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## **Data-Driven and Citizens' Inclusive Smart Cities: Top-Down and Bottom-Up Approaches to Tackle Societal and Climate Challenges**

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### **Abstract**

This chapter initially covers the main work which is the Citizen Focus Action Cluster in the Smart Cities Marketplace. It draws attention to the resources that are available for cities to use in relation to collaborating with other cities when addressing inclusion issues in designing their urban strategies.

It addresses the crucial role of data in citizen engagement in the development of smart cities and does this by presenting three case studies.

It concludes with a reflection on the future trends which are worth following covering policy and technology developments in this field.

### **16.1 Introduction**

A citizen-centred approach has become an inherent part of the definition of intelligent and smart cities in the past few years, although it is taken into effective consideration at different degrees, from mere statements and communication-oriented approaches (buy-in of citizens as technologies' users/adopters) to more or less "critical" and "transformative" visions that foresee to engage with citizens playing active roles in all phases of a smart cities project, encompassing planning/designing implementation and evaluation phases, thus contributing to the renewal of urban democratic processes.

The entire field of promoting smart cities has been indeed subject to criticism of it being far too “submissive” to market forces and the deployment of technologies at the urban scale by replicating discourses on “creative cities” that would end up (mostly) benefitting citizens of high–middle classes and reproducing existing inequalities and divides. In the work of the EIP smart cities and communities (re-named Market Place<sup>1</sup> after 2020), we have aimed at facilitating dialogue and discussions among the broadest possible spectrum of stakeholders interested into overcoming “tech-centred” approaches so as to counteract the drift of the smart cities discourse, towards merely market-driven directions: for this purpose, a dedicated “citizen focus” action cluster<sup>2</sup> has been set up and developed through the years, focusing on citizen engagement in smart cities, which we humbly believe have contributed to make the discursive and empirical frameworks of smart cities all in all more inclusive.

This short chapter has a three-fold aim: it intends to present the main frameworks and action lines of the Citizen Focus Action Cluster since its creation to date, and to point at the key resources that we believe can still be a point of reference for cities that want to work with other cities when thinking of their own urban innovation processes in an inclusive manner. On the other hand, and coherently within the context this volume provides, we wish to emphasise the crucial role of data in citizen engagement within smart cities projects and to present three concrete case studies/examples. Finally, we reflect on future trends to follow up and keep track of in the next few years in view of the most recent policy and technology developments in the field.

## **16.2 Sharing and Networking on Citizen Engagement in Europe. Resources and Lessons Learnt from the Citizen Focus Action Cluster of the Smart Cities Marketplace**

The Action Cluster had started in 2014 by facilitating networking and mutual learning among 61 commitments submitted by about 100 organisations and projects, several of those being funded by the European Commission. After having distilled the good practices and the principles emerging from the bottom-up process harvesting knowledge from cities, researchers, and

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<sup>1</sup> <https://smart-cities-marketplace.ec.europa.eu/>

<sup>2</sup> <https://smart-cities-marketplace.ec.europa.eu/action-clusters-and-initiatives/action-clusters/citizen-focus>

companies into a first booklet, the Cluster has converged on one main communication campaign with an Inclusive Smart Cities Manifesto<sup>3</sup> that has positioned citizen engagement at the core of the smart cities discourse, linking it closely to the design phases, presenting co-design and co-creation as some of the methods to pursue this, so as to overcome the narrower and top-down interpretations of citizen engagement as ways to convince/educate citizens that have featured in its initial steps (as highlighted by Cardullo and Kitchin, 2019<sup>4</sup>). Moreover, the Manifesto has represented a first move towards overcoming a “universalistic” and generalising definition of “citizen” that is too often concealing an idea of a citizen as white-young or middle aged, middle or upper-class, CIS-gender or male, and able citizen.

The Manifesto has put forward a vision of inclusiveness within its first statement “in the design of smart cities solutions, it is crucial to use the appropriate means to engage and empower population groups difficult to reach such as people experiencing poverty and/or social exclusion, younger and older people, migrants, people with disabilities, and aim at gender balance in participation and engagement”. Finally, the Manifesto has conveyed the message that citizen engagement is boosted by data and can foster data generation by citizens, as it encouraged cities to “Promote the use of open data and/or an appropriate access to data by citizens, developers, start-ups and engaging citizens in the evaluation of urban policies by applying Open Government practices integrating feedback loops to renew and improve services, ensure privacy by design”. Presented in a high-level launch event in Brussels, translated in many European languages, and signed by more than 200 organisations across Europe, the Manifesto has supported a paradigm shift that was becoming mature and that has been continued in the forthcoming activities of the Action Cluster Citizen Focus.

Also, to confirm our non-reductionist vision and diversified vision of citizen engagement, we have put efforts in promoting participatory budgeting (PB) as a methodology that enables citizens to decide on how to allocate portions (although small ones) of the city’s budget: in fact, PB integrates participatory and consultative elements, crowdsourcing of project ideas, with deliberation and voting on a selection of the crowdsourced project ideas. We have curated and disseminated knowledge and good practices on participatory

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<sup>3</sup> <https://smart-cities-marketplace.ec.europa.eu/sites/default/files/EIP-SCC%20Manifesto%20on%20Citizen%20Engagement%20%26%20Inclusive%20Smart%20Cities.pdf>

<sup>4</sup> Cardullo, P. and R. Kitchin (2019). Smart urbanism and smart citizenship: The neoliberal logic of ‘citizen-focused’ smart cities in Europe August 2019. *Environment and Planning C Politics and Space* 37(5): 813–830.

budgeting as well as the online platforms that enable them, acknowledging how back in 2016, already over 8 million European citizens had been actively involved in participatory budgeting initiatives (EPRS, 2016, p. 8<sup>5</sup>) and its relevance and strong potential in the context of smart cities planning and implementation. Many cities have been increasingly using online digital tools to implement participatory budgeting, either through in-house designed or open source or proprietary platforms. Furthermore, it is proven how digitalised versions of PB can both empower citizens and acknowledge their role in decision-making processes and achieve “smart literacy” goals.

Participatory budgeting can be experimented and piloted with thematic focus on areas of intervention which are particularly relevant for smart cities, such as smart mobility, energy efficiency, waste management, etc. (i.e., Capaccioli *et al.*, 2017<sup>6</sup>), and this type of experiences has been reported and analysed. The work carried out on PB in the Cluster fed into the chapter on citizen engagement that was included in the Smart City Guidance Package.<sup>7</sup> Whilst promoting the good practices and the online platforms in use from several cities (Barcelona, Madrid, and Paris, among others), we have acknowledged as the most promising ones those experiences such as in Barcelona, where participatory budgeting has been part of a broader set of policies aimed at re-interpreting a smart city definition around notions of technological sovereignty and politics around the “right to the city”. In Barcelona, the Decidim platform<sup>8</sup> has been the core of the participatory budgeting experiment, “a digital infrastructure for participatory democracy”, a “public-commons” project mostly financed and made possible by the city but designed and maintained by an open-source community. It is used to consult and co-create with citizens on the specific topics/policies/regulations at stake at a given time, and the digital component of collecting ideas and feedback on the platform is always accompanied, pandemic conditions permitting, by in-presence meetings.

Critical aspects that the focus groups and webinars on PB which we have organised, have shown that there is a geographical gap as this practice

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<sup>5</sup> European Parliament Research Services (2016). Participatory Budgeting. An Innovative Approach [https://www.europarl.europa.eu/RegData/etudes/BRIE/2016/573894/EPRS\\_BRI\(2016\)573894\\_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2016/573894/EPRS_BRI(2016)573894_EN.pdf)

<sup>6</sup> Capaccioli, A., Poderi, G., Bettega, M. and V. D’Andrea (2017). Exploring participatory energy budgeting as a policy instrument to foster energy justice. *Energy Policy*, vol. 10, pp.621–30.

<sup>7</sup> [https://www.researchgate.net/publication/343615678\\_Smart\\_City\\_Guidance\\_Package](https://www.researchgate.net/publication/343615678_Smart_City_Guidance_Package)

<sup>8</sup> <https://decidim.org/>

and its variants and platforms are much less present in eastern European countries. Other hindrances that have been shared within the Citizen Focus Action Cluster community, included some of those also recalled by a recent study (Radma-Liiv, 2022<sup>9</sup>) stemming from the Horizon 2020 Tropic project. This compared e-participation experiences in six European countries. A careful design and implementation is required as PB experiments require the collaboration of multiple internal and external stakeholders; so any flaw in the process can lead to delayed decisions, increased conflict, and distrust from participants. The research, mutual learning, and networking activities of the Citizen Focus Action Cluster have along the years encompassed many more topics and areas than the ones mentioned above, through the establishment of so-called “Initiatives” (or cluster sub-groups): citizen-centric approach to data, Citizens’ Control of Personal Data,<sup>10</sup> Policy Labs,<sup>11</sup> and the creation of the Citizen City<sup>12</sup> toolkit are among the most prominent ones. Most of the knowledge that has been generated has converged into the “Citizen Engagement Solution Booklet”<sup>13</sup> that stemmed in 2021 from the collaboration between the Smart Cities Information System and the Action Cluster: in fact, in the booklet, we defined citizen engagement as “a way of actively involving citizens in the city’s decision-making processes, that can help to address these needs. Citizen engagement exists in many different forms, ranging from merely influencing and informing people, to real participation and actual decision making. The set-up of such an engagement process could be initiated by the city or its citizens, and in its most thorough form is organised by collective effort”.

The booklet provides a substantial and informative set of resources accompanied by concrete cases and good practices from cities covering the different steps of setting the goals for citizen engagement and co-creation of urban innovations, designing and implementing the interventions, and scaling results up to the policy levels. It also encompasses a variety of sectors, from mobility to energy communities and waste management and more.

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<sup>9</sup> Radma-Liiv, T. (2021). Organizing e-participation: Challenges stemming from the multiplicity of actors. *Public Administration*, 1–17. <https://doi.org/10.1111/padm.12788>RANDMA-LIIV<sup>17</sup>

<sup>10</sup> <https://smart-cities-marketplace.ec.europa.eu/action-clusters-and-initiatives/action-clusters/citizen-focus/citizens-control-personal-data>

<sup>11</sup> <https://smart-cities-marketplace.ec.europa.eu/news-and-events/news/2018/policy-labs-building-future-policy-making>

<sup>12</sup> <https://smart-cities-marketplace.ec.europa.eu/action-clusters-and-initiatives/action-clusters/citizen-focus/citizens-city>

<sup>13</sup> <https://smart-cities-marketplace.ec.europa.eu/insights/solutions/solution-booklet-citizen-engagement>

A main obstacle that we have detected on the way towards “mainstreaming” a citizen engagement approach to smart cities initiatives refers to the lack of resources, meant as both financial and human: those cities that are or have been partners within Horizon 2020/Europe funded projects have more frequently incorporated citizen engagement practices (although with different “intensity”); when external funding is not available, the needed investment might be lacking. Funded projects often function as learning pathways where allocated resources allow for input from specialists/experts partners to guide the cities’ efforts from a methodological point of view, while at the same time building internal skills and capacities; yet, restructuring the processes of a public administration and shrinking budgets are often mentioned as impediments to allocating staff and resources dedicated to engagement and participatory processes that feed into urban innovation policies and projects.

### **16.3 Good Practices. Citizen Generated Data to Improve Urban Innovation and Smart Cities Policies. Top-Down and Bottom-Up Approaches**

The good practices we present and describe in this section have been selected with the rationale of, on the one hand, focusing on a more top-down approach to the engagement work that can be done relying on data. This is the case for Camden, London (see Section 3.3) and for Sofia (see Section 3.11) through its Policy Cloud H2020 project<sup>14</sup> when decision is made by the city administration to put in place a project and/or make use of a technology that makes the most out of data for the sake of urban innovation policies and their evidence-based qualities, while preserving citizen’s right to privacy. A complementary comprehensive review of citizens’ generated data practices as forms of “data donation” that can benefit public policies is to be found in a JRC report (Ponti & Craglia, 2020<sup>15</sup>): it documents 18 European projects involving citizen-generated data via digital technologies (low-cost sensors and accessible digital technologies). These have proven to re-configure the relationship between citizens and the public sector, giving the former ones increased agency and control so that they undertake a “change-agents” role: this is particularly important in times of serious challenges related to the

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<sup>14</sup> <https://policycloud.eu/>

<sup>15</sup> Ponti, M. and Craglia M. (2020). Citizen-generated data for public policy. A brief review of European citizen generated data projects, European Commission, Ispra, 2020 JRC120231.

climate crisis that make a change agenda urgent and enhanced accountability and transparency from local authorities a must.

On the opposite, the other set of good practices featured in this section was chosen as they are more bottom-up in terms of their origin, management, and development, and refer to the use of crowdsourced data and information from citizens to feed into web and mobile applications that are aimed at addressing societal challenges. The Europe- and India-based projects that we will refer to show interesting and challenging aspects as far as harnessing citizen-generated data to contribute to solving pressing societal matters, such as gender-based violence and increasing the wellbeing and perception of safety in public spaces.

### **16.3.1 Harnessing open data for evidence-based urban policies – the Camden and Sofia use-cases**

The Horizon 2020 Policy Cloud project on cloud-based solutions for data-driven policy management has a whole field of experimentation and piloting on policies for citizens. This has been utilised by the Camden Borough in London, UK and by Sofia, the capital city of Bulgaria, which is a pilot site for the project. To build internal legitimacy for the processes described below, Policy Cloud has leveraged on recent EU policies such as the Communication Towards a Common European Data Space (2018)<sup>16</sup> on fostering access and re-use of public and publicly funded data as a cornerstone of an European Data Space as well as the former Revised PSI (Public Sector Information) Directive from 2013.<sup>17</sup>

The Camden Borough in London was one of the Policy Cloud piloting partners, and it applied the use of the project platform and data analytics technology for predicting risks related to unemployment in its 210,100 population. Starting from an existing commitment to publish open data in adherence to the International Open Data Charter, the Council is relying on hundreds of published datasets from offices that manage unemployment schemes and allowances but also housing and social welfare more broadly, to highlight trends. Such a work is based on data and is underpinned by the notion that residents have the right to access data which does not compromise individual privacy. The ultimate objective is to identify impacting factors and thus informing evidence-based policy choices that have increased feasibility and achieve greater legitimacy. The Council checks on KPIs and statistics

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<sup>16</sup> <https://digital-strategy.ec.europa.eu/en/news/communication-towards-common-european-data-space>

<sup>17</sup> <https://digital-strategy.ec.europa.eu/en/policies/psi-open-data>

based on the number of citizens claiming governmental aid when seeking work: through data analytics performed by the platform developed by Policy Cloud. Age groups most affected by unemployment are identified and issues with discrimination related to gender bias or other biases on the ground of ethnic origins, as well as the specific areas of the borough that might be more heavily affected enable policy choices to become more responsive to the needs of specific populations. The pilot has shown several advantages of the platform and proven its accessibility, due to the lack of need for infrastructure to run the tool and its adaptable features.

Sofia has instead used the concept of improving urban policy-making through the analysis of crowdsourced data by using data from direct communication with and from citizens and the city administration itself. The capital of Bulgaria with its population of about 1.8 million inhabitants has sought for improving the overall urban environment of the city, via assessment and validation of urban policies through big data analytics. Analysis of big data has been sourced from different sectors, such as: transport, parking and road infrastructure, waste collection, cleanliness of public spaces, air pollution, and violation of public order. The main existing data source for the cloud-based Policy Cloud platform has been the citizens' contact centre ("SofiaCall" service), which has been operational since 2014 and facilitates direct communication from citizens, industry, and institutions wanting to signal non-urgent deviations in the urban environment. Citizens use the contact centre to post online signals (as are quite typical for this type of services, free text and pictures can be uploaded, categories/labels assigned and each signal is geo-located). Call Sofia contains 300.000 signals in 90 categories, 70.000 in 2019, each one manually processed by officers.

Analysing the territorial distribution of signals by category through the Policy Cloud platform enables municipal and district administrations to identify problems, issues, and behavioural trends in the urban environment. Monitoring and control of the services are also made possible: risks are identified and preventive actions can be envisaged, as well as adjustments being made to policies. An additional crowdsourced database that has been used in the project is the "Air Things Platform"<sup>18</sup> for air-quality monitoring (while all scenarios use data from Sofia Call, one uses also Data from Air Things). What happens with Policy Cloud making use of crowdsourced data is that it produces meaningful and structured results starting from unstructured data: incidents and problems are categorised and analysed by type, area, frequency,

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<sup>18</sup> [http://www.interreg-balkanmed.eu/article/137\\_AIRTHINGS-Project---Open-Data-Platform-](http://www.interreg-balkanmed.eu/article/137_AIRTHINGS-Project---Open-Data-Platform-)

and year/month, and patterns are identified that enable predictions and forecasts. Re-usable analytics tools are made available to the city, as well as a “Data MarketPlace” that is respectful of privacy and GDPR regulations.

Visualisation tools embedded in the platform proved to be crucial for buy-in of decision-makers and policy officials (bar charts, heat-maps, spider charts, etc.). Interestingly, a co-creation process was organised from the design and validation phases of the scenarios for use of the platform itself with feedback collection from different stakeholders inside and outside the city, involving the innovation hubs in the city, such the Gate Institute Centre of Excellence on Data and Artificial Intelligence within the Sofia University.

### **16.3.2 Crowdsourced data for enhancing safety perception in public space and transport**

Safecity was established in December 2012 as an immediate response to a gang-raping episode ending up in femicide of the raped and brutalised victim who got national and international media attention in Nirbhaya, India. The debate focused on the opportunity for women to avoid going out in the evening as a possible solution; so the promoting NGO took on an empowerment-oriented approach instead, creating means of reporting the places where women face harassment or violence so that “hot spots” of incidents can be viewed on a map. The data collected on the “Safecity.in<sup>19</sup>” platform consist of individual reports explaining what happened, the location where the incident took place, and the date and time when it happened. An NGO in the form of a foundation<sup>20</sup> registered both in the US and India has created and piloted the platform that since its launch has collected over 45,000 reports in India, Nepal, and Kenya and is expanding its usage worldwide, with 10,000 reports uploaded in 2020-21. The collected data are thought of to be useful to not only city dwellers but also the administration, NGOs, and police officials. This practice achieves multiple goals from creating awareness on harassment so that women and other disadvantaged communities are encouraged to break silence and to report harassment experiences to community building and leadership. Also, a data gap is filled in, by generating geo-localised datasets that local administrations (but also managers at large institutions such as university campuses) can use to address the problems. Users of the app can also make informed decisions on where to travel, at what time, and by which transportation. In terms of impact on local policies, Safecity succeeded to

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<sup>19</sup> <https://www.safecity.in/>

<sup>20</sup> <https://www.safecity.in/wp-content/uploads/2021/09/Red-Dot-Foundation.pdf>

influence police patrol and local vigilance schedules, to augment budgets for CCTV surveillance and speed up decision-making to fix street lightning and toilets in areas perceived as unsafe (Bencke, 2019<sup>21</sup>; Adams, Lea & D'Silva, 2021<sup>22</sup>).

It is worth stressing that anonymous reporting is encouraged on the app and platform, and validity concerns are only very rarely raised in the validity checks that are routinely performed to test the reliability of the platform, via patterns' reliability.

A similar initiative is developed with a different business model and technology, branded as Safetipin<sup>23</sup>. Also located in India (9 cities) with more use-cases (21) in several African and Asian cities too, Safetipin is a social enterprise that has partnered with software designers and developers to devise a service having in mind city administrations as core stakeholders to buy and implement the model, along with citizens. The team offers on the first place a "safety auditing" service, to assess how an area, a neighbourhood, or a city are safe according to a rubric of indicators devised by the company team and an expert advisory board, encompassing lighting of streets, visibility, diversity, (number of people from different age group and gender present in a certain time), crowd, availability of public transport, walk paths, security, i.e., available police and other private security, openness, i.e., if the user has a proper view of the area properly or not, and feeling, i.e., how safe the app users report they feel at a given time in that place.

By "quantifying" safety levels of a given public area attributing a score to it, it becomes possible for policy-makers and implementers to measure improvements. The scope is broader than safety reflected as freedom from harassment as it also includes criteria to measure walkability, accessibility, and functionality of public spaces, which are all taken into account. The Safetipin Site app can be customised for each project to collect additional information required by governments. This could involve accessibility of bus stops, functionality of public toilets, last mile connectivity from metro stations, and so on.

The MySafetipin mobile app is thus made available to citizens who can use the multiple functions such as providing feedback about how safe they

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<sup>21</sup> Bencke, F. (2019). *Gender and The City. Building feminist geography approaches to public life surveys in urban India*. University of Copenhagen, Master Thesis in collaboration with Safetipin/Red Dot Foundation.

<sup>22</sup> Adams, A., Lea, S.G. and E.M. D'Silva (2021). Digital Technologies and Interventions Against Gender-Based Violence in Rural Areas, *International Criminal Justice Review*. 2021;31(4): 438–455. doi:10.1177/10575677211040413

<sup>23</sup> <https://safetipin.com/>

feel in a space/area and “audit” the place themselves including pictures if they wish. All data provided by different means (both stakeholders and individuals allow to compute a safety score for a location, which can be then used by people to make safer choices by means of selecting a place to stay when travelling based on the safety score of the neighbourhood, driving or walking using the safest route, finding the nearest safe place and heading there. Advanced functionalities enable users to ask friends to track them and get notifications should they have any troubles or receiving notifications when in an unsafe place.

At the same time, stakeholders can be served through an extra function defined as ‘Safetipin Nite’ for collecting data both at night and during the day: by installing a phone with the app on the windshield of a car, routes can be worked out in back-end mode by trained professionals so that all streets of the city are covered: as the car moves, photographs are taken at predefined distances and are uploaded onto the platform servers. Machine learning (computer vision) algorithms are used on these pictures to extract information on safety parameters. A few additional data points are then added by trained coders who use this information to audit a given point, and this information, all geo and time-tagged, adds on to all other data that are collected by different means (individual citizens included) to measure the safety levels of urban spaces. The complex technology that has been created by integrating different apps is described in more detail at the developer’s website<sup>24</sup>. The use of Women Safety Audits leveraging on (both open data and crowdsourcing) technologies has been supported by UN Women (see UN Women 2019, p. 20 onwards); Safetipin has been highlighted as a good practice by UN Habitat and UK Aid agency. Yet, some studies point at flaws and criticisms in its functioning and at areas for improvement in, among others, data visualisation components of the technology, as well as privacy and data protection (Manazir, Govinda & Rubina, 2019<sup>25</sup>).

Similar to the two above-mentioned experiences and the related technologies, a European version has recently kicked off, in the shape of the Safe and the City project<sup>26</sup>, run by a women-led SME and piloted in London. It was awarded a Greater London Authority “Green Deal grant” to scale the technology in 2021 and by a further grant from the Foundation for Integrated

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<sup>24</sup> <https://metadesignsolutions.com/case-study-safetipin>

<sup>25</sup> Sharique Hassan Manazir, Madhav Govind, and Rubinan (2019). My Safetipin Mobile Phone Application: Case Study of E-participation Platform for Women Safety in India, *Journal of Scientometric Res.* 2019; 8(1):47–53.

<sup>26</sup> [www.safeandthecity.com](http://www.safeandthecity.com)

Transport (FIT) as funding enabling social enterprises to grow their business and impact. The tool is offering a free personal safety navigation app by which users can plan their routes and share and rate their journeys while keeping safe as they receive notifications walking to any areas the police have flagged as a historical street for crimes. In addition, if any emergency occurs, a two-click access allows to quickly contact appropriate emergency services. Users are asked to report when they feel unsafe, so that the shared information also feeds into the geo-tagged mapping system. The service privacy and data protection policy is GDPR compliant, and as the app is free for final beneficiaries/individual users, the incentive to report and provide personal data/information consists of using the services with no fee. Also this SME profiles itself as mission-oriented and runs awareness raising campaigns against sexual harassment against women and LGBTQ+ minorities.

The three case studies presented in this chapter show interesting bottom-up approaches where the initiative is taken by civil society organisations and/or social enterprises, to design cloud-based IT solutions, even using integrated cutting-edge technologies (as it is the case for Safetipin and Safe and the City in particular), that rely on both user-generated data and data that is collected by the organisations in partnership with local and police authorities. The final purpose is to tackle societal problems and facilitate women and minority right to safety in public space and particularly during nighttime, which have been the subject of extensive studies and literature (i.e., Ceccato, 2014<sup>27</sup>). The cases can also be considered as illustrative of increasingly spread gendered approaches to inclusive smart cities design (URBACT, 2022<sup>28</sup>; Sanguiliano, 2017<sup>29</sup>; Nesti, 2019<sup>30</sup>). Data and privacy protection are in all cases provided by users upon the incentive of a free-to-use service, and in the Europe-based service (Safe and the City), their use is regulated according to GDPR compliance.

The key features include an attention to cover and fill data-gaps that are usually featuring urban data collection when it comes to societal issues that might be undervalued in mainstream policies and perceptions from

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<sup>27</sup> Ceccato, V. (2014). Safety on the move. Crime and perceived safety in transit environments, *Security Journal*, 27, 127–131.

<sup>28</sup> <https://urbact.eu/smart-cities-innovation-and-gender-equality>

<sup>29</sup> Sanguiliano, M. (2017). Smart Cities and Gender: main arguments and dimensions for a promising research and policy development area. Paper prepared and published for the OHCHR (Office of the High Commissioner United Nation Human Rights).

<sup>30</sup> Nesti, G. (2019). Mainstreaming gender equality in smart cities: Theoretical, methodological and empirical challenges. *Information Polity*, vol. 24, no. 3, pp. 289–304, 2019.

minorities; along with an attention to broaden the scope from mere statistics and quantitative data to qualitative ones including reports from users, this is also in line with those studies that argue in favour of more inclusive and empowering forms of data-driven civic engagement and activism (D'Ignazio & Klein, 2020<sup>31</sup>; Costanza-Chock, 2020<sup>32</sup>).

## 16.4 Envisioning the Future of Citizens' Intelligent Cities and the Role of Citizen Engagement

Climate change has become a serious challenge and consequently a topic of discussion among European policy-makers for more than two decades now. The European Union has been largely recognised to be a leader in promoting climate action within its borders and beyond them, attracting attention towards global environmental problems and supporting key agreements related to the environment such as the Paris Agreement. In 2019, the European Commission presented the European Green Deal<sup>33</sup> as a new growth strategy that aims to transform the EU into a fair and prosperous society, with a modern, resource-efficient, and competitive economy with net greenhouse gases emissions in 2050. A renewed awareness of the urgency to tackle climate change impact and focus on environmental policies has also changed the definition of “smart cities”: the use of digital infrastructures and solutions has been framed more than it was the case already as means to achieve climate neutrality goals. In fact, achieving 100 cities that commit to cut emissions by 55% by 2030 is the objective identified by the Mission Board for climate-neutral and smart cities,<sup>34</sup> in view of making Europe climate-neutral by 2050. Digital technologies play a key role here; so these policies are integrated with Europe's digital policy and initiatives (such as the new Digital Europe Programme) thought of as a convoy to accelerate the transition: high-quality connectivity infrastructures and digital environments that empower end-users, complying with GDPR and European ethical standards, are expected to grow and develop further.

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<sup>31</sup> D'Ignazio, C. and L. Klein (2020). *Data Feminism. A new way of thinking about data science and data ethics that is informed by the ideas of intersectional feminism.* MIT Press.

<sup>32</sup> Costanza-Cock, S. (2020). *Design Justice. Community-Led Practices to Build the Worlds We Need,* MIT Press.

<sup>33</sup> [https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal\\_en](https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en)

<sup>34</sup> [https://ec.europa.eu/info/research-and-innovation/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/eu-missions-horizon-europe/climate-neutral-and-smart-cities\\_en](https://ec.europa.eu/info/research-and-innovation/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/eu-missions-horizon-europe/climate-neutral-and-smart-cities_en)

Studies have estimated that ICT could enable a 20% reduction of global CO<sub>2</sub>e emissions by 2030, holding emissions at 2015 levels, and that the ICT sector's emissions "footprint" is expected to decrease to 1.97% of global emissions by 2030, compared to 2.3% in 2020. Furthermore, the emissions avoided through the use of ICT are nearly ten times greater than the emissions generated by deploying it and with substantial benefits to agriculture as well including water and oil-use decrease (GeSI, 2015<sup>35</sup>). Even taking into account more critical opinions in terms of the environmental impact of the ICT industry than the above-mentioned ones, and the demonstrated need for sector-based efforts and regulations needed to make sure that the greenhouse emissions of the sector itself are in line with the Paris Agreements (Freitag *et al.*, 2021<sup>36</sup>), we can assume that it can play a positive role in achieving solutions in the face of the climate crisis. Private and public investments are expected in projects that use automation through AI and robotics to disassemble and separate waste, to enhance stability, effectiveness, and safety of low (zero) carbon electric grids, as well as in systems that model extreme weather phenomena, by climate impact modelling for mitigation and adaption, also thanks to collection, better access, enhanced analysis of environmental "big" data, and a new generation of digital tools for citizen' engagement.

The Interim Report from the Mission (EC, 2020<sup>37</sup>) identified the so-called Climate City Contracts as the key tools to be used by cities to set up programmatic objectives and strategies towards de-carbonisation for energy, transport, buildings, and even industry and agriculture. The mission policy report acknowledges that beyond R&I, a broader involvement is required across a spectrum of actors and policy areas and that a meaningful engagement of citizens is needed. Even if in the main part of the text and the dedicated chapter on citizen engagement of the report the formulation is not specific and in-depth as one could expect, the proposed framing for citizen engagement in smart cities that is presented in one of the reports' annexes is much more to the point and very close to the approach we have pursued within the Citizen Focus Action Cluster of the Smart Cities Marketplace, with a call to substantial impact, differentiation

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<sup>35</sup> GeSI (Global eSustainability Initiative). #SMARTer2030. ICT Solutions for 21st Century Challenges.

<sup>36</sup> Freitag, C., Berners-Lee, M., Widdicks, K., Knowles, B., G.S., Blair and A. Friday (2021). The real climate and transformative impact of ICT: A critique of estimates, trends, and regulations. Patterns, Volume 2, Issue 9.

<sup>37</sup> European Commission, DG R&I (2020). 100 climate-neutral cities by 2030 - by and for the citizens Interim report of the mission board for climate-neutral and smart cities. Luxembourg, Luxembourg: Publications Office of the European Union.

from consultative/communication efforts, and inclusiveness: “To be effective, citizen engagement has to be *inclusive, deliberative, and influential*. These three basic criteria put it in a different league compared to other ways in which we reach out to society such as communication, public consultations or stakeholder debates. Citizens bring original perspectives to R&I and policymaking, and their engagement helps bridge the gap between science, markets and society. This is especially important in fundamental transformations – e.g. the transition to climate neutrality – that require not just innovation in technologies, but also profound changes in lifestyles and behaviour, along with innovative governance models. Such transformations cannot be imposed from the top: they need to be embraced and shaped by the citizens themselves” (ibid, EC, 2020, p. 23).

This policy framework and its objectives are supported by the Net-Zero Cities Consortium<sup>38</sup> that is set up to constitute a one-stop-shop that will offer support to cities committed to implement the climate contracts via open calls for proposals. Citizen engagement is a crucial part of the process for creating a Climate City Contract, along with the concept of co-creating the contracts with local stakeholders and citizens, since the design phase of the contracts and along the implementation. Following the open calls run in 2022 with the participation of 377 cities, the 100 cities that will be part of the programme have been selected.<sup>39</sup> Nevertheless, the EC has announced that the NetZero Consortium will also offer forms of support to the other applicant cities although via a twinning programme. The Net-Zero platform is therefore a digital platform to follow up in the next years when the challenge will be to have a more focused approach towards citizen engagement within climate neutrality policies in urban contexts.

Besides the fact that citizen engagement as a field will be much more oriented towards specific policy areas and topics related to climate change, we can also expect that the technological developments already mentioned above and reflected in case studies in paragraph 16.3.1 in particular and partly 16.3.2 will heavily influence this field of studies and practice. The increasing share of R&I endeavours in big-data analytics through artificial intelligence algorithms and systems in particular has vast potential applications for civic-engagement purposes as well (Brandusescu & Reia, 2022<sup>40</sup>): public trust

<sup>38</sup> <https://netzerocities.eu/>

<sup>39</sup> <https://op.europa.eu/en/publication-detail/-/publication/822ee360-c9bf-11ec-b6f4-01aa75ed71a1/language-en/format-PDF/source-256649647>

<sup>40</sup> Brandusescu, A., & Reia, J. (Eds.). (2022). Artificial intelligence in the city: Building civic engagement and public trust. Centre for Interdisciplinary Research on Montréal, McGill University. <https://www.mcgill.ca/centre-montreal/projects/completed-projects/ai-city>

and meaningful civic engagement can flourish and persist as data and artificial intelligence become increasingly pervasive in our lives, provided that some inherent challenges are critically approached and researched upon. In fact, these technologies pose new challenges both to core individual values such as privacy and equality, fairness, security, and accountability that have been outlined in studies (Gebru, 2020<sup>41</sup>) and tackled in the White Paper on Artificial Intelligence – A European Approach to Excellence and Trust<sup>42</sup> that require further investigation, research, and experimentation. Horizon Europe has integrated these concerns as research priorities under different clusters so that several calls for proposals have been published and probably more will follow on these issues: between the years 2022 and 2023, at least six new projects will be launched that will investigate, on one hand, how to de-bias AI systems and re-think fairness to avoid gender and intersectional bias is reproduced and multiplied in different domains<sup>43</sup>, and, on the other, on how to harness the AI technologies for inclusive and fair civic engagement and democratic participation<sup>44</sup>: the generated research and the pilots that will be set up will offer knowledge and inspiration to advance this field for sure.

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<sup>41</sup> Gebru, T. (2020). Race and Gender, in Dubber, M. D., Pasquale, F. and S. Das (eds.) (2020). *The Oxford Handbook of Ethics of AI*, pp. 253–270. New York, Oxford University Press.

<sup>42</sup> [Link to the White Paper on Artificial Intelligence.](#)

<sup>43</sup> <https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/horizon-cl4-2021-human-01-24> (check the list of funded projects to the bottom of the page)

<sup>44</sup> <https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/horizon-cl2-2022-democracy-01-01> (the list of funded projects will be published to the bottom of the page when available after the Evaluation results will be published and the Grant Agreement signed with the winning consortia).