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## Toward a Smart Urban Planning. The Co-production of Contemporary Citizenship in the Era of Digitalization

Lissandrello, Enza

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# 1 Towards a Smart Urban Planning. The Co-Production 2 of Contemporary Citizenship in the Era of Digitalization

3 Enza Lissandrello<sup>1</sup>

## 4 Abstract

5 This paper investigates mediated negotiations in 'smart city' experimentalism. As often claimed, data can open  
6 pathways for innovative planning processes. However, the idea of planning underpinned by the interplay between  
7 citizens and data too often remains unquestioned. How might we move the idea of planning from data to  
8 providing (technical solutions) to data to transform (urban societal realities)? How can data empower citizens as  
9 true drivers of transformative urban change? This paper argues for a planning perspective to enhance a new  
10 sense of citizenship in a future technology-driven urban democracy. The framework combines planning theory  
11 with theories of societal change under a critical pragmatism. The empirical research derives from Mobility Urban  
12 Values (MUV2020), a Horizon 2020 innovation and research project (2017–2020), with the ambition to change  
13 mobility endeavors towards a more participatory and sustainable urban policy. The paper synthesizes analysis of  
14 the 'practice stories' of professionals dealing with and facilitating the interplay between data and citizens in six  
15 European cities. It then discusses MUV's deliberative planning process in which citizens generate data (co-  
16 creation of values), interpret data (co-design of facts) and perform utterances to call for new urban policy (co-  
17 production of actions). The conclusions draw a possible pathway to enhance smart urban planning as a  
18 perspective to empower citizens *with* data for a progressive democracy in the era of digitalization. Change-  
19 oriented practitioners can potentially facilitate smart urban planning through: 1) technological devices that engage  
20 individual citizens (choices) with data practices in everyday life; 2) frames for the interpretation of data *with*  
21 citizens' and communities (practice); and 3) public conversations between citizens with other publics (system) for  
22 new street-level practices of urban democracy.

23

24 **Keywords:** planning theory; data; theories of change; deliberative democracy; critical pragmatism

## 25 1 Introduction

26 This paper aims to illuminate a new perspective to mediate the interplay between citizens and data by  
27 rethinking the nature of planning in an era of digitalization. Both data and citizen sciences have too  
28 often left unquestioned the very idea of planning as the very fundamental mindset for working data *with*  
29 citizens. The 'idea of planning' has been discussed in theory as a way of thinking '*prior to a particular*  
30 *set of practices or institutions, and provides a vantage point from which to judge the vagaries of*  
31 *regulatory or professional requirements, and hence the possibility for challenge and subversion*'  
32 (Campbell 2012: 393). The planning perspective allows new insights into the contemporary interplay  
33 between citizens and data. Data can open up new pathways for innovative processes when they do not  
34 just remain anchored to evidence-based planning. Under an evidence-based paradigm, data often  
35 serve to provide 'solutions' among a close cycle of experts and professionals (rather than citizens): a)

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<sup>1</sup> Aalborg University, Rendsburggade 14, enza@plan.aau.dk

36 proving scientific facts, b) testing technology services and c) creating evidence to present to policy  
37 actors for negotiating future strategies. However, the evidence provided by data remains too often  
38 distant from the real politics of planning. In other words, within an evidence-based paradigm, data  
39 generally fail to address the very question: What data matter politically and which kinds of meanings  
40 and transformative potential do data represent for citizens and urban democracy? Thinking of citizens  
41 as data points reproduce and maintain (rather than transforms) a technocratic idea of planning. A 'smart  
42 mentality' focused on techno-scientific solutions risks to separate the city from its very politicization.  
43 Neglecting issues of citizens' accountability for participation and deliberative governance, the 'co-  
44 creation' with data and citizens—often claimed by smart cities experiments—risk remaining a pure  
45 'exercise' in public engagement. A progressive idea of planning is at the base of rethinking future urban  
46 citizenship for contemporary change-oriented practitioners.

47 How might we move the idea of planning from data to providing (technical solutions) to data to transform  
48 (urban societal realities)? How can we open the idea of planning to empower citizens through data for  
49 a smarter and more sustainable urban future? This paper advances the idea of smart urban planning.  
50 It draws on theories of change and a critical-pragmatism approach, and it elaborates on the practical  
51 experience of Mobility Urban Values (MUV), an EU Horizon 2020 research and innovation project  
52 (2017–2020) aimed at changing urban mobility and policy. MUV's change-oriented practitioners engage  
53 citizens through a gamified interaction (Di Dio et al. 2018), shape local communities, and arrange new  
54 partnerships with local businesses, policymakers, and Open Data enthusiasts in six EU cities  
55 neighborhoods (in Amsterdam, Helsinki, Barcelona, Palermo, Fundao and Ghent). Societal values  
56 related to mobility guide new visions for more sustainable, safer, inclusive, and healthier future  
57 scenarios and urban innovation (Lissandrello et al. 2018) with an impact (Caroleo et al., 2019). This  
58 paper does not aim to assess the success of the MUV project in achieving more sustainable urban  
59 mobility in urban planning; instead, it focuses on the learning experience to elaborate further on the  
60 idea of planning for a future technology-driven urban democracy.

61 The paper is structured as follows. The first part frames the current discussions on smart city  
62 experimentalism, questioning the planning idea underpinning such processes. A critical pragmatic  
63 perspective highlights the theories of change and advances a deliberative planning approach based on  
64 data values, facts, and actions. The second part adopts this framework to examine the “practice stories”  
65 of MUV's professionals dealing with the co-creation of values through data, the co-design of those data  
66 into a meaningful interpretation of facts, and new citizens' utterances for conversations and calls of  
67 policy actions. It follows a pathway towards the idea of smart urban planning to orient and inspire  
68 change-oriented professionals to facilitate a future coproduction of citizenship through data. From the  
69 planning perspective, citizens—not just as data points—become drivers of transformative urban change  
70 through new models of interaction and community building through data. The vision of smart urban  
71 planning in an era of digitalization is all about underpinning the future sense of citizenship within the  
72 digital and physical ecosystem of knowledge and action.

## 73 **2 Rethinking the Idea of Planning**

74 Planning as the guide to future action is radically changing. The practical reason is that planning is  
75 deeply dependent on societal development. Therefore, every kind of change in society—as desired  
76 values of sustainability—creates pressure on the institutionalization of planning. Planning also  
77 changes in its very idea, therefore its purpose as the way of thinking about the future, beyond

78 particular regulatory and governance frameworks. For example, the ecological discourse on climate  
79 change and the transition to a low-carbon society has placed pressure on the production–  
80 consumption linearity within the growth paradigm. The technical and economic rationality in planning  
81 has, therefore, embroiled the process in uncertainty. The recent COVID-19 crisis has also accelerated  
82 awareness of the limit of planning in ‘the risk society’ (Beck 1992). Professionals need new methods,  
83 skills, and attitudes for planning under conditions of risk and change, a change occurring suddenly  
84 without long-term warning and with significant consequences such as a recession and biodiversity  
85 collapse. Zygmunt Bauman (2007) argues that we are facing ‘the passage from the ‘solid’ to the  
86 ‘liquid’ phase of modernity.

87 We are merely living in a time when social forms (structures that limit individual choices, institutions  
88 that guard repetitions of routines, patterns of acceptable behavior) can no longer (and are not  
89 expected) to keep their shape for long. These social forms ‘decompose and melt faster than the time  
90 it takes to cast them, and once they are cast for them to set’ (Bauman 2007: 1). Likewise, planning  
91 institutions and the way to think and govern the future are becoming unlikely to be given enough time  
92 to solidify. Liquid societal dynamics of transformation also entail smart city imagination as a flow of  
93 technological innovation (Cardullo and Kitchin 2019). While we still have not adopted routines to plan  
94 with and through data, the liquid smart-mentality and digitalization place individual citizens at the  
95 center of future distributed urban transformations. The planning idea underpinning smart urban  
96 practice, however, often reproduces the citizenship of passive users. Finally disciplined by guidance  
97 on ‘the correct’ use of technology, the ‘smart citizen’ can assume ‘the correct’ behavior encapsulated  
98 through a multiplicity of digital devices and services, digital platforms, apps, and wearables as  
99 pervasive technology-mediations. The smart citizen adopts a function as a data provider.

100 A new technological urban imaginary (Vanolo 2016) develops the smart city’s idea and big data  
101 production within an evidence-based idea of planning. Therefore, the latest phase of citizen-focused  
102 claims and language often just mirrors a one-way direction (Cowley, Joss and Dayot 2018; Saunders  
103 and Baeck 2015). Citizens providing data are a passive voice to inform, narrow, limit, and control  
104 through the interplay between technology and participation. Interaction is often facilitated by a  
105 particular entrepreneurial or pre-given design (Wilson, Tewdwr-Jones and Comber 2019; Baker,  
106 Coaffee and Sherriff 2007; Kitchin 2015). The question is, therefore, how technology and participation  
107 through data can co-produce a new type of *citizenship*, *i.e.*, *citizens as active and responsible voices*.  
108 This paper argues for a focus on the idea of planning to think and to govern the future: an idea that  
109 can place at the center of methods to produce new capacities for knowledge, communities of practice,  
110 and commonhoods in the era of digitalization. Planning requires enabling skills and attitudes to  
111 navigate the risk society for an effective change of the role of citizens from data providers to data  
112 drivers of urban democracy (Lissandrello and Vesco 2020).

113 Planning as a process of change concerns casual, emergent, and co-evolving behaviors, social  
114 practices, and systems that define and enhance diverse policy perspectives and drivers. In the urban  
115 context, these processes of change take form and reflect diverse temporalities. The city is a system of  
116 slow and fast dynamics of change. Sedimented historical layers of urban form and urban identity are  
117 resilient to change, while fast contemporary urban lifestyles, nowadays supported by technologies,  
118 transform urban dynamics and the sense of citizenship. Therefore, theories of change are important  
119 for planning because they offer a perspective to identify the process of transformation, the tension

120 points (Flyvbjerg et al. 2016), and the policy angle that is already part of the system. For example,  
121 behavioral change-based policy on individual choice often offers a perspective that implies an  
122 external influencer that includes 'the different combinations of policy instruments – classically  
123 characterized as carrots, sticks, and sermons – to... facilitate choices such that individuals can make  
124 as a 'better' choices for themselves' (Shove, Pantzar and Watson 2012). Data are often gathered  
125 from individual citizens, using, for example, techniques for rewarding behavior. In the field of urban  
126 mobility studies, low-carbon policy based on behavior change can consist of rewarding individual  
127 choices of biking or walking rather than using a car. This 'rewarding' can happen in form of specific  
128 prizes, taxes, and salaries. For an urban change, the fact that individual citizens' choices produce  
129 behaviors, habits, and routines is important. Indeed, when individual citizens consolidate their  
130 patterns of behavior, they also shape social practice. The perspective of social practice allows us to  
131 illuminate change through 'practice carrying'. In other words, choosing to bike rather than drive a car  
132 is not about an individual's choices alone but a pattern of practice and communities, for example,  
133 biking communities. In a perspective of change, policy-based social practice can consist of connecting  
134 individuals into communities. In the example of low-carbon policy based on urban mobility practice, a  
135 'practice carrying' can be the car-sharing policy that connects individuals within a (digital) social  
136 context of communities of sharing. But changes in policy and planning occur within a complexity that  
137 includes behaviors (individual choices) and social practice (communities). This complexity can be  
138 understood as a system. A system is an ensemble or assemblage of multiple social practices as  
139 normalized behaviors and mechanisms of societal regulation that stabilize and maintain the system  
140 itself. In a policy perspective, a 'system change' consists of turning the existence of the system itself  
141 (Urry 2004), therefore the complexity of behavior, social practice and the holistic policy perspective  
142 represented by the system. Studies on socio-technical system change (Geels, 2005) show that that  
143 implies a long-term and complex transformation governed and maintained by both individual choices  
144 and social practices. A systemic change thus implies the alignment of innovations with 'turning points'  
145 or 'cracks' that might exist within the institutionalized and normalized behavior and practice under the  
146 flows or exogenous dynamics. These exogenous dynamics can be, for example, the climate change  
147 (landscape) that places pressure for a change of automobility (regime). Simultaneously, car-free  
148 neighborhoods (niches) can constitute an example of turning points or cracks in the current  
149 automobility practice and behaviors. From a system perspective, a change thus takes place through  
150 the alignment of multiple dynamics. Change-oriented practitioners and professionals cannot fully  
151 influence these alignments. However, the system approach is extremely relevant to change-oriented  
152 practitioners to identify 'turning points' or 'cracks' which might activate opportunities to co-construct,  
153 co-generate or co-produce systemic change. 'Things may look bleak and hopeless, but for those who  
154 are nimble on their feet, the inevitable creaks and crevasses in the institutional structure always  
155 provide ever so many opportunities for positive action' (Krumholz and Forester 1990). Thinking the  
156 future requires the awareness that a system change will entail complex multi-level dynamics,  
157 unexpected consequences, risks and flows that require professionals to "reflect in action" (Schon  
158 1983). In other words, in the context of 'smart' digitalization and urban data, change-oriented  
159 practitioners need to rethink the fundamental idea of planning. The potential coproduction of systemic  
160 change depends on the idea of thinking and governing the future as a way to enhance opportunities  
161 and political engagement and learning. The choices of individual citizens, communities and possible  
162 futures of urban citizenship need to be at the center of the system change. A critical-pragmatism  
163 framework to planning and public policy offers a pathway to pose questions about the interplay of

164 citizens and data. Such an interplay can consist of dealing with creaks, crevasses and cracks in the  
165 current system. It might open possibilities for micro-politics ‘in the trenches’ (Forester 1999, 2013;  
166 Wagenaar 2011) in the deliberation about value, facts and actions (Forester, 2017). In the remainder  
167 of this paper, this framework of theories of change and critical pragmatism contributes to exploring the  
168 ‘practice stories’ of MUV professionals engaged in the process of dealing with the interplay of data  
169 and citizens across the spheres of technology and participation. Smart urban planning includes the  
170 generation of data with citizens and the co-creation of values through individual choices, as well as  
171 the interpretation of data into a co-design of meanings with communities of practice, and the  
172 coproduction of a collective redesign of policy actions. These stages aim to illuminate a planning  
173 perspective of coproduction of citizenship for systemic urban change.

### 174 **3 Shaping Citizenship *with* Citizens: MUV Mediated Negotiations**

175  
176 MUV (Mobility Urban Values) is a three-year Horizon 2020 project (2017–2020) in which an  
177 interdisciplinary team of EU academics and practitioners has envisioned the possibility of activating  
178 systemic urban change. The focus point of the change-oriented practitioners was bringing ethical urban  
179 mobility practices through technology-driven data devices. The theories of change, just mentioned,  
180 constitute the background for a vision that intertwines issues of individual choices, common social  
181 practice, and urban ecosystem change. Citizens impact their environment through their choices and  
182 behavior, shape communities, and transform their urban living system. MUV departs from a gamification  
183 strategy through an app that aims to influence the choices of individual citizens towards more  
184 sustainable mobility lifestyles. By uploading the app, citizens are transformed into MUVers, so they  
185 become active players in the digital world. By selecting their everyday active mobility choices (walking,  
186 cycling, public transport, or car-sharing), citizens gain points connecting to local businesses that reward  
187 them with prizes when they become sustainable-mobility champions. The MUV idea is that, through a  
188 motivational device (app) based on gamification and reward, citizens can produce data on their mobility  
189 choices. This approach to behavior change based on a policy of control exploits techniques of rewarding  
190 or nudging through technology. However, MUVers co-create sustainable mobility values as ‘carriers’ of  
191 practice in their everyday active-mobility practice. These values are co-created when citizens engage  
192 in gaming communities and MUVerhoods. Sharing their sustainable mobility experience, citizens  
193 connect their journeys (points) to other MUVers, competing for the mobility challenge of winning points.  
194 MUVers connect to local businesses, as well as provide active mobility data to local planners and  
195 participating mobility managers. The next section synthesizes analysis and extracts some of the MUV  
196 practice stories of change-oriented practitioners (pilot coordinators in various cities), performing the  
197 participatory process of engagement of data and citizens for urban-policy innovation.

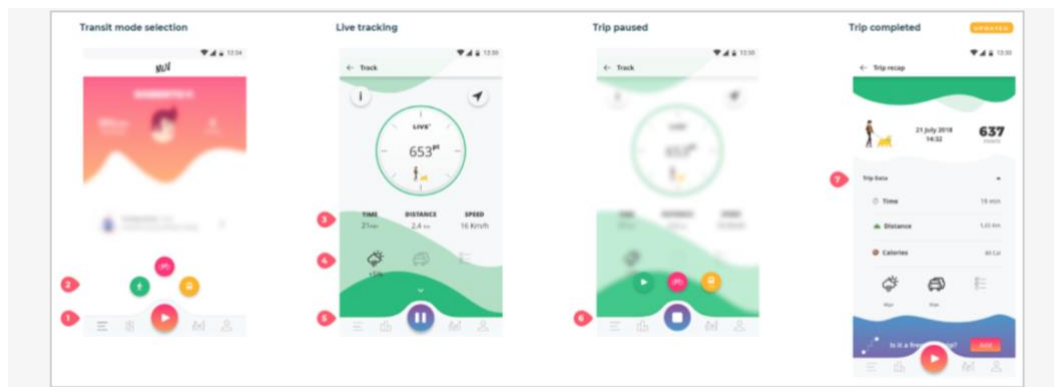
198

#### 199 **3.1 Generating Mobility Data with Citizens—The Co-Creation of Values**

200

201 People think about mobility in terms of problems. When you approach citizens from this angle, they  
202 start to talk about frustrations: finding parking places, safety on roads, congestion. The turning point of  
203 the system is to transform the idea of mobility into something completely different from what citizens  
204 experience in everyday life: let’s talk about mobility as fun (MUV pilot coordinator 2017). When  
205 downloading entering the digital device, citizens transform into MUVers. MUVers are digital individuals

206 who, through a metaphor of sports narrative, play athletes to get rewards for their sustainable-mobility  
207 choices, i.e., walking, biking, car-sharing, carpooling and travelling on public transportation. MUVers  
208 connect to public authorities that gather MUV mobility data and provide training sessions to coach-  
209 athletes to improve their sustainable mobility skills. MUVers also connect to local business communities  
210 that, as sponsors, have the opportunity to promote their brand and their products through the athletes'  
211 best achievements and provide prizes to them. The MUV app (Fig. 1), through gamification, collects  
212 and tracks spatio-temporal data on citizens' active mobility.



213  
214 **Fig. 1** The MUV mobile app—on-screen visualisation to generate data and co-create values

215 MUV gamification is therefore based on a 'nudging' policy, as depicted in Fig. 1, within the theories of  
216 behavioral change. However, MUV gamification is a means of mediation from the individual behavior  
217 of citizens to a common social practice of game communities. MUVers compete with each other,  
218 connect to local businesses and gain knowledge of their own impact on the urban environment.  
219 MUVers generate data and co-create values simultaneously when engaging in a more sustainable  
220 urban lifestyle. In everyday active-mobility practice, connecting with other MUVers and shopping at  
221 local businesses, MUVers mobilize MUVerhoods. MUVerhoods are physical and digital environments  
222 that shape an urban context and provide the actors of urban transformations (citizens, local  
223 businesses, public authorities, active local communities) a sense of community with a playful vision of  
224 reality. The engagement and mobilization of MUVerhoods occur on-street level through playful events  
225 with citizens as the MUV open-days. The design of these events aims to inform and diffuse the MUV  
226 game and shape game customizations (MUV pilot coordinator 2017).

227 MUVers champions are ambassadors who maintain strong individual ties within the MUVerhoods  
228 (community) and expand that community. MUVers target groups vary among cities. In Palermo, these  
229 groups include university students and tourists. In Fundao, the target is composed of workers in new  
230 enterprises (such as start-ups), in Helsinki residents already sensitive to traffic. In Ghent, families with  
231 children and schools' teachers are involved in the MUV project. In Barcelona, the target group is  
232 individual citizens already engaged with alternative modes of transportation and sports lovers; in  
233 Amsterdam, rather, participants are elderly communities and data hackers. Gamification on urban  
234 streets and the organization of events takes place when giving prizes to the MUV winners,  
235 establishing gamified competitions among cities and involving citizens in participation activities such  
236 as workshops during EU mobility weeks and other local festivals. MUVers have an active role in  
237 shaping their gaming communities. The effect of MUVhoods' motivations creates new urban values  
238 such as a healthy and cultural lifestyle, inclusive and safe shopping and 'smart' identity. MUV aims to

239 inspire enjoyment of mobility to empower citizens' with their data measurement ('meten is weten'—'to  
240 measure is to know'—to quotes a famous Dutch sentence). This quote is a model of urban citizenship  
241 for the digital future (be the change he/she wants to see)' (MUV pilot coordinator 2018).

### 242 3.2 Interpreting Facts—The Co-Design of Meanings

243 The MUVers data on active mobility gathered from the app have been visualized in MUVmaps in each  
244 city. How do you ensure that people feel not only like data-points? The pilot coordinator in Amsterdam  
245 proposed this leading question when preparing workshops with citizens. The stake is the kind of  
246 difference that MUV will make for people when interpreting data into facts. MUV is not the only  
247 platform that creates mobility data. Nowadays, we have several route-planning and ridesharing  
248 platforms and other digital products related to mobility. Large flows of data also sometimes do not  
249 involve the users of these platforms. In MUV, the interpretation of data into facts—mobility tracks and  
250 journeys—has been the center of the co-design strategy. Data call for the design of meanings along  
251 with the citizens (MUV pilot coordinator 2019).



252

253

Fig. 2 The MUVmap (Ghent)

254 Besides mobility journeys, MUVMaps serve to visualize and interpret data collected from MUVers  
255 through the app. Citizens and policymakers need greater transparency of data. Data collected are  
256 often perceived as evaporating from the hands of those who generate them. How do the data  
257 collected by a cyclist help the cyclist? Specific questions have been a leading role of pilot coordinators  
258 (MUV pilot coordinator 2018). Interpreting the maps with participants, such as start-up companies,  
259 municipality workers and media agents, afforded the opportunity to visualize for the first time the data  
260 gathered by the MUV app. All the participants demonstrated real satisfaction in being directly involved  
261 in this process of mapping and visualization. Their contribution was active and productive (MUV pilot



262 coordinator 2019). The interpretation of facts through maps has enabled translating data meanings  
263 into values. For example, maps of mobility practice in Fundao have deepened values for a more  
264 healthy lifestyle; in Ghent safety-related data have pinpointed specific areas in MUVerhoods. Data  
265 interpretations have also emphasized the intertwined importance of quantitative data on the diverse  
266 tracks with the qualitative perspectives and approaches of citizens (MUV pilot coordinator 2019). The  
267 'MUV ambassadors' in Ghent, for example, have provided qualitative insights on the safety of bikers  
268 in their everyday mobility. The issue was to pinpoint specific critical areas in the neighborhood to  
269 engage the local knowledge. The 'citizen expert panel' in Helsinki, responding to surveys and tracking  
270 routes, has contributed direct interpretations of data on living MUVers experience. The collective  
271 understanding of the data on walking, for instance, reproduced and visualized on the maps, has led to  
272 insights on pedestrians' diverse safety issues in various cities and neighborhoods. In Palermo,  
273 walking issues highlighted by citizens identified specific safety needs for tourists or young citizens  
274 during the night across the historical center that would be improved with better lighting. In Barcelona,  
275 citizens interpreted maps to define issues with the timing of green lights for pedestrians on the  
276 crosswalks in peak-hours. The voice of the new green wave of an active citizens' movement in  
277 Barcelona proclaims alternatives to car-mobility that are emerging but still require strategies of  
278 connectivity among, for example, existing bicycle lanes. The absence of data on the map raised  
279 citizens' safety issues or specific lacks of service such as an efficient public-transport ticket service in  
280 Barcelona that impedes easier hop-on and hop-off.

### 281 **3.3 Calling for Policy Actions—The Co-Production of Conversations**

282 The interpretations of the maps produced by the citizens' journeys and their analysis with the  
283 visualization of tracks on maps have enabled highlighting particular problems. These problems have  
284 been utilized to shift from 'complaints' to 'policy action' with citizens. Every MUV pilot city in these  
285 three years of experience with MUVers and MUVerhoods also open channels of co-policymaking  
286 between citizens and urban mobility planners, policy makers and other publics. The MUVers' active,  
287 playful activity has sparked positive energy to talk freely about new ideas for future policy actions  
288 (MUV pilot coordinator 2020). The calls for policy actions have proven to be more effective when  
289 designed in combination with festivals and other events in cities. The 'EU mobility week' has been the  
290 anchoring event to produce new conversations among citizens and various types of publics, for  
291 example, through temporary communication campaigns. In Palermo, a guerilla marketing campaign  
292 has raised the attention for citizens-policy interaction on mobility issues, mediated by MUV  
293 professionals. Posters produced after the interpretation of the maps with citizens have been placed on  
294 the street level to trigger several conversations (MUV pilot coordinator 2019). In Ghent, a campaign  
295 facilitated the information about the safer routes on the neighborhood and the crossroads that kids  
296 can use. MUVers' are equipped with fluorescent covers that show 'safety across the neighborhood'. A  
297 'neighborhood house' has been established to provide more information on safety and the MUV app.  
298 Other campaigns have been the to chalk-spray Emoji's conversations that visualize the bikers'  
299 experiences on 'hot spots' (Fig.3). New ideas on how to improve urban mobility policy in MUVerhoods  
300 concerning citizens' everyday-mobility practice have produced conversations adapted to the diverse  
301 pilot contexts and urban identities. In Palermo, the safety of pedestrians during evening hours has  
302 created the idea of streetlights designed by artists that would activate as people pass by to reduce  
303 fear on the streets and criminality and encourage walking instead of taking the car (MUV pilot  
304 coordinator 2019).



305

306

**Fig. 3** Living MUV Emoticons (Ghent)

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Safety for tourists to enjoy the city and discover urban experiences have been advanced by the conversations between cyclists and the public administration by adopting some temporary obstacle-free bike lanes. Values of sustainability have forged ideas of carpooling among citizens by multiple people. In Ghent conversations on the upcoming Sustainable Urban Mobility Plans (SUMP) have been enhanced targets for MUVers data (MUV pilot coordinator 2019). In Barcelona, the conversations have activated citizens' ideas on the safety needs of pedestrians on crosswalks and traffic adjustments such as the green light timing; also emerging ideas have been facilitating hop-on-hop-off on public transport with the use of contactless cards or smartphones (MUV pilot coordinator 2019). In Fundao, the idea of converting rural ways into bike lanes will facilitate a healthy lifestyle; promoting a bike lane to school will reduce car dependency; and education can enhance sustainable mobility orientations. Peripheral car parking in the city and pedestrian routes crossing the whole town will facilitate walking instead of other modes of transport (MUV pilot coordinator 2019). In Helsinki, the conversations between citizens and other policy actors have also underlined the relationship and the role of citizens and data providers. Citizens providing data have pursued the idea to become immediately informed about the role and nature of the data provided (e.g., automated graphs generated in the response), increasing the motivation for data production (MUV pilot coordinator 2019).

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#### **4 Towards a Smart Urban Planning: Co-Producing Citizenship in the Era of Digitalization**

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The MUV project and the practice stories of the change-oriented practitioners in various cities have provided exciting lessons on the interplay between data and citizens to inspire the idea of planning: data shape not just pieces of evidence to point to specific solutions but can co-produce a diverse view of the role of the citizens and future citizenship. The MUV participatory process has developed towards deliberately meet inclusive, safe, resilient and sustainable urban-mobility values with citizens. Six EU neighborhood communities have been transformed in MUVerhoods, living urban experiences based on mobility data and game communities. The idea of planning that emerges here is the shift from a mindset of thinking the future *for* citizens as data-points to imagining the future *with* citizens as

333

334 active agents of transformative urban governance. Lessons from MUVs consist of the redesign of the  
 335 deliberative stages through which the role of citizens change concerning the data for a transformative  
 336 urban democracy. MUV contributes to illuminate a pragmatic pathway to re-imagine the idea of  
 337 planning with data and citizens—for the generation of data (the co-creation of values), the  
 338 interpretation of facts (the co-design of meanings) and the call for policy actions (the coproduction of  
 339 conversations) (Table 1). MUV inspires the idea of planning in which data open new pathways to  
 340 transform urban societal realities and co-produce a new sense of future citizenship. Smart urban  
 341 planning, under a critical-pragmatism perspective, emerges as a participatory process in which values  
 342 are co-created with data citizens, meanings are co-designed by their interpretation and actions are  
 343 co-produced by conversations at street-level urban democracy. The role of the professionals as  
 344 change agents consists of mediating citizens' everyday practice to generate data and values in their  
 345 daily life, facilitating citizens' interpretation of data through representation and negotiate citizens' ideas  
 346 with policy actors. A key lesson from MUV is the continuous data-driven mediation to cultivate  
 347 conversations among data, citizens and policy actors.

Co-Creation of Values	Co-Design of Meanings	Co-Production of Conversations
Generate Data	Interpretation of Data	Transformation of Data into Action
Professionals mediate citizens' everyday practice to generate data of value for individual and collective choices.	Professionals facilitate citizens' representation and interpretation of data into facts.	Professionals elicit citizens to negotiate policy actions
Lessons from MUV: the app and gamification strategy collect data and shape urban mobility values as an active and healthy lifestyle	Lessons from MUV: data aggregated are visualized and communicated through maps that citizens can interpret	Lessons from MUV: communication campaigns and temporary urbanism engage citizens' ideas at street-level practice
Citizens create data communities	Citizens design data meanings	Citizens produce urban citizenship
Lessons from MUV: game communities shape MUVerhoods where citizens connect to play active mobility together	Lessons from MUV: visualization of aggregated data on maps elicits local knowledge of MUVerhoods	Lessons from MUV: campaigns at street-level produce a new sense of citizens' ownership of MUVerhoods

348 **Table 1** Staging a critical pragmatic pathway for smart urban planning

349 Acting as a smart urban-planning process, MUV has opened a new mindset regarding the interplay of  
 350 data and citizens in policymaking. Smart urban planning is not just about the final destination of data  
 351 —if data will serve traffic planning, or urban development, or new sustainable mobility plans or the  
 352 provision of new services—but the very way change-oriented professionals think in action future  
 353 citizenships. A shift from an idea of planning *for* citizens to planning *with* citizens requires reflexive  
 354 professionals to re-imagine the very coproduction of urban ecological and digital ecosystems of  
 355 knowledge through citizens and data. In MUV, this system of knowledge has created new positive  
 356 energy for policy change towards a new culture of participation and deliberative democracy. In the era  
 357 of digitalization, professionals urge rethinking the idea of planning through data for future urban  
 358 democracy. Change-oriented practitioners can enhance a transformative potential by rethinking the

359 role of citizens through data with: 1) technological dispositive that do not just 'gather' data but engage  
360 individual citizens' to make sense of those data in the practice of the everyday life (choices); 2) frame  
361 the means for the interpretation of data with citizens' to shape new communities of knowledge  
362 (practice); and 3) create public conversations between citizens and other publics for transformative  
363 utterances of urban societal realities (system), to be enhanced possibly by street-level practices. The  
364 citizens' practice in their everyday life is the essential setting for re-imagining and redesigning new  
365 digital and physical urban futures for planning the next city.

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