International Association of Societies of Design Research Congress 2023
LIFE-CHANGING DESIGN
Politecnico di Milano
9-13 October 2023

When 'doing ethics' meets public procurement of smart city technology – an Amsterdam case study

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doi.org/10.21606/iasdr.2023.520

City governments increasingly experiment with civic participation in the procurement and the realization of smart city technologies in order to improve the incorporation of human values. In this paper, a model is proposed with the level of participation, the continuity of participation and the extent of institutional embedding to illustrate how challenging these experiments are. The City of Amsterdam also experiments with its procurement approach for a new camera car service that ensures an ethically responsible, privacy-friendly and secure collection of images from public space. Two starting points drive this change: 1) in order to have more control over the data, the municipality develops its own machine learning models for processing the images and 2) a multi-stakeholder co-design project – including a citizen panel – is an integral part of the process in which the service is designed and realized. To support this new procurement process, a group of design-researchers were involved in a collaborative case study to identify requirements relevant for the tender. An analysis of the case study findings along the three dimensions brings us to the conclusion that the approach developed by the City of Amsterdam is a fruitful encounter between 'doing ethics' and procurement. The lessons of this procurement approach for 'doing ethics' are claimed to be of value for other practical contexts and further research.

Keywords: public procurement; doing ethics; smart city technology; urban management

1 Introduction – Ethical challenges in smart city technologies

In recent years, many cities around the world have turned into 'smart cities'. Digital technologies such as sensors and cameras using algorithms and artificial intelligence are implemented to manage the city more efficiently and increase sustainability and safety. None of these technologies are neutral (Hickok, 2022). Their design is based on underlying sets of values that prioritize particular interests or world views above others (Brigham & Introna, 2007; Engelbert & Van Zoonen, 2019). Furthermore, algorithms and artificial intelligence can be biased leading to harmful situations for individuals or

groups (Herruzo, 2022; Kortuem, 2019). Moreover, their exact functioning often remains opaque. Citizens are usually not aware of the technologies used for managing their cities and public spaces and the values they are based on (Cardullo & Kitchin, 2019; van Twist et al., 2023). This is increasingly problematic as more and more urban processes are becoming 'smart.' In a democratic society, civil society should be able to understand, scrutinize and contest the technologies and algorithms that manage and govern their public spaces (Alfrink et al., 2022; Sheikh et al., 2023) .

Professionals in urban management have started to understand these ethical implications. Various cities have launched manifestos and declarations (e.g. the Declaration of the Cities for Digital Rights[1] and the Tada[2] manifesto in Amsterdam). These pamphlets express the importance of developing smart city technologies from a human and civic perspective, calling to create technology based on values such as transparency, accountability, and inclusivity. They also urge city administrators to enable citizens to understand and critique the workings of these technologies. However, various involved professionals still find it challenging to operationalize these principles. In the procurement process, city officials have difficulties translating abstract principles from manifestos into requirements for products and services and communicate them with external developers and designers (Nagitta et al., 2022; Naudé & Dimitri, 2021).

The challenges in this field of public service design require finding new approaches and accompanying organizational change. In the research project Human Values for Smarter Cities we explore the developments of more integrated, value-based and multistakeholder design approaches for the ethical implementation of smart city technologies. As part of that broader trajectory, we were involved as design researchers in a procurement process of the City of Amsterdam that is setting up a new camera car service while improving the incorporation of human values it adheres to. It intends to do so by making adjustments in its approach to and thinking about procurement and design of smart city technologies. More specifically, the City of Amsterdam is developing a tender based on two starting points: 1) in order to have more control over the data, the municipality develops its own machine learning models for processing the images and 2) after the tender award, a multi-stakeholder co-design project – including a citizen panel – is an integral part of the process in which the service is designed and realized. Our aim during this collaborative case study was twofold: a) to identify value-based requirements for this specific kind of procurement process and b) to design a method that could support this identification.

For the purpose of this paper, we analyse the case study findings from the perspective of a model with three dimensions that together are claimed to be crucial for the realization and implementation of an 'ethical camera car and data collection' in the City of Amsterdam. In section 5, this results in identifying insights and lessons for public bodies procuring smart city technology while investing in 'doing ethics' and in institutional embedding at the same time. But first, in section 2, we introduce the model with the three crucial dimensions, which helps to explain why new approaches to the incorporation of values in deployable smart city technology are challenging. Next, in section 3 we describe the context and details of the collaborative case study about the new approach to procurement by the City of

[1] https://citiesfordigitalrights.org/declaration

[2] https://tada.city/en/home-en/

Amsterdam. The findings in section 4 show what requirements were identified in the collaborative case study and what method was applied to support this.

2 The role of citizens in incorporating values in procurement

The securement of human values in public service design of smart city technologies can be considered a challenge that consists of three dimensions: the level of participation, the continuity of participation during a technology's life cycle and the extent of the institutional embedding. Relating new approaches like civic prototyping and participatory procurement to these dimensions, illustrate why it is difficult for the public sector to implement procurement processes that adhere to all three of them.

2.1 Modelling participation level, participation continuity and institutional embedding

In the field of procuring and realizing ethical smart city technologies by local governments, we identify three crucial dimensions. The first dimension is the level of participation in engaging citizens in the procurement, realization and evaluation of smart city technologies. Elaborating on the work on the ladder of citizen participation of Arnstein (1969), Cardullo & Kitchin (2019) develop a scaffold consisting of four levels: non-participation, consumerism, tokenism and citizen power (the citizen's layer in Figure 1). They encourage policymakers and industry stakeholders to move beyond tokenistic, superficial forms of citizen involvement and towards more genuine engagement with empowered citizens. On the fourth level citizens are actively involved in the design, implementation, and monitoring of smart city technologies, although this also implies an increase of obligations they are confronted with.

The second dimension is the presence of continuity of participation in relation to human values, which is depicted by the arrows connecting the citizen layer with the technology layer in Figure 1. This relates to the participatory 'touchpoints' of contestability in all phases of the life cycle of a smart city technology (Alfrink et al., 2022). In the early phases of use-case development and training AI algorithms, conflict-embracing approaches enable stakeholder participation, making room for and leveraging conflict towards continuous improvement. Later, in the building and testing phases, involving stakeholders in multiple rounds, testing for biases, and seeking feedback on accuracy and ethical dimensions, increases a safe performance in deployment. As part of the deployment and monitoring phase, feedback signals, such as corrections and appeals from decision objects create a feedback loop to enable ongoing improvements, but also the detection of unfair outcomes and potentially collective action.

Because of their smaller scale, pilot projects can facilitate intense participation, but often are secluded from the institutional organization. This is why the third dimension is the extent to which a pilot project for a smart city technology is embedded in the institutional context in order to be able to scale it up and deploy it (van Winden & van den Buuse, 2017). This dimension is depicted by the arrows connecting the technology layer and the institutional layer in Figure 1. Obviously pilot projects' technology and infrastructure need to be designed to be scalable and interoperable with other systems. In addition, an adaptive and knowledge-sharing organizational structure is necessary to balance the need for exploration and exploitation that is crucial for pilot projects to continue innovating while also scaling up. Finally, for scaling up, the pilot project should be able to measure its

potential return on investment (RoI) and be prepared to make a connection with the existing regulatory and procurement policies of the local government.

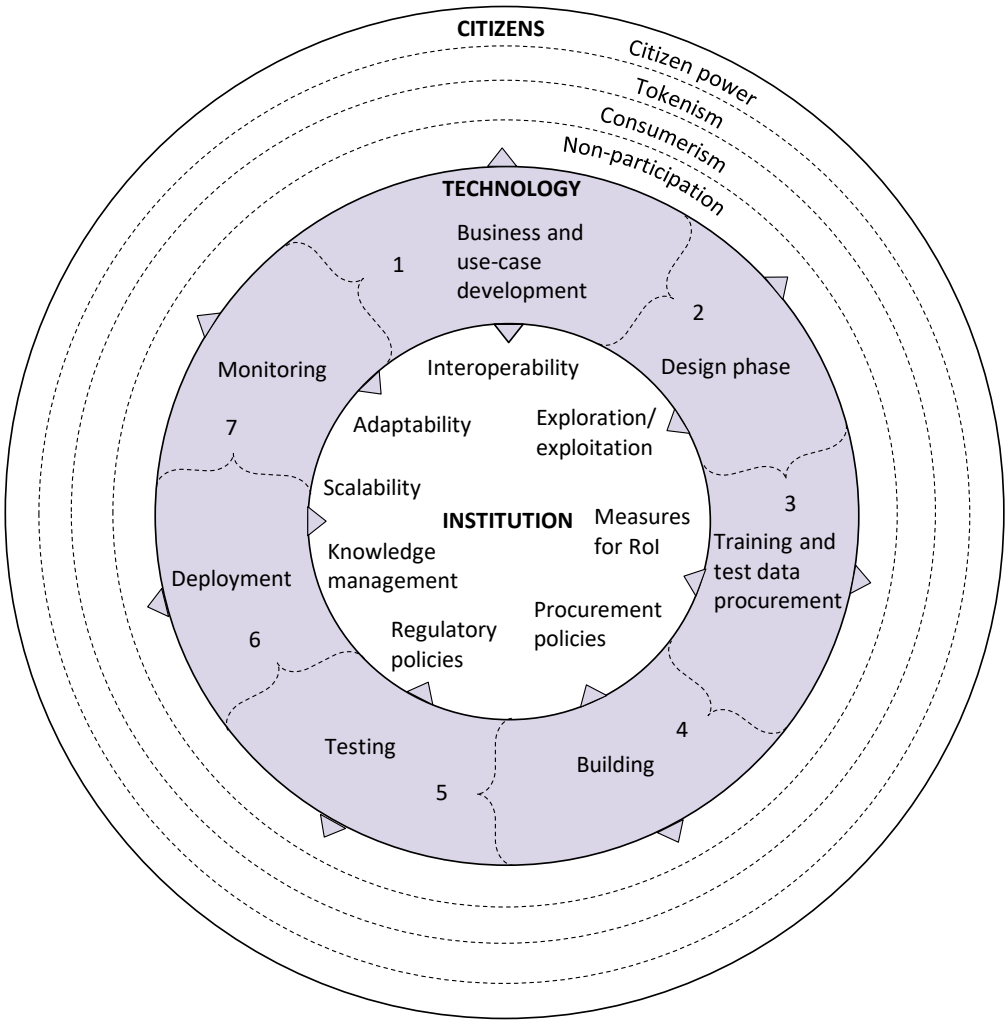

Figure 1. Model for the technology's life cycle with levels and continuity of participation, and institutional embedding.

Following Steen's description, we consider high levels of civic participation as a part of 'doing ethics': to "organize collaborative and iterative processes that make room for ethical reflection, inquiry, and deliberation, and that involve thinking, feeling, and action (…)" (Steen, 2023, p. 8). We also acknowledge the continuity of participation as crucial for 'doing ethics', which is an element Kortuem focuses on with "mov[ing] beyond seeing ethics as a technical design aspect that can be "solved" and (…) seeing AI ethics as an ongoing, never-ending process that reflects changes in society" (Kortuem, 2019, p. 78).

Optimizing for all three dimensions in the model – participation level, participation continuity and institutional embedding – is likely to confront institutions with a considerable effort and accompanying organizational change. In order to get further insight into the scope of this effort and change, we apply the dimensions of this model to scrutinize two current approaches to realize and deploy ethical smart city technologies by involving citizens.

2.2 Civic participation in relation to procuring value-based smart city technology

Civic prototyping and participatory procurement are two examples of current approaches to involve citizens in the realization of smart city technology in order to embed human values. They relate differently to the three introduced dimensions.

Civic prototyping is described as "a process that is led and owned by the local community, where designers, experts, local government, business or academic partners participate as guests, rather than leaders." (Jaśkiewicz, 2022, p. 19). This way locals can leverage their local knowledge for local challenges and the intervention that emerge, give a sense of ownership and trust that alien interventions lack. In terms of the focus area of participation, this could be labelled as 'citizen power', although it is a challenge to involve diverse groups of citizens. In terms of 'touch points' throughout the systems life cycle, we could say that they occur continuously, although the prototype often is unable to become a real service in everyday life. Looking at the focus area of institutional embedding, there is a long way to go from civic prototyping to a deployed service, even when it was part of a pre-procurement challenge (Cardullo & Kitchin, 2019).

In participatory procurement processes citizens become involved in the procurement process of local governments (Hickok, 2022). For example, the impact assessments for deploying a smart city technology system are made public to facilitate discussion and input from interested parties and impacted communities. This openness allows for concerns and feedback to be raised, and in some cases, prevent the implementation of a system if the impact is deemed unacceptable. The transparency also enables parties to question and verify information, and hold organizations accountable. With respect to the dimension of participation in this approach, there is a risk that the participation remains stuck in tokenistic, superficial ways of engagement. In addition, this participation is mainly in the early phases of a systems life cycle, which is only the beginning of the dimension of continuity of participation through the whole life cycle. The focus area of institutional embedding seems to be taken care of in this example, since it is located in a governmental context.

Although the two approaches are valuable, they both seem to have their own specific drawbacks. Civic prototyping is optimizing for 'doing ethics', but remains too far away from institutional embedding and participatory procurement optimizes for institutional embedding and only 'does ethics' mainly during the first phase of a systems life cycle.

The City of Amsterdam intends to develop a new approach to procurement of smart city technology that has its own way to optimise for all three dimensions. Before we can reflect on that, we first describe the case study context and questions (section 3) and the research steps and findings (section 4) in which three aspects become clear: what the procurement approach looked like, how the identification of requirements was executed and what the character of the new requirements was.

3 Case study – An 'ethical procurement process' in the City of Amsterdam

In the project Human Values for Smarter Cities we conducted a collaborative case study with the City of Amsterdam on an 'ethical camera car' and the procurements process as a start to design it.

3.1 Human values for smarter cities – Research context

The research project Human Values for Smarter Cities[3] (2022-2026) is focused on the developments of an integrated, value-based and multistakeholder design approach for the ethical implementation of smart city technologies (Amsterdam University of Applied Sciences, 2021). Three of the larger city municipalities in the Netherlands are members of the consortium and both researchers and designers from various universities and labs are involved. Our collective aim is to develop tools, processes and knowledge that can contribute to incorporating human values in the design, implementation, and monitoring of these technologies. The development of an 'ethical camera car' is the case exemplifying a smart city technology.

In the project in general, we follow a Research through Design approach in which researchers and partners continuously collaborate in various iterations of design processes. Research through Design has been described as a process in which "knowledge is generated on a phenomenon by conducting a design action, drawing in support knowledge from different disciplines, and reflecting on both the design action and an evaluation of the design result in practice" (Rodgers & Yee, 2014, p. 166). These processes aim to produce practical knowledge for practitioners as well as theoretical contributions for researchers.

In this specific case study we were involved in the redesign of a procurement process that prepares for a multi-stakeholder design approach in a later stage. We closely collaborated with the Computer Vision Team (CVT) of the department for Digitalisation and Innovation of Amsterdam[4] for one of its future services concerning a new camera car service. In the procurement process towards tender documents, the computer vision team invited the Human Values for Smarter Cities project to collaborate with them. The focus of this collaborative research was to identify requirements that contribute to the incorporation of human values in the intended technology. Various parties were involved in this research. The Responsible Sensing Lab[5] is a collaboration between the City of Amsterdam and the Amsterdam Institute for Advanced Metropolitan Solutions[6]. The lab works closely with experts on contestable AI[7] at Delft University of Technology and the Civic AI research lab[8] at the University of Amsterdam. The research group Civic Interaction Design[9] of the Faculty of Digital Media and Creative Industries at the Amsterdam University of Applied Sciences lead the research project.

3.2 Towards ethical data collection and processing in the City of Amsterdam

Like most cities, the City of Amsterdam aims to keep its public space clean, well-maintained and safe. Related to these aims, the procurement selection guide (City of Amsterdam, 2023b) for a new camera car service starts with introducing how the municipality wants to accelerate the following developments:

[3] https://civicinteractiondesign.com/projects/human-values-for-smarter-cities/
[4] https://www.amsterdam.nl/innovation/digitalisation-technology/
[5] https://responsiblesensinglab.org/
[6] https://www.ams-institute.org/
[7] https://contestable.ai/
[8] https://www.civic-ai.nl/
[9] https://civicinteractiondesign.com/

- Improving the employees' and residents' information position by giving them access to a single up-to-date view on public space and on work that is conducted there;
- Better planning and deployment of capacity, resources and assets;
- Providing insight into the impact of work done by the municipality and learn from that.

Related to these developments, the Computer Vision Team has prepared their own facility that uses image recognition models to detect relevant objects in public space. These might, for example, be objects that should not be present on a certain location in public space or objects that the municipality needs to act on, because of a specific municipal task. The image recognition facility provides the city with insights about changes in public space to which it can respond proactively and effectively. The service is not deployed yet, but it is scalable, meaning that new use cases can be added as the latest technology is used to develop models and process data. For this service to become operational, public space data needs to be collected structurally and periodically. The prospect of this service is that with a single scan of public space in an ethical and privacy-friendly way, multiple work processes within the municipality can be 'activated'.

Just like the existing number plate scanning for the parking management in the City of Amsterdam, scanning public space for other objects also involves processing personal data. With "processing" we mean that people are caught on camera, even if their likeness is removed immediately on the camera. People in the city see an increasing number of scanning vehicles moving through public space. These activities are one of the most visual tasks carried out by the municipality in realizing a clean, well-maintained and safe city. Despite there being developments towards a legal justification for this multiple use of collected images, many citizens still find scanning in public spaces unpleasant, which the municipality acknowledges as a sensitive issue. A response to this issue, among other ones, can be found in recent policy documents in which the City of Amsterdam puts its city dwellers and their values central in the developments of a digital society (City of Amsterdam, 2019, 2020).

With "the Agenda for the Digital City, Amsterdam aims to adhere to the values set out in the Tada manifesto and determined by the Coalition of Cities for Digital Rights." (City of Amsterdam, 2020, p. 12). The Tada values were developed by the City of Amsterdam with five partners between 2017-2019 based on the conviction that values cannot be a checklist, but consist of directions you constantly have relate to (Wernink & Schmidt, 2019). Within the scope of these developments, the municipality intends to procure the following service: "the ethically responsible, privacy-friendly and secure collection of images from public space, including their metadata" (City of Amsterdam, 2023b, p. 8).

3.3 Co-designing an 'ethical camera car' after the award of the tender

On March 17, 2023, the municipality commissioned a Selection Guide as phase one of a Request For Tender under the 'restricted European tender procedure' (City of Amsterdam, 2023b). This procedure consists of two phases: 1) a selection phase based on selection criteria described in a 'Selection Guide' and 2) a award phase based on requirements and wishes described in a 'Registration guide'. In the selection phase any camera car company may ask to participate by submitting answers to the list of selection criteria. The companies who are selected can go to the award phase to submit a tender related to the requirements and wishes. After assessment of the submitted tenders, the numbers one and two in the ranking will be requested to participate in a Proof of Concept with the Computer Vison Team. The company who performs the best will ultimately be selected as the winning party.

The intended contract consists of two parts that cover a period of one year, with the possibility of an extension of an extra year (City of Amsterdam, 2023b). In the first part, the camera car company will collect data from public space a number of times. The first use case that will be worked on concerns identifying heavy objects on the vulnerable bridges and canal walls in Amsterdam. When collecting data, the company must apply the models developed by the Computer Vision Team to detect objects or situations in public space and anonymize the images. The second part and parallel to the first, the contract envisages a Research and Development track (R&D track) in which government officials, company employees, citizens, designers and scientists will jointly work on the best possible way of collecting data from public space. The following are some of the questions that will be central in this co-design process:

- Can other technologies than image recognition be used to achieve the same goal?
- Could a combination of various technologies, as addition to image recognition, reduce the amount of personal data to be processed?
- Are there ways in which it is clearer to citizens what the purpose of the scanning vehicle is and how it works?
- Can the operation and output of the artificial intelligence be made transparent and more 'contestable' for those involved?

Continuous learning, iterative prototyping and agile improvement are central during this co-design period, ranging from 2023 to 2024 (City of Amsterdam, 2023a). A set of (new) measures and applications seems to be a logical outcome of the intended collaboration to achieve the aims. This could include the use of other, more or additional sensors, an improved way of providing information during scanning or a careful way of data processing. These measures to be taken are expected to lie partly with the company and partly with the municipality.

In addition, the municipality sees teamwork with the company as particularly valuable and promising. It offers scope for step-by-step application of new compliance requirements, e.g. based on the European Union AI Act[10], which many market parties are currently unable to meet. In the proposed tender, the government and the market work together on future-proof solutions.

3.4 Questions steering the collaborative research on requirements

In the early phases of the procurement process the Computer Vision Team and the Human Values for Smarter Cities project collaboratively worked on two related design research questions about the requirements for the intended procurement. These research questions (RQ) were:

> *RQ1: How can the collaborative research group translate abstract human values from the Tada manifesto into requirements for the intended procurement process?*
>
> *RQ2: What design requirements should be part of the procurement documents for the intended co-design of an 'ethical camera service'?*

The explorations around these questions are part of the next section describing the findings.

[10] https://digital-strategy.ec.europa.eu/en/policies/regulatory-framework-ai

4 Findings – The applied method and identified requirements

Regarding a method (RQ1) we designed and applied a canvas that played a central role in researching and identifying requirements that contribute to the incorporation of human values in the specific procurement process followed by the City of Amsterdam (RQ2).

4.1 The design and application of a canvas to identify requirements

After a briefing in which the early version of the tender was explained by the Computer Vision Team, we developed a canvas that could support the search for these requirements. The canvas consisted of three dimensions:1) seven phases in a system's life cycle, 2) four layers of touch points where system and city dwellers meet and 3) the values from the Tada Manifesto.

Our starting point was that a system's life cycle consists of cycles of seven phases (Alfrink et al., 2022) :

1. business and use-case development;
2. design;
3. training and test data procurement;
4. building;
5. testing;
6. deployment;
7. monitoring.

Canvas

What does it mean to be …. in each cell?

1. Inclusive
2. Control(led by humans)
3. Tailored to the people
4. Legitimate and monitored
5. Open and transparent
6. From everyone - for everyone

Unsure

Sure

Value Strategy Solution(s)

	Business case and use case	Design phase	Training and test data	Building	Testing	Deployment	Monitoring
Physical appearance + presence						5: Transparency recording or not – cover on camera	
Sensors, data processing + algorithms			1, 2 and 3: Public scrutinization of training data – Game				
Formal procedures + actions							2 and 4: Enabling collective appeals – public access to decisions
Democratic debate + decision making	6: Making anonymized data accessible – Amsterdam.nl						

Figure 2. The canvas consisting of three dimensions: four layers, seven phases and six values.

Every phase develops into the next phase and in the seventh phase the results are input for a new cycle starting in phase one. Building on the co-design plans of the City of Amsterdam, our assumption was that relevant requirements could be formulated in every phase. This implied a broad conception of the term 'requirements' including earlier phases of the cycle before deployment and monitoring. We acknowledged that each of these phases could contain potential 'touch points': moments in the chain of design and deployment of technology in public space at which citizens or their representatives (NGOs, rights movements, etc.) can interact with a system and its designers/ executors to discuss or contest its functioning.

We distinguished four layers of touch points:

1. the physical appearance and presence of the car;
2. the sensors, data processing and algorithms;
3. the formal procedures and actions in the executive branch;
4. the democratic debate and decision making concerning these technologies.

Based on the two dimensions of seven phases and four layers, we made a matrix: the seven phases as columns and the four layers as rows, resulting in a canvas of 28 cells (see Figure 2 with some preliminary examples).

The six values of the Tada Manifesto played an important role in the canvas by means of the question "What does it mean to be [Value 1-6] in each cell?". The values were available on the side as follows:

1. Inclusive – Our digital city is inclusive. We take into account the differences between individuals and groups, without losing sight of equality.
2. Human controlled – Data and technology should contribute to the freedom of people. Data are meant to serve the people. To be used as seen fit by people to benefit their lives, to gather information, develop knowledge, find room to organize themselves. People stay in control over their data.
3. Tailored to the people – Data and algorithms do not have the final say. Humanity always comes first. We leave room for unpredictability. People have the right to be digitally forgotten, so that there is always an opportunity for a fresh start.
4. Legitimate and monitored – Citizens and users have control over the design of our digital city. The government, civil society organizations and companies facilitate this. They monitor the development process and the resulting social consequences.
5. Open and transparent – What types of data are collected? For what purpose? And what are the outcomes and results? We are always transparent about those aspects.
6. From everyone – for everyone – Data that government authorities, companies and other organizations generate from the city and collect about the city are held in common. Everyone can use them. Everyone can benefit from them. We make mutual agreements about this.

After an individual preparation the experts in the research group organized a workshop in which each of them introduced his findings while sticking them on the canvas (Figure 3). This led to discussions in which findings were further adjusted and agreed up on.

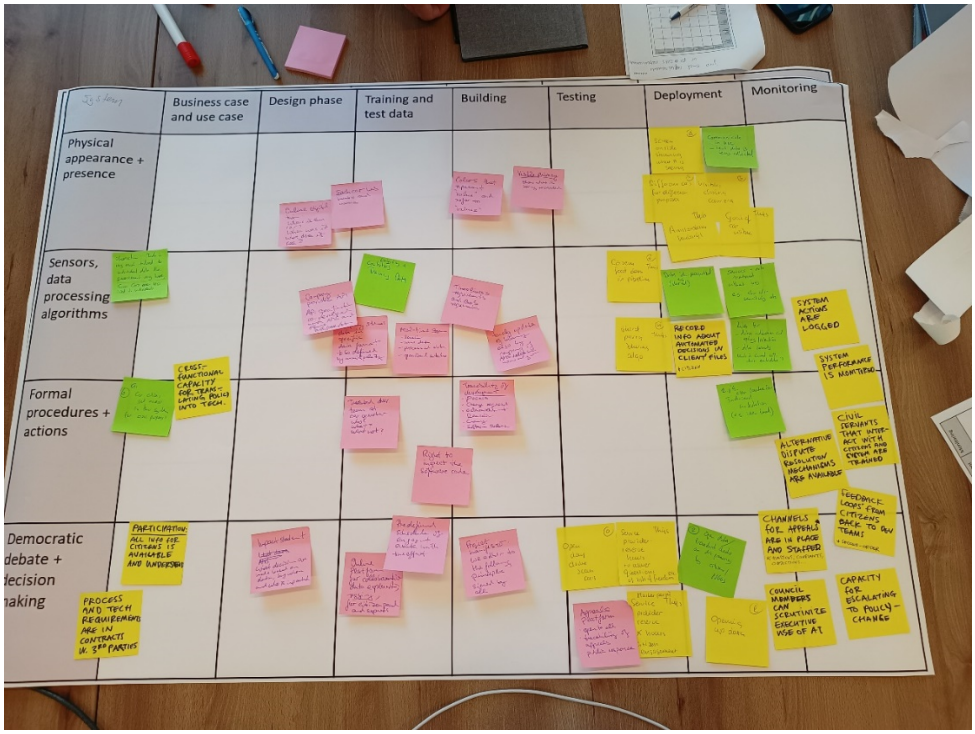

Figure 3. Results of the first workshop on the canvas.

4.2 Requirements on four layers

The findings of the first workshop were presented in the four layers, and discussed and annotated in a follow up workshop, a few weeks later, together with the Computer Vision Team. The output of that workshop was discussed in a final meeting to come to definitive descriptions of the collected requirements.

4.2.1 The physical appearance and the presence of the car

For the graphic treatment and the communication of the cars' actions the municipality wanted the camera car company to reserve time and resources for experiments in the R&D track. A difference was made between 'wishes' that would give a potential service company extra points and 'knock-out criteria' based on which a company would be removed from the list of candidates. An open question was whether the company would also be visually present on the car or only the municipality.

Room for experiments with the communication to the public of the cars' actions on the car itself also was a wish on the requirements list for the R&D track. Live access to the data that was collected and processed by the car was seen as a necessary affordance of the system. But how general or how specific this communication to the public should be, was regarded as part of the R&D-track with the company. An important wish was to be able to mount physical add-ons like a shutter on the camera when it was not recording.

With respect to a digital twin we arrived at a list of aspects of the 'quality of service' related to the available budget:

- What municipality wanted to govern about the operation of the car.
- The kind of operational data the municipality needs.
- The accessibility of data and the format it was available in.

- The delay of the moment the data could be available.
- The metadata of the images and the route that has been driven.

4.2.2 The sensors, data processing and algorithms

The municipality was said to be responsible for the systems to be as unbiased as possible because the models are build there. Bias was considered also to be relevant to heavy objects (e.g. containers) on bridges and canal walls. The developed models were going to be part of a test period and an impact assessment during the R&D trajectory. Moreover, this topic was stated to be related to the new European AI-act that both municipalities and companies have to comply with.

The quality of service was mentioned here again, but now with respect to possibilities to install and update software like blurring algorithms. The municipality is developing these models that the company needs to implement. A complication could be that the cameras on the service car are different than the cameras the algorithm was based upon. Related to this is that, in order to improve an object recognition model, blurred images can be used, but to improve a person blurring model, you need raw images. An API (application programming interface) is in the tender and its specifications will be part of the R&D track. Rules for data retention including metadata are also in the tender, but the period for retention is a municipality internal affair. In general, security is an important aspect in the tender with respect to topics like physical access and digital authorizations. A tight process with the security officer was mentioned here.

With respect to the involvement of citizens in the training of models and the processing of data a number of things were said. We argued that the municipality would be coordinating these processes, possibly together with one of the involved knowledge institutes. Next to experts, citizens might see things that need to be blurred or identify false positives and false negatives. Building on this last aspect, citizens could be involved by supplying their own data or by tagging existing data. Involvement like this could contribute to citizens' understanding of systems like the scan car.

The topics mentioned with respect to the traceability of technological developments were clearly important to develop into agreements with the company. Some topics were added: changes in software releases, addressing bugs, limits of processing the data, transparent architecture, and openness of code. With respect to the last topic the question, at the moment of discussion, was whether the code could be open to the municipality or the public.

4.2.3 The formal procedures and actions in the executive branch

The impact and privacy assessments are responsibilities on the side of the municipality and both already planned.

In general, the facilitation of appeals was thought to be the municipality's responsibility with respect to all mentioned points, also as a part of the R&D-track. The existing website with appeal forms in the parking enforcements[11] was said to have integration with the data already. A remaining question was whether this would cover everything needed for other use cases. All the relevant steps and data with respect to one specific decision should be available for the department which is handling that case

[11] https://www.amsterdam.nl/parkeren/parkeerbon/parkeerbon-bezwaar-maken/

and for the persons who appeals. A need was mentioned for monitoring and clustering individual appeals for systemic flaws that repeatedly propose wrong decisions.

The aspects of embedding these systems in the municipality mentioned in the workshop were acknowledged in the discussion with the municipality. Some topics were discussed.

- What is needed need to equip council members about the executive on their use of AI?
- In case of a new purpose, is that a political decision and should it be debatable in the city council?
- Should there be experiments on top of the standard appeal mechanisms: mediation for example?
- Is the model detecting certain objects for a particular policy aim, and should there then be the possibility for receiving signals from citizens about issues that are actually not technical, but that that are policy related?
- Building on the latter: should there be some means of or some point of context that can be alert on that front?

4.2.4 The democratic debate and decision making

In the workshop we collected some requirements concerning understandability of camera cars and scrutiny of execution. With respect to facilitating engagement with citizens in the R&D track, the service provider plays a role, but the municipality too, for example the personal data service desk at the municipality. Some level of decision-making power was stated to be important both for involved civil servants and for the companies employees. The requirement that the data should be available for re-use and checks – also for NGO's and citizens – was acknowledged. What data exactly and the way that should be done was regarded as a decision of the municipality. All the topics mentioned here, were also stated to be important in future developments around smart city tech and should be considered in relation to the existing routes for democratic debate and decision making.

4.3 Reflecting on the method and requirements in a group interview

After the selection guide for the first phase of the tender was published (City of Amsterdam, 2023b), we had a group interview with the Computer Vision Team to reflect on the process and the findings. In the group interview, they stated that the process with the canvas identifying requirements supported a shift in their thinking about requirements, especially in the context of their new procurement approach.

For example, on the layer of the physical appearance and the presence of the car, many pre-determined aspects that normally would to go into the tender for the camera car company to realize, now became other kinds of requirements. For example, the company was now required to reserve time and resources to be able to experiment in the R&D track with the graphic treatment of the scan car, but also with ways the car could communicate its actions. Discussion about quality of service of the company started on this layer and returned on the data processing level, but some aspects were easier to define as requirements for the tender, while others were postponed to the R&D-track.

On the layer of sensors, data processing and algorithms the challenge of bias was one of the topics no longer the responsibility of the service company. Since the municipality is delivering the AI models and their training, the responsibility lays there, also for involving citizens in their finetuning. The consequence is that a 'hard' requirement for the service company is to be able to implement and run

those models. Similarly, an API is a requirement for the service company, but the specifications will be part of the R&D track that starts after the tender is awarded.

The requirements mentioned on the layer of formal procedures in the executive branch and democratic debate including decision-making were both labelled as the responsibility of the municipality. Some aspects of this layer were stated to become a part of the R&D track, like involving citizens in the way appeals are handled.

The general idea is that values like those of the Tada manifesto will play a role in the discussions in R&D track on all layers. Another important aspect pointed out here was that the R&D track is seen as an important collective learning process including all participants which might be able to spark of a new standard approach to more participatory ways of continuously improving existing or procuring new smart city technologies.

5 Conclusions and discussion - When 'doing ethics' meets procurement

In this paper we set out to examine how 'doing ethics' and procurement relate to each other in the context of smart city technology service design. In what follows, an analysis of the case study along the three dimensions brings us to the conclusion that the approach developed by the City of Amsterdam is a fruitful encounter between 'doing ethics' and procurement. We wrap up the paper discussing the broader lessons we draw from these conclusions and some limitations of our work.

5.1 The Amsterdam approach along the model's three dimensions

In section 2 we illustrated how the securement of human values in public service design of smart city technologies can be considered a challenge that consists of three dimensions: the level of participation, the continuity of participation during a technology's life cycle and the extent of the institutional embedding. Although the case study had its own research questions, section 3 and 4 contain the details necessary to discuss the Amsterdam approach to a new value-based camera service along these three dimensions.

The findings show that the City of Amsterdam intends for the citizens to participate in a co-creative way, which is where the level of tokenism changes into citizen power in the participation levels of Cardullo and Kitchin (2019). Many ideas for requirements were placed in the R&D track – covering phases 2 through 5 – where the voice of citizen panel is crucial for the prototype experiments that will be conducted on the various layers (see the green citizen participation levels in Figure 4). Furthermore, the understanding of the Tada values as applied in the method canvas and their translation into definite design requirements on the various layers, will return in the R&D track. There even seems to be some room for alternative values if they may come up during the R&D track. The fact that the City of Amsterdam also invites critical experts from knowledge institutions to participate together with citizens, shows its openness to unexpected ways of looking at designing for values in smart city technologies. This argument becomes even stronger with the fact the City of Amsterdam is also part of the service delivery for the recognition and blurring models which will be scrutinized during the R&D track.

The approach the City of Amsterdam chooses in terms of the continuity of participatory touchpoints during the systems life cycle (Alfrink et al., 2022), is also hopeful (see the outer green arrows in Figure 4). The R&D track covers iterations across the phases 2) design phase, 3) training and test data

procurement, 4) building and 5) testing. Furthermore, it includes the two layers of physical presence, data and algorithms, but as we have seen in the requirements there is preparation of the layers in the executive branch and the democratic debate that are connected to 6) deployment and 7) monitoring. It should be noted, that although there was participation of knowledge institutions, there was no participation of citizens in the procurement phase (1). Within the present ideas and existing policies (like the participation plan) about moving to a more value-based approach including participation this first phase without citizens seemed to be necessary in order to embed the procurement and its co-design in the institution.

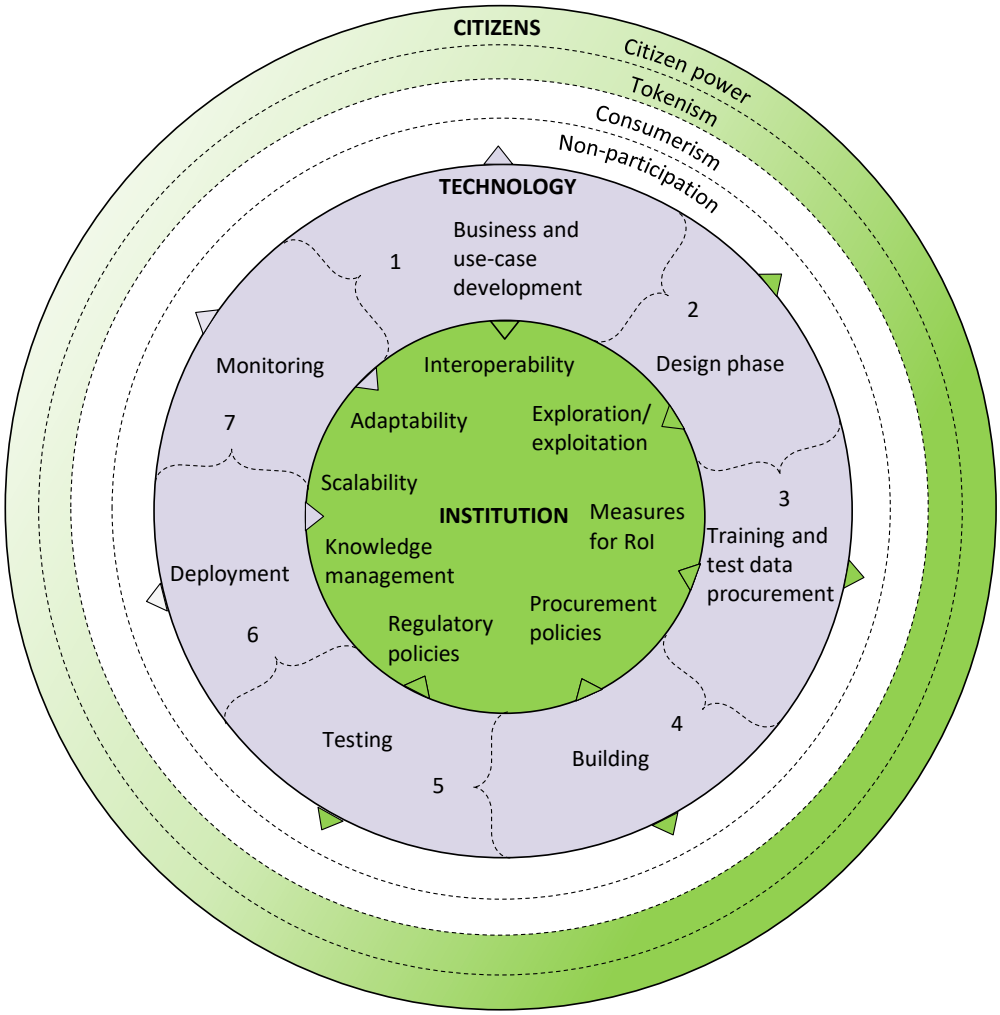

Figure 4. The current approach depicted in the model.

The followed approach is strongly embedded in the municipality's institutional context in terms of its procurement and participation policies, but also in terms of departments that would like to deploy future services (Ruijer et al., 2023; van Winden & van den Buuse, 2017). Because important elements of the service in this procurement process are delivered by the City of Amsterdam, the involved technology and infrastructure are prepared to be scalable and interoperable with other systems within the organization. At the same time, a knowledge-sharing organizational process is available to balance exploration and exploitation crucial for pilot projects to continue innovating in R&D tracks while also scaling up. This institutional embedding situation is depicted in Figure 4 by the inner green arrows in phase 1 through 5 and by the green circle in the centre covering all aspects mentioned there.

Based on this analysis along the three dimensions, the approach to realize a value-based camera car service in Amsterdam could be claimed to be well equipped to combine 'doing ethics' and institutional embedding. The level and continuity of participation goes beyond what is usually achieved in participatory procurement approaches as described in section 2. In participatory procurement approaches the participation often remains tokenistic and limited to phase 1. Furthermore, the institutional embedding is much stronger present in the Amsterdam approach then in civic prototyping, which increases the chances to actually realize and deploy a new camera service. This is among other things, fuelled by acknowledging many of the current procurement regulations and participation policies, but at the same time stretching them in order to invest in the other two dimensions.

5.2 Procurement for 'doing ethics'

The approach analysed in this paper could be framed as 'procurement for doing ethics' in smart city technology design, which implies that the procurement process and content is different than procurement 'as usual'. The most important interrelated changes for this kind of procurement are:

1. The municipality develops its own machine learning models for processing the images, which makes it responsible for parts of the service procured.
2. A multi-stakeholder co-design project – including a citizen panel – is an integral part of the process in which the service is designed and realized (an R&D track).
3. Values become incorporated in required processes and experiments that will be embedded in the R&D track.
4. Four layers (section 4) play a role for possible touchpoints between citizens or civic organisations on the one side and the technology or municipality on the other side.
5. All stakeholders need to reserve time and resources te be able organize and participate in experiments in the R&D track
6. It takes an effort for all stakeholders in the R&D track to be able to collaborate with each other on an equal footing and to be part of a collective learning process.

As the changes show, the usual roles of all stakeholders in procurement trajectories change. Civil servants, citizens, designers, builders, researchers are all involved at the same time in the R&D track designing and realizing the service, instead of one after another. It also shows that concepts such as 'requirements' and 'service delivery' become more fluid, compared to how they are usually used in procurement. This is shown by the introduction of 'process requirements', the municipality as part of the service delivery and a multi-stakeholder group co-designing the service.

This procurement approach optimizes both for the institutional embedding, the level of participation and the continuity of participation. It shows how a public body can procure a new service, while it invests in doing ethics by continuous civic participation and in institutional embedding at the same time. It incorporates that human values are not simple measures that can be tackled once and for all, but acknowledges that they are a continuously returning. However, how this encounter between 'doing ethics' and procurement will manifest itself in the actual co-design in R&D track is a topic for future research. Apart from an agile, iterative process it will require some form of guidance ethics and certain levels of skills of the participants to be fruitful (Alfrink et al., 2023). It will also be interesting to see which layers of touchpoints will play an intensive role in the R&D track and whether alternative values are put forward to design for.

An important contribution this paper makes to the literature about incorporating ethics in smart city technologies, is the model with the three dimensions that helps to understand the difficulty in finding a balance between 'doing ethics' and institutional embedding (NL Digitaal, 2019; Steen, 2023). We also acknowledge some limitations in this paper. We have neglected that an approach like civic prototyping has its own merits in terms of citizens understanding technology and civic ownership (Jaśkiewicz, 2022). On another level, we have not touched upon the discussion about the extent to which a camera service is necessary for recognizing situations the local government has to act upon. It takes away responsibility of the citizens that might also be able to play a role in reporting or to solve a certain situation. In a timeframe in which many cities invest in a participation society, many smart city technologies seem to be a move in an opposite direction (Brigham & Introna, 2007).

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Acknowledgement: The research and this paper based on it was funded by Regieorgaan SIA/Taskforce for Applied Research SIA.