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Lissandrello, Enza

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

Enza Lissandrello

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

Keywords Planning theory · Data · Theories of change · Deliberative democracy · Critical pragmatism

E. Lissandrello (✉)
Aalborg University, Rendsburggade 14, Aalborg, Denmark
e-mail: enza@plan.aau.dk

373

1   Introduction

This paper aims to illuminate a new perspective to mediate the interplay between citizens and data by rethinking the nature of planning in an era of digitalization. Both data and citizen sciences have too often left unquestioned the very idea of planning as the very fundamental mindset for working data *with* citizens. The 'idea of planning' has been discussed in theory as a way of thinking 'prior to a particular set of practices or institutions, and provides a vantage point from which to judge the vagaries of regulatory or professional requirements, and hence the possibility for challenge and subversion' (Campbell 2012: 393). The planning perspective allows new insights into the contemporary interplay between citizens and data. Data can open up new pathways for innovative processes when they do not just remain anchored to evidence-based planning. Under an evidence-based paradigm, data often serve to provide 'solutions' among a close cycle of experts and professionals (rather than citizens): (a) proving scientific facts, (b) testing technology services and (c) creating evidence to present to policy actors for negotiating future strategies. However, the evidence provided by data remains too often distant from the real politics of planning. In other words, within an evidence-based paradigm, data generally fail to address the very question: What data do matter politically and which kinds of meanings and transformative potential do data represent for citizens and urban democracy? Thinking citizens as data-points reproduce and maintain (rather than transform) a technocratic idea of planning. A 'smart-mentality' focused on techno-scientific solutions risks to separate the city from its very politicization. Neglecting issues of citizens' accountability for participation and deliberative governance, the 'co-creation' with data and citizens—often claimed by smart cities experiments—risk remaining a pure 'exercise' in public engagement. A progressive idea of planning is at the base of rethinking future urban citizenship for contemporary change-oriented practitioners.

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

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

2 Rethinking the Idea of Planning

Planning as the guide to future action is radically changing. The practical reason is that planning is deeply dependent on societal development. Therefore, every kind of change in society—as desired values of sustainability—creates pressure on the institutionalization of planning. Planning also changes in its very idea, therefore its purpose as the way of thinking the future, beyond particular regulatory and governance frameworks. For example, the ecological discourse on climate change and the transition to a low-carbon society has placed pressure on the production–consumption linearity within the growth paradigm. The technical and economic rationality in planning has, therefore, embroiled the process in uncertainty. The recent Covid-19 crisis has also accelerated awareness of the limit of planning in 'the risk society' (Beck 1992). Professionals need new methods, skills and attitudes for planning under conditions of risk and change, a change occurring suddenly without long-term warning and with significant consequences such as a recession and biodiversity collapse. Bauman (2007) argues that we are facing 'the passage from the 'solid' to the 'liquid' phase of modernity.

We are merely living in a time when social forms (structures that limit individual choices, institutions that guard repetitions of routines, patterns of acceptable behavior) can no longer (and are not expected) to keep their shape for long. These social forms 'decompose and melt faster than the time it takes to cast them, and once they are cast for them to set' (Bauman 2007: 1). Likewise, planning institutions and the way to think and govern the future are becoming unlikely to be given enough time to solidify. Liquid societal dynamics of transformation also entail smart city imagination as a flow of technological innovation (Cardullo and Kitchin 2019). While we still have not adopted routines to plan with and through data, the liquid smart-mentality and the digitalization place individual citizens at the center of future

distributed urban transformations. The planning idea underpinning smart urban practice, however, often reproduces a citizenship of passive users. Finally disciplined by guidance on 'the correct' use of technology, the 'smart citizen' can assume 'the correct' behavior encapsulated through a multiplicity of digital devices and services, digital platforms, apps and wearables as pervasive technology-mediations. The smart citizen adopts a function as data provider.

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

Planning as a process of change concerns of casual, emergent and co-evolving behaviors, social practices and systems that define and enhance diverse policy perspectives and drivers. In the urban context, these processes of change take form and reflect diverse temporalities. The city is a system of slow and fast dynamics of change. Sedimented historical layers of urban form and urban identity are resilient to change, while fast contemporary urban lifestyles, nowadays supported by technologies, transform urban dynamics and the sense of citizenship. Therefore, theories of change are important for planning because they offer a perspective to identify the process of transformation, the tension points (Flyvbjerg et al. 2016) and the policy angle that is already part of the system. For example, behavioral change-based policy on individual choice often offers a perspective that implies an external influencer that includes 'the different combinations of policy instruments—classically characterized as carrots, sticks, and sermons—to… facilitate choices such that individuals can make as a 'better' choices for themselves' (Shove et al. 2012). Data are often gathered from individual citizens, using, for example, techniques for rewarding behavior. In the field of urban mobility studies, low-carbon policy based on behavior change can consist of rewarding individual choices of biking or walking rather than using a car. This 'rewarding' can happen in forms of specific prizes, taxes and salaries. For urban change, the fact that individual citizens' choices produce behaviors, habits and routines is important. Indeed, when individual citizens consolidate their patterns of behavior, they also shape social practice. The perspective of social practice allows us to illuminate change through 'practice carrying'. In other words, choosing to bike rather than drive a car is not about an individual's choices alone but a patternation of practice and communities, for example, biking communities. In a perspective

of change, policy-based social practice can consist of connecting individuals into communities. In the example of low-carbon policy based on urban mobility practice, a 'practice carrying' can be the car-sharing policy that connects individuals within a (digital) social context of communities of sharing. But changes in policy and planning occur within a complexity that includes behaviors (individual choices) and social practice (communities). This complexity can be understood as a system. A system is an ensemble or assemblage of multiple social practices as normalized behaviors and mechanisms of societal regulation that stabilize and maintain the system itself. In a policy perspective, a 'system change' consists of turning the existence of the system itself (Urry 2004), therefore the complexity of behavior, social practice and the holistic policy perspective represented by the system. Studies on socio-technical system change (Geels 2005a, b) show that that implies a long-term and complex transformation governed and maintained by both individual choices and social practices. A systemic change thus implies the alignment of innovations with 'turning points' or 'cracks' that might exist within the institutionalized and normalized behavior and practice under the flows or exogenous dynamics. These exogenous dynamics can be, for example, the climate change (landscape) that places pressure for a change of automobility (regime). Simultaneously, car-free neighborhoods (niches) can constitute an example of turning points or cracks in the current automobility practice and behaviors. From a system perspective, a change thus takes place through the alignment of multiple dynamics. Change-oriented practitioners and professionals cannot fully influence these alignments. However, the system approach is extremely relevant to change-oriented practitioners to identify 'turning points' or 'cracks' which might activate opportunities to co-construct, co-generate or co-produce systemic change. 'Things may look beak and hopeless, but for those who are nimble on their feet, the inevitable creaks and crevasses in the institutional structure always provide ever so many opportunities for positive action' (Krumholz and Forester 1990). Thinking the future requires the awareness that a system change will entail complex multi-level dynamics, unexpected consequences, risks and flows that require professionals to 'reflect in action' (Schön 1983). In other words, in the context of 'smart' digitalization and urban data, change-oriented practitioners need to rethink the fundamental idea of planning. The potential co-production of systemic change depends on the idea of thinking and governing the future as a way to enhance opportunities and political engagement and learning. The choices of individual citizens, communities and possible futures of urban citizenship need to be at the center of the system change. A critical-pragmatism framework to planning and public policy offers a pathway to pose questions about the interplay of citizens and data. Such an interplay can consist of dealing with creaks, crevasses and cracks in the current system. It might open possibilities for micro-politics 'in the trenches' (Forester 1999, 2013; Wagenaar 2011) in the deliberation about value, facts and actions (Forester 2017). In the remainder of this paper, this framework of theories of change and critical pragmatism contributes to exploring the 'practice stories' of MUV professionals engaged in the process of dealing with the interplay of data and citizens across the spheres of technology and participation. Smart urban planning includes the generation of data with citizens and the co-creation of values through individual choices, as well as the

interpretation of data into a co-design of meanings with communities of practice, and the co-production of a collective redesign of policy actions. These stages aim to illuminate a planning perspective of co-production of citizenship for systemic urban change.

3 Shaping Citizenship *with* Citizens: MUV Mediated Negotiations

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

3.1 Generating Mobility Data with citizens—The Co-creation of Values

People think about mobility in terms of problems. When you approach citizens from this angle, they start to talk about frustrations: finding parking places, safety on roads and congestion. The turning point of the system is to transform the idea of mobility into something completely different from what citizens experience in everyday life: Let us talk about mobility as fun (MUV pilot coordinator 2017). When dowloading entering the digital device, citizens transform into MUVers. MUVers are digital individuals who, through a metaphor of sports narrative, play athletes to get rewards for their sustainable mobility choices, i.e., walking, biking, car-sharing, carpooling and traveling on public transportation. MUVers connect to public authorities that gather MUV mobility data and provide training sessions to coach–athletes to improve their sustainable mobility skills. MUVers also connect to local business communities that, as sponsors, have the opportunity to promote their brand and their products through the athletes' best achievements and provide prizes to them. The MUV app (Fig. 1), through gamification, collects and tracks spatio-temporal data on citizens' active mobility.

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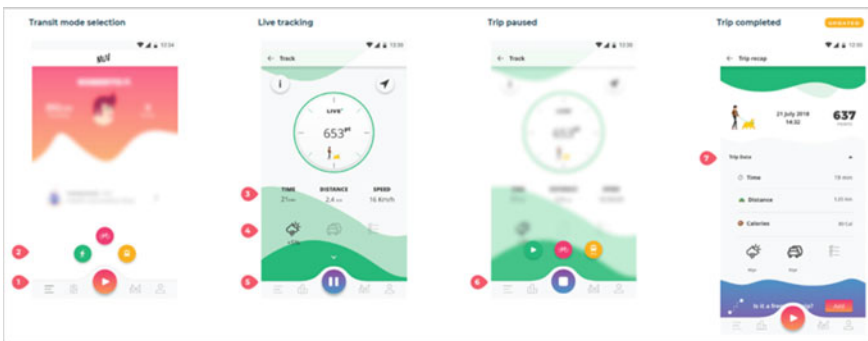

Fig. 1 MUV mobile app—on-screen visualization to generate data and co-create values

events with citizens as the MUV open-days. The design of these events aims to inform and diffuse the MUV game and shape game customizations (MUV pilot coordinator 2017).

MUVers champions are ambassadors who maintain strong individual ties within the MUVerhoods (community) and expand that community. MUVers target groups vary among cities. In Palermo, these groups include university students and tourists. In Fundao, the target is composed of workers in new enterprises (such as start-ups), in Helsinki residents already sensitive to traffic. In Ghent, families with children and schools' teachers are involved in the MUV project. In Barcelona, the target group is individual citizens already engaged with alternative modes of transportation and sports lovers; in Amsterdam, rather, participants are elderly communities and data hackers. Gamification on urban streets and the organization of events takes place when giving prizes to the MUV winners, establishing gamified competitions among cities and involving citizens in participation activities such as workshops during EU mobility weeks and other local festivals. MUVers have an active role in shaping their gaming communities. The effect of MUVhoods' motivations creates new urban values such as a healthy and cultural lifestyle, inclusive and safe shopping and 'smart' identity. MUV aims to inspire enjoyment of mobility to empower citizens' with their data measurement ('meten is weten'—'to measure is to know'—to quotes a famous Dutch sentence). This quote is a model of urban citizenship for the digital future (be the change he/she wants to see) (MUV pilot coordinator 2018).

3.2   Interpreting Facts—The Co-design of Meanings

The MUVers data on active mobility gathered from the app have been visualized in MUVmaps in each city. How do you ensure that people feel not only like data-points? The pilot coordinator in Amsterdam proposed this leading question when preparing workshops with citizens. The stake is the kind of difference that MUV will make for people when interpreting data into facts. MUV is not the only platform that creates mobility data. Nowadays, we have several route-planning and ridesharing platforms and other digital products related to mobility. Large flows of data also sometimes do not involve the users of these platforms. In MUV, the interpretation of data into facts—mobility tracks and journeys—has been the center of the co-design strategy. Data call for the design of meanings along with the citizens (MUV pilot coordinator 2019) (Fig. 2).

Besides mobility journeys, MUVMaps serve to visualize and interpret data collected from MUVers through the app. Citizens and policymakers need greater transparency of data. Data collected are often perceived as evaporating from the hands of those who generate them. How do the data collected by a cyclist help the cyclist? Specific questions have been a leading role of pilot coordinators (MUV pilot coordinator 2018). Interpreting the maps with participants, such as start-up companies, municipality workers and media agents, afforded the opportunity to visualize

Fig. 2 MUVmap (Ghent)

for the first time the data gathered by the MUV app. All the participants demonstrated real satisfaction in being directly involved in this process of mapping and visualization. Their contribution was active and productive (MUV pilot coordinator 2019). The interpretation of facts through maps has enabled translating data meanings into values. For example, maps of mobility practice in Fundao have deepened values for a more healthy lifestyle; in Ghent, safety-related data have pinpointed specific areas in MUVerhoods. Data interpretations have also emphasized the intertwined importance of quantitative data on the diverse tracks with the qualitative perspectives and approaches of citizens (MUV pilot coordinator 2019). The 'MUV ambassadors' in Ghent, for example, have provided qualitative insights on the safety of bikers in their everyday mobility. The issue was to pinpoint specific critical areas in the neighborhood to engage the local knowledge. The 'citizen expert panel' in Helsinki, responding to surveys and tracking routes, has contributed direct interpretations of data on living MUVers experience. The collective understanding of the data on walking, for instance, reproduced and visualized on the maps, has led to insights on pedestrians' diverse safety issues in various cities and neighborhoods. In Palermo, walking issues highlighted by citizens identified specific safety needs for tourists or young citizens during the night across the historical center that would be improved with better lighting. In Barcelona, citizens interpreted maps to define issues with the timing of green lights for pedestrians on the crosswalks in peack-hours. The voice of the new green wave of an active citizens' movement in Barcelona proclaims alternatives to car-mobility that are emerging but still require strategies of connectivity among, for example, existing bicycle lanes. The absence of data on the map raised

citizens' safety issues or specific lacks of service such as an efficient public-transport ticket service in Barcelona that impedes easier hop-on and hop-off.

3.3 Calling for Policy Actions—The Co-production of Conversations

The interpretations of the maps produced by the citizens' journeys and their analysis with the visualization of tracks on maps have enabled highlighting particular problems. These problems have been utilized to shift from 'complaints' to 'policy action' with citizens. Every MUV pilot city in these three years of experience with MUVers and MUVerhoods also opens channels of co-policymaking between citizens and urban mobility planners, policymakers and other publics. The MUVers' active, playful activity has sparked positive energy to talk freely about new ideas for future policy actions (MUV pilot coordinator 2020). The calls for policy actions have proven to be more effective when designed in combination with festivals and other events in cities. The 'EU mobility week' has been the anchoring event to produce new conversations among citizens and various types of publics, for example, through temporary communication campaigns. In Palermo, a guerilla marketing campaign has raised the attention for citizens-policy interaction on mobility issues, mediated by MUV professionals. Posters produced after the interpretation of the maps with citizens have been placed on the street level to trigger several conversations (MUV pilot coordinator 2019). In Ghent, a campaign facilitated the information about the safer routes on the neighborhood and the crossroads that kids can use. MUVers' are equipped with fluorescent covers that show 'safety across the neighborhood'. A 'neighborhood house' has been established to provide more information on safety and the MUV app. Another campaign has been the to chalk-spray Emoji's conversations that visualize the bikers' experiences on 'hot spots' (Fig. 3). New ideas on how

Fig. 3 Living MUV emoticons (Ghent)

to improve urban mobility policy in MUVerhoods concerning citizens' everyday-mobility practice have produced conversations adapted to the diverse pilot contexts and urban identities. In Palermo, the safety of pedestrians during evening hours has created the idea of streetlights designed by artists that would activate as people pass by to reduce fear on the streets and criminality and encourage walking instead of taking the car (MUV pilot coordinator 2019).

Safety for tourists to enjoy the city and discover urban experiences has been advanced by the conversations between cyclists and the public administration as 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).

4 Toward a Smart Urban Planning: Co-Producing Citizenship in the Era of Digitalization

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 toward 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 active agents of transformative urban governance. Lessons from MUVs consist of the redesign of the deliberative

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

Acting as a smart urban planning process, MUV has opened a new mindset regarding the interplay of data and citizens in policymaking. Smart urban planning is not just about the final destination of data—if data will serve traffic planning, or urban development, or new sustainable mobility plans or the provision of new services—but the very way change-oriented professionals think in action future citizenships. A shift from an idea of planning *for* citizens to planning *with* citizens requires reflexive professionals to re-imagine the very co-production of urban ecological and digital

Table 1 Staging a critical pragmatic pathway for smart urban planning

Co-creation of values Generate data	Co-design of meanings Interpretation of data	Co-production of conversations 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

ecosystems of knowledge through citizens and data. In MUV, this system of knowledge has created new positive energy for policy change toward a new culture of participation and deliberative democracy. In the era of digitalization, professionals urge rethinking the idea of planning through data for future urban democracy. Change-oriented practitioners can enhance a transformative potential by rethinking the role of citizens through data with: (1) technological dispositive that do not just 'gather' data but engage individual citizens' to make sense of those data in the practice of the everyday life (choices); (2) frame the means for the interpretation of data with citizens' to shape new communities of knowledge (practice) and (3) create public conversations between citizens and other publics for transformative utterances of urban societal realities (system), to be enhanced possibly by street-level practices. The citizens' practice in their everyday life is the essential setting for re-imagining and redesigning new digital and physical urban futures for planning the next city.

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