban future: what will they look like, and how will  
166 people live in them? (A printable version of the cards can be downloaded at  
167 <http://liveablecities.org.uk/updates/future-city-visions-workshop-materials>).
- 168       • Designing the future city. Finally, participants were asked to design a future city (50  
169 years from now) from their professional perspective, bearing in mind the issues and  
170 ideas that emerged from discussions in previous activities. Depending on the number of  
171 participants, in each workshop the models of 1-3 cities were created and discussed by  
172 the whole group. These models were at the same time fictional plans and conceptual  
173 representations, used to describe the general vision of the city for the particular group,  
174 as well as its infrastructures, patterns of production and consumption, and the way in  
175 which people would live in it (Figure 1).



176

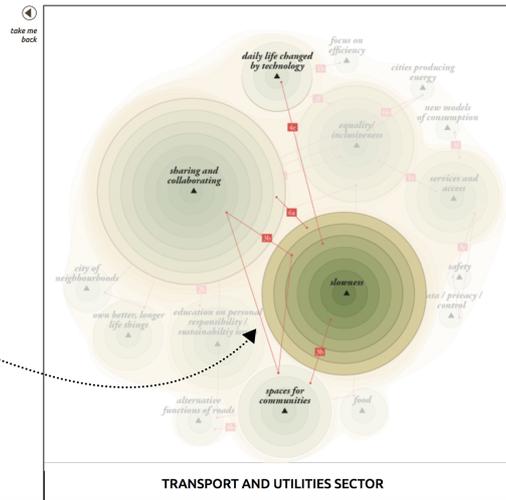
177 *Figure 1. Participants designing their imaginary future cities during two Future Visioning*  
178 *Workshops*

179

180 As the series of workshops progressed, it became clear to the team that both connections and  
181 contradictions in what people from different sectors would say and build could be identified.  
182 However, the series of reports that was produced as a first outcome of the project proved  
183 unsuitable to capture the richness of this information. In order to do this, a cartographic  
184 approach was chosen to visualise the individual visions as well as the overall emerging scenario  
185 simultaneously. The conversations and the models from each workshop were coded and  
186 analysed using a conventional approach to quantitative content analysis (Hsieh and Shannon,  
187 2005). The transcriptions and photographs that constituted the main documentation outputs  
188 from the workshops were carefully studied by the research team, who searched for themes and  
189 patterns that emerged from the text (see Figure 2).

*"This system for work makes us more resilient for climate change, if our travels are more localised, if our knowledge is more cloud-based."*

Transport and utility breakfast				
tot.	Topic	Comment	Group	Area
3				
4				
5		1a	a	L M C
6		6a	a	L M C
7		8a	a	L M C
8	8	6b	b	L M E C G
9		2b	b	L M E C G
10		3b	b	L M E C G
11		1d	d	L M E C G
12		1f	f	L M E C G
13		2a	a	L M C
14		5a	a	L M P C
15		6a	a	L M C
16	7	7a	a	L M E C
17		3b	b	L M E C
18		2d	d	L M E C
19		4e	e	L M C
20		4a	a	L M P C
21		1e	e	L M C
22	5	3e	e	L M P C G
23		3f	f	L M P C
24		4f	f	L M C
25		2b	b	L M E C G
26	4	8b	b	L M E C G



190

191 *Figure 2 This image shows an example of how conversations between participants in the*  
 192 *workshops have been coded and visualised in the Atlas. This example refers to the ‘Transport*  
 193 *and Utilities’ sector, and in particular to a comment that has been tagged as being about both*  
 194 *“slowness” and (not pictured) “daily life changed by technology”. The table also have some*  
 195 *additional coding, that refers to the areas of the comment, which in this case are mobilities, and*  
 196 *the environment. On the left, the image shows how this comment has been represented in the*  
 197 *interactive Atlas within the topic of “slowness”, and how the comments within this category are*  
 198 *linked to the topics of “daily life changed by technology”, but also (in other examples) “sharing*  
 199 *and collaborating” and “spaces for communities”.*

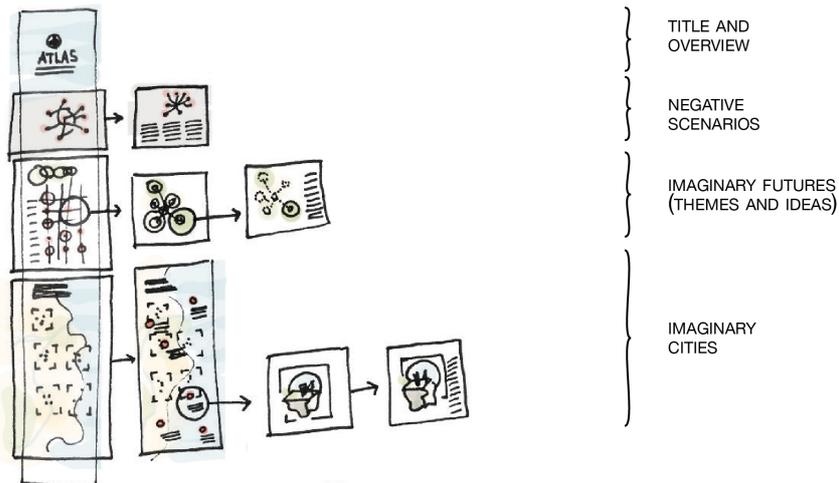
200

201 The analysed data was then collected into an atlas. In this context, an atlas is intended as a  
 202 cartographic communicative device that represents specific universes of objects as considered  
 203 systematically in their structures, parts, measures, shapes, and relations (Harley and  
 204 Woodward, 1987; Baule, 2006).

205 The Atlas of Imaginary Future Cities was designed as a communicative artefact to:

- 206 • Explore differences and similarities across issues discussed by different groups.
- 207 • Move through layers of granularity of the information: from a general overview, to a very  
 208 detailed one, in which it is possible to read the exact words of the participants.

209 Figure 3 illustrates the structure and mode of interaction of the Atlas.



*complexity of the information*

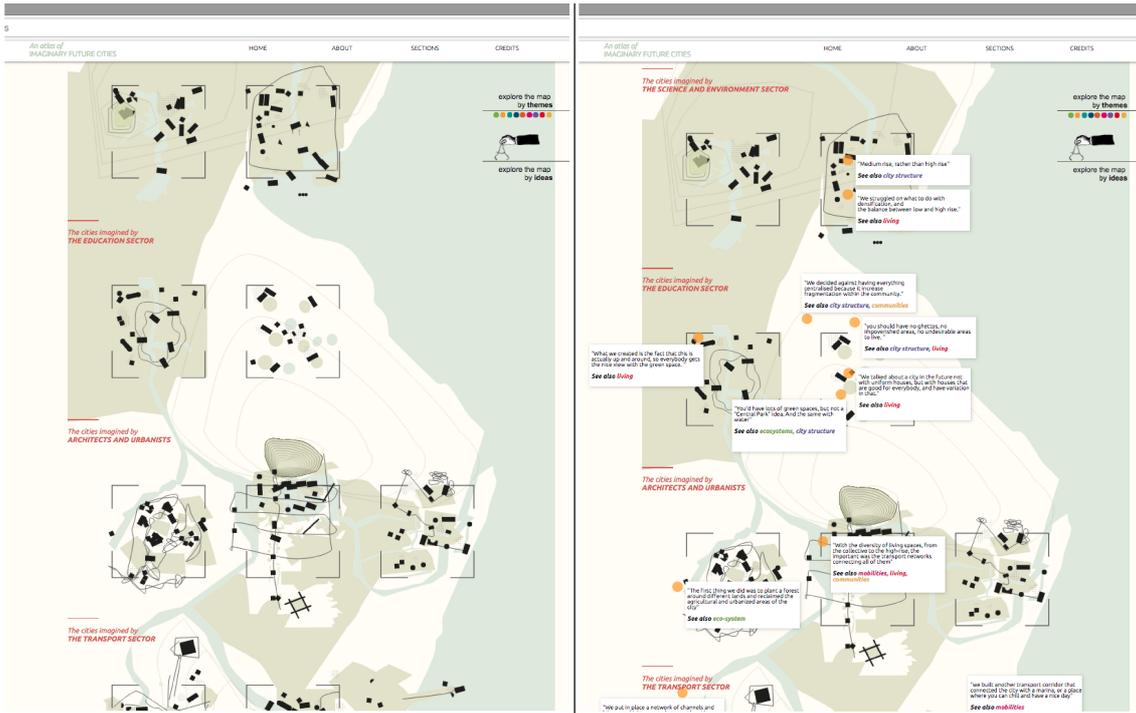
*engagement with the original data*

210

211 *Figure 3 A sketch of the structure of the Atlas. From the single home page, the user can explore*  
 212 *the maps and access visualisation of individual workshops. Different users may therefore wish*  
 213 *to simply have an overview of what emerged from the research, or delve into the complexity of*  
 214 *the information, examining in details the dataset that have been used to compile the Atlas.*

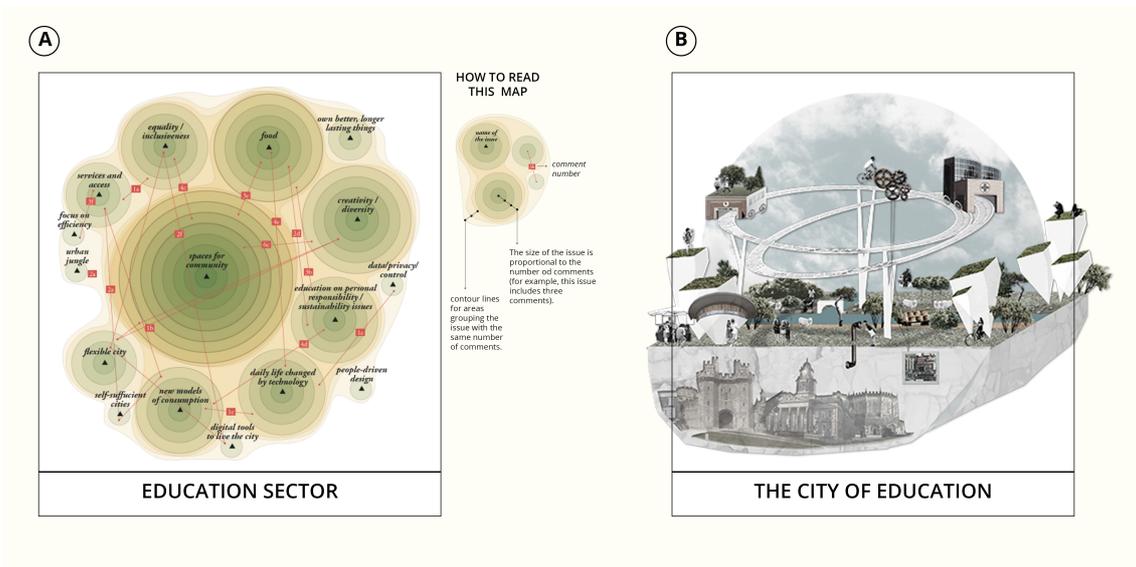
215

216 The Atlas is published online as a continuous page that presents the overarching  
 217 visions as emerged from the three future-focussed activities conducted in the workshop  
 218 (negative scenarios; imagining futures in the city; designing the future city). By  
 219 exploring the interactive maps in the Atlas' home page, users can examine the  
 220 networks and constellations representing the issues discussed across the workshops,  
 221 how different themes (e.g. 'energy', 'mobilities', etc.) are interpreted by the sectors, but  
 222 also what the most striking differences across visions and discussions are (Figure 4).  
 223 From here, users can access the individual visualisations of each activity, and explore  
 224 emerging topics and individual ideas within each workshop (Figure 5).



225

226 *Figure 4. A section of the Atlas representing all of the imaginary cities envisioned by*  
 227 *the different sectors in a single map, that can be navigated exploring how themes (such*  
 228 *as energies, mobilities, governance, etc.) are articulated.*



229

230 *Figure 5. A visualisation of the issues explored by the Education Sector during the*  
 231 *second part of the workshop (A), and (B) a graphic translation of the model that the*  
 232 *group built to describe their vision of the future city*

233

234 In this paper, the authors will not present the content of the visions that emerged from the  
235 Future Visioning Workshops, and that are visualised in the Atlas, a summary description of  
236 which is provided in a recently published article (Pollastri et al., 2017). What this paper will  
237 discuss in the next section is the role that visioning processes and artefacts designed as  
238 conversations can play in engineering and urban design research and practice.

#### 239 **4. Discussion**

##### 240 ***4.1 The value of this type of work in engineering programmes and urban design projects.***

241 The process of visualising described above presents neither extremes of plausibility nor  
242 extremes of aspirations. However, what it does achieve is of profound value to the design  
243 process. There is always a need for all relevant perspectives to be brought to bear on a design,  
244 and in doing so each perspective must be heard and considered equally. This balance of  
245 perspectives is vital, and is brought about here by involving them in the conversations. Once  
246 this has been done, then it is possible to test the ideas using extreme futures (Rogers et al.,  
247 2012; Rogers 2018).

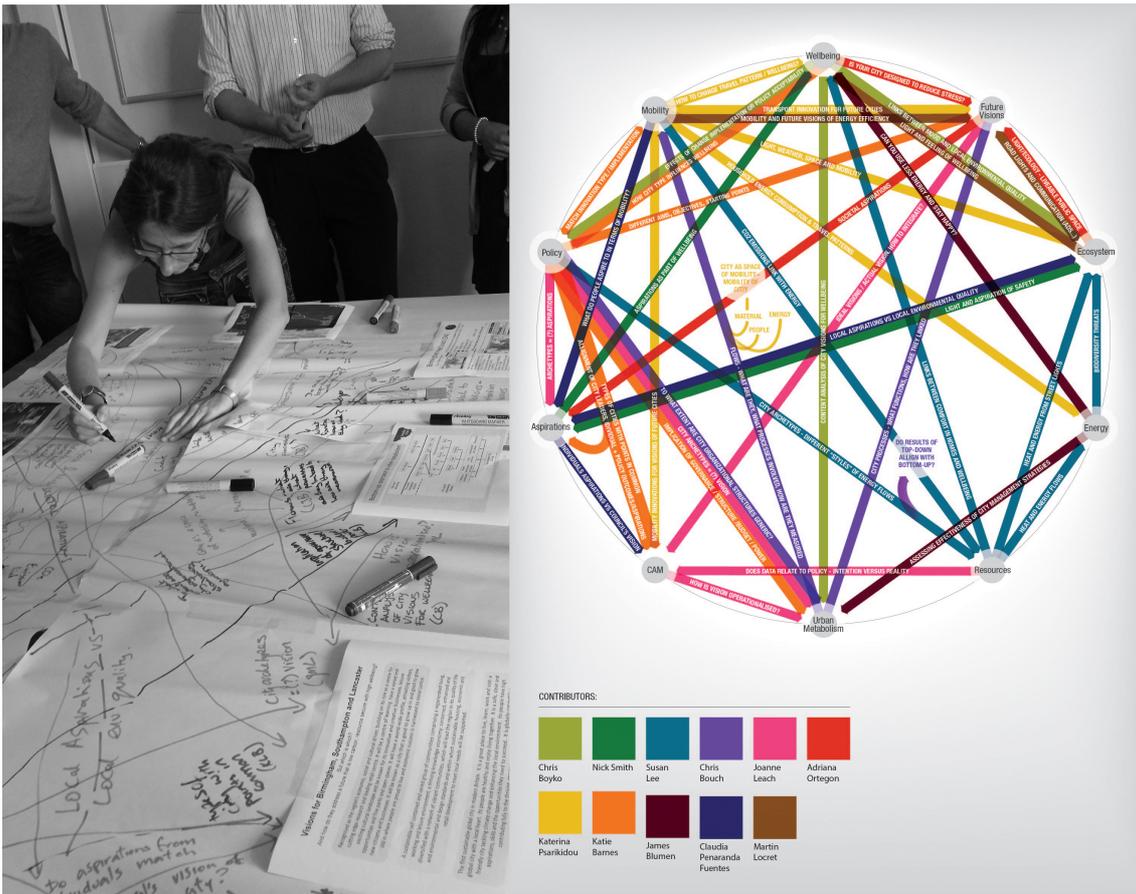
248 Urban design processes inevitably involve tensions and trade-offs (Lombardi et al. 2011), and  
249 the conversations advocated herein provide a means of resolving the tensions and trade-offs at  
250 the very earliest stage of the design process. This reflects the imperative of introducing such  
251 ideas, alongside the ideas of sustainability, resilience and liveability, before design decisions are  
252 made. It also reflects the imperative of avoiding 'lock out' that can be caused once design  
253 decisions have been made (Rogers et al., 2008), as well as the constraints that codes,  
254 standards and regulations bring to designs, and even well-intentioned design aids such as  
255 sustainability assessment frameworks (Leach et al., 2014).

256 The underlying principle of conversations is that they form a narrative, and this reflects the  
257 recommendation of the Future Urban Living Policy Commission (see Table 1) that citizens  
258 should collaborate with those who govern their city and with all other city stakeholders to create  
259 a city narrative that not only describes the city's history and its current context, but also sets out  
260 their visions for the future (Rogers et al., 2014). The visions thus arrived at will combine the  
261 imperatives that should underpin urban designs – sustainability, resilience, liveability,  
262 smartness, adaptability – and the ambitions and aspirations of all those in the city. This can be  
263 conceptualised as then setting the brief for urban design professionals. Any design brief can be

264 questioned and challenged, of course, yet in so doing the designs should become progressively  
265 more robust, and such iteration might be considered with those who hold the conversations  
266 described above. Circularity in the design processes at an early stage can only be of value if it  
267 can be achieved.

#### 268 ***4.2 The role that visualisation processes played in Liveable Cities.***

269 This paper presented one way in which collaborative visualisation processes were adopted in  
270 the Liveable Cities programme. On the whole, such processes played two key roles in the  
271 Liveable Cities project: (1) articulating the team's research areas, interests, and objectives; (2)  
272 providing an opportunity for critical reflection. Regarding the first point, when the entire team  
273 was assembled after the first year of the programme, researchers and stakeholders met and  
274 visually mapped their areas of interest and objectives within the broader project (Figure 6). This  
275 exercise helped to better articulate to each other what everybody's research interests were,  
276 over and above a verbal presentation, alongside the methods that were used and the case  
277 studies that would be undertaken. The process of visualising the whole project also helped the  
278 team to see where connections and potential synergies could happen. For example, the  
279 wellbeing and the ecosystem services groups saw that they could work together to develop a  
280 robust methodology for auditing the physical environment that involved collecting valuable data  
281 for both teams simultaneously.



282

283 *Figure 6. Liveable Cities team members mapping their research and their questions to each*  
 284 *others (left). On the right: a visualisation of research areas and interdependencies produced*  
 285 *after the workshop.*

286

287 Concerning the second point, the research team learned a valuable lesson about the perceived  
 288 finality of some visualisations within a larger process of visual conversations on urban futures. In  
 289 a meeting with the team's researchers and PhD students shortly after all of the future visions  
 290 workshops were completed, visualisations from the workshops were shown, and everybody was  
 291 invited to provide feedback. Specifically, the group was asked to modify, question and discuss  
 292 the visualisations from their research point of view. For example, if there was no mention of how  
 293 energy could be provided, the researchers and PhD students were encouraged to write the  
 294 question on the visualisation or draw something to symbolise the lack of energy provision. What  
 295 resulted was a debate between the team, but the visualisations were left untouched. In speaking  
 296 with the team, they felt that the visualisations looked too 'complete', and that adding to them in  
 297 any way would mean defacing the hard work that had gone into making them. These critical

298 comments helped to understand that visualisations may need to look less finished at different  
299 stages of the process in order to allow the diverse array of stakeholders who are involved in  
300 urban issues to poke, prod and interject with their thoughts and ideas.

301

### 302 ***4.3 Design implications***

303 The findings discussed so far have important implications for the design of processes, spaces,  
304 infrastructures, and artefacts for envisioning urban futures as conversations.

305 Firstly, if, as the literature and previous research suggest, it is crucial to involve diverse groups  
306 of actors (including citizens) in envisioning urban futures, then the process of designing such  
307 visions should start with the careful design of the infrastructures that make this involvement  
308 meaningful. This means, in practice, designing the strategies, platforms, tools, and spaces for  
309 exploring pluralistic futures (DiSalvo, 2010). In the experience presented here, this involved:

- 310 - setting up shared rules and a common language, by providing a context, tasks, and  
311 shared resources (such as the Thinking Cards) that support the involvement of all  
312 participants regardless of specific knowledge or professional background.
- 313 - promoting different ways of thinking, making, and expressing ideas to be employed at  
314 any time. In some cases, it was useful to encourage participants to work independently  
315 and at the same time on different aspects of the matter, to mitigate the power of  
316 dominant voices.
- 317 - Finding a balance between structuring and facilitating the conversation and allowing  
318 radical and imaginative ideas to emerge.

319 Another important phase in the design process of these type of visions is finding ways to  
320 visually articulate the outcomes of the conversations, to make them readable and usable in the  
321 research or design projects they are intended for. In practice, this means devising both methods  
322 for translating conversations into structured data, and graphic means to visualise such data.

323 Translating conversations into structured data to be visualised, like any act of translation, is not  
324 a neutral process. In conventional content analysis, categories are assigned by researchers  
325 studying a text, and therefore very much depend on the way the content is understood and  
326 interpreted by those who conduct the study. This is a clear limitation of research and design  
327 methodologies of this kind, one that should be carefully considered to mitigate bias and

328 misinterpretations. In this case, the team involved in the design of the visualisations sought to  
329 do so by involving the broader research team in various stages of the analysis, to discuss  
330 insights and initial findings. Once again, the collaborative processes of visualising, rather than  
331 the visualisations themselves represent the significance of this approach.

332 By tracing on the Atlas the findings that emerged from the analysis, the designer made a series  
333 of choices that influence the message received by the reader. At the same time, however, this  
334 practice was necessary in this context to make visible patterns of information that would  
335 otherwise remain unseen.

336 Designing a graphic language to represent this information meant, therefore, to find ways of  
337 making these patterns visible while maintaining their ambiguous nature. Because of the  
338 speculative nature of visioning, conversations about urban futures are necessarily characterised  
339 by ambiguity, uncertainty, and subjectivity. The challenge, when translating such conversations  
340 into visual artefacts, is to maintain these characteristics and make them explicit, balancing the  
341 ambiguity of ideas with the clarity of their presentation. This can be done, for example, through  
342 visual modality markers (Kress and Van Leeuwen, 1996), that is, by using elements such as  
343 colours, definition, scale, and grain to modulate the levels of certainty and realism of the visions.

344 For example, while the cartographic approach adopted in the Atlas of Future Imaginary Cities  
345 highlights patterns of information and key themes and topics, the individual urban visions  
346 produced by the various sectors remain elusive, and are represented in a way that deliberately  
347 leaves room for subjective interpretation (Pollastri et al., 2017).

348 Finally, as previously pointed out when discussing the role of visualisations within Liveable  
349 Cities, the modes of interaction with the visualisation should also be considered in the design of  
350 the artefact. Future visions can be left unfinished, and incorporate devices that encourage active  
351 manipulation, if their purpose is to act as tools for thinking and discussing, rather than to present  
352 ideas. Figure 7 shows an example of a future vision for Birmingham parks that a group of  
353 citizens developed and presented to local councillors and other stakeholders. Because this  
354 vision was intended as the starting point of a meeting to discuss future strategies, ideas and  
355 comments were arranged into a box, designed to be unpacked and explored.



356

357 *Figure 7. The box that was used to visualise citizen's ideas for the future of Birmingham's parks,*  
 358 *as presented to local City Councillors and other stakeholders involved in drafting a 25 years*  
 359 *strategic agenda.*

360

361 **5. Conclusions**

362 This research has shown that it is possible for visualisations of urban futures to embed the  
 363 complexity and the contradictions that characterise life in the city, as long as equal attention is  
 364 paid to the design of processes and artefacts of visualisations. Processes of visualisations  
 365 should be designed to enable and facilitate creative conversations between different actors, and  
 366 artefacts visualising such conversations must be able to articulate the different emerging visions  
 367 and their interrelatedness, while maintaining their fundamentally ambiguous and subjective  
 368 character.

369 The experience conducted as part of Liveable Cities demonstrated the role that visions  
 370 developed as conversations can have in engineering and urban design processes, particularly  
 371 those that are interested in investigating longer-term futures. While engaging citizens and  
 372 stakeholders in visioning conversations may not lead to the development of plausible and  
 373 actionable strategies, the value of these visions lies in the way in which they challenge  
 374 assumptions and highlight less-quantifiable issues.

375 This paper aims to discuss the need for and the main characteristics of a pluralistic, process-  
 376 based approach for developing multi-actor visions of possible urban futures in the context of  
 377 engineering and urban design practice and research projects. While the authors hope that the  
 378 description of this experience may encourage others to experiment with similar approaches, it is

379 not an ambition of this study to provide the reader with a directly transferable set of methods  
380 and tools. Further work is needed at this point to explore and test the potential and dynamics of  
381 processes of pluralistic visions of urban futures in various other contexts, especially those  
382 characterised by heated debates on contested future, where understanding and unpacking  
383 diversities of experiences and aspirations is paramount.

384

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391

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460 **Tables**

461 Table 1. Recommendations of on citizens participation in creating urban future visions (from  
 462 previous studies).

Findings from the Birmingham Eastside Urban Regeneration Project (Rogers <i>et al.</i> , 2008; <a href="http://www.esr.bham.ac.uk">www.esr.bham.ac.uk</a> )	What is 'sustainable' is determined locally: local conditions set local priorities.
	The past and the present must be incorporated to achieve more sustainable regeneration.
	Early involvement in the development process is central to advancing the sustainability agenda.
	Individual design decisions influence the ability to meet very different sustainability objectives.
	Sequencing activities correctly in the development process keeps sustainability-related options open.
The Future Urban Living Policy Commission Six Recommendations for Change (Rogers <i>et al.</i> , 2014)	Citizens should be empowered to combine with those who govern and other city stakeholders to create a City Narrative that describes their city's history, its present context and its visions for the (far) future, via a transparently democratic process that delivers consensus across all sections of the community.
	Citizens should be empowered to be instrumental in delivering this City Narrative, and be entrusted to do so.
	There is a need for a system that creates inspirational local leadership, and this would best be achieved via either mayors or leadership groups elected on the basis of an ability to deliver the City Narrative.

	<p>Local government leaders in turn need to be empowered by the triple devices of a balanced degree of devolution of power from national government, an ability to raise finances locally and structures that enable effective cooperation with organisations beyond the city's boundaries (regional, national and global).</p>
	<p>Cities need financial and business models that allow them to experiment, enable them to invest for the long-term, and facilitate the capture of economic, social and environmental returns on investment.</p>
	<p>There should be a radical upgrade in the role of planners to promote creative, long-term, thinking on urban sustainability and resilience, and to enable more organic growth within that strategic framework. In this role planners should act as integrators of urban practitioners and other urban stakeholders.</p>

463

464 **Figure captions**

465

466 Figure 1. Participants designing their imaginary future cities during two Future Visioning  
467 Workshops

468 Figure 2. A sketch of the structure of the Atlas. From the single home page, the user can  
469 explore the maps and access visualisation of individual workshops. Different users may  
470 therefore wish to simply have an overview of what emerged from the research, or delve into the  
471 complexity of the information, examining in details the dataset that have been used to compile  
472 the Atlas.

473 Figure 3. A section of the Atlas representing all of the imaginary cities envisioned by the  
474 different sectors in a single map, that can be navigated exploring how themes (such as  
475 energies, mobilities, governance, etc.) are articulated.

476 Figure 4. A visualisation of the issues explored by the Education Sector during the second part  
477 of the workshop (A), and (B) a graphic translation of the model that the group built to describe  
478 their vision of the future city

479 Figure 5. Liveable Cities team members mapping their research and their questions to each  
480 others (left). On the right: a visualisation of research areas and interdependencies produced  
481 after the workshop.

482 Figure 6. The box that was used to visualise citizen's ideas for the future of Birmingham's parks,  
483 as presented to local City Councillors and other stakeholders involved in drafting a 25 years  
484 strategic agenda.

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486