Bridging the gap between algorithmic transparency and meaningful citizen participation:

an exploratory case study on Amsterdam's municipal algorithm register

Lina Goelzer

Digital Rights House in partnership with The Municipality of Amsterdam

20 June, 2023

EXECUTIVE SUMMARY

About the study

In September of 2020, Amsterdam launched a municipal algorithm register as a "window into the artificial intelligence systems" used by the government organization. Three years later, this exploratory case study investigates the following question: *how can the municipality use the algorithm register as a tool to enable citizen participation in its development, adoption, and use of algorithms?* The research was motivated by the following factors:

- Citizen participation is a policy priority across the municipality of Amsterdam.
- The human-centered use of technology and digital rights are priorities for the municipality of Amsterdam.
- The municipal algorithm register has been framed as a tool to facilitate democratic participation.
- The algorithm register has been in a beta version since 2020, with the full-fledged version to be launched in 2023.

The study consists of a policy analysis, a literature review, and expert interviews of civil servants and stakeholders from the private sector and academia. This is followed by an experimentation phase aimed at investigating how to best engage with citizens on the topic of the municipal adoption and use of algorithms. Three different types of citizen participation have been tested: a 90-minute-long small group citizen conversation, a survey distributed to citizens through digital channels, and informal conversations with citizens in parks, community centers, and other public spaces.

Findings

➢ Amsterdam's municipal algorithm register aims to operationalize principles of transparency and (inclusive) democracy. However, there is no clear roadmap linking algorithmic transparency to concrete processes for citizen participation.
➢ The algorithmic governance literature defines meaningful transparency as both complete and actionable; it is framed as a means (for accountability and participation) and not an end.

➤ Achieving algorithmic transparency in Amsterdam is an ongoing effort, due to the difficulties of populating the register, especially with high-risk algorithms. Although citizens have been involved in the design of the register, much work has yet to be done to institutionalize citizen participation processes in the adoption and use of algorithms.

➤ Lack of citizen awareness and understanding of algorithms and their use is seen as the most significant barrier to citizen participation on the municipality's use of algorithms.

➤ Many citizens who want to participate on the topic of algorithms don't feel able to do so, and are unsure that their participation would make an impact.

Recommendations

1. *Increase citizen awareness of the algorithm register, and of the use of algorithms in general.*
   - Only then will the register be effective in equipping citizens with the information they need in order to be more engaged on the topic of algorithms.

2. *Inform citizens when a decision about them is made using an algorithm.*
   - Citizens want to know when they have been affected by algorithmic decision-making, but they are usually not informed. Not only is this a key transparency gap, it is also an obstacle to citizen participation.

3. *Design a multi-channel, multi-stakeholder participation strategy on the topic of algorithms.*
   - In order to be as inclusive and accessible as possible, participation channels should be diverse and adapted to their target audiences.
   - Partnering with community organizations and others who work directly with citizens presents an opportunity to reach a wider range of citizens and to scale participation efforts more effectively.

4. *Create opportunities for citizen input throughout the algorithm lifecycle.*
   - Citizens express particular interest in having a say in whether or not an algorithm should be in use (adoption phase), as well as being able to contest a decision being made by an algorithm (after implementation).

5. *Create a circular relationship between citizen participation efforts and the algorithm register.*
   - Examples and explanations from the algorithm register play a key role in making participation more accessible and productive. At the same time, the register can be used to direct citizens towards channels where they can provide input.

Foreword:

As a Masters candidate in Governing the Large Metropolis at Sciences Po Paris, with a focus on Cities and Digital Technology, I am completing my end of studies internship on the topic of Digital Rights Governance with Digital Rights House and the Municipality of Amsterdam. My primary mission as an intern is to complete a research project on the topic of citizen participation and the municipal algorithm register in Amsterdam. This project, completed between February and June of 2023, is part of a broader shared research agenda between Digital Rights House and the Municipality of Amsterdam, focused on engaging citizens on how the municipality uses and governs technology.

I would like to thank my supervisors from both Digital Rights House and the Municipality for making this opportunity possible, and for providing essential support and guidance. I would also like to thank the experts who gave me their time and expertise in the interview phase, the Research and Statistics team at the municipality who administered the survey, and, most importantly, the citizens who made this study on participation possible.

Lina Goelzer

20/6/2023

Table of Contents

I.   INTRODUCTION

In 2020, Amsterdam, alongside the city of Helsinki, gained international attention for releasing the first municipal algorithm register, providing a "window into the artificial intelligence systems" used by the government organization[1].

However, on the ground, this came to be in a context of significant national and local distrust of government and its use of algorithms, especially following the Dutch childcare benefits scandal which gained international attention in 2018. As such, the use of tools such as the algorithm register in Amsterdam serves as a means to rebuild public trust of the government and its use of technology.

As is made clear by Amsterdam's 2020 Digital City Agenda[2], the register was put into place at a time when increasing citizen participation was a key policy priority for the municipality, both within and beyond the realms of technology governance. A white paper published alongside the launch of the register describes it as a means not only for transparency, but also for citizen participation in the government use of AI[3]. Almost three years after the initial launch of the register in Amsterdam, this research report aims to analyze the relationship between these two goals, with a focus on how transparency can in turn facilitate citizen participation as a final outcome of this algorithmic governance tool.

Research Question:

The investigation is guided by the following research question: *how can the municipality use the algorithm register as a tool to enable citizen participation in its development, adoption, and use of algorithms?* The selection of this question was driven by the salience of citizen participation as a key priority for both the municipality and Digital Rights House, and by the ongoing development and implementation of algorithmic governance tools, specifically the algorithm register, by the municipality. The reasoning is further outlined below:

---

1 M. Haataja, L. van de Fliert, and P. Rautio, "Public AI Registers," White Paper (Saidot AI, City of Amsterdam, & City of Helsinki, 2020).

2 Agenda Digitale Stad; Tussenrapportage 2019-2020, March 2019, Gemeente Amsterdam.

3 M. Haataja, L. van de Fliert, and P. Rautio, "Public AI Registers," White Paper (Saidot AI, City of Amsterdam, & City of Helsinki, 2020).

Citizen participation is a policy priority across the municipality. In particular, there has been a heightened focus since 2020 on developing new strategies to incorporate citizen participation into policy-making across the board. It is also a key priority of their partnership with Digital Rights House and other civil society organizations

The human-centered use of technology and digital rights are priorities for the municipality. The municipality has been developing a governance framework for digital technologies since 2018, as well as a specific algorithm lifecycle approach since 2020. These focus on principles such as transparency, accountability, empowerment, and inclusivity. The algorithm register was launched as part of these digital and AI agendas.

 The algorithm register has been framed as a tool to facilitate democratic participation. Amsterdam was the first city, alongside Helsinki, to release a municipal Algorithm Register in 2020. A white paper published alongside the launch of the register describes it as a means not only for transparency, but also for citizen participation in the government use of AI[4]. This research analyzes the relationship between these two goals, with a focus on how transparency can in turn facilitate citizen participation.

The register has been in a beta version since 2020, with the full-fledged version to be launched in 2023. The timing of this research project makes it particularly relevant as the city transitions to a new version of the register. It is a key moment to incorporate key learnings and feedback, especially from citizens. The focus over the past three years is and continues to be populating the register, but now is the time to think about what else is possible.

Approach:

   Through an exploratory case study approach, this research aims to evaluate how the implementation of the register tool has been able to achieve its goal of enabling citizen participation thus far and how it can concretely do so moving forward. The latter is based on an investigation of the goals, constraints, and opportunities faced by both the municipality and by citizens on the issue of participation in the design, implementation, and use of algorithms. This approach has been selected because it is conducive to exploring the routinization of innovation

---

[4] M. Haataja, L. van de Fliert, and P. Rautio, "Public AI Registers," White Paper (Saidot AI, City of Amsterdam, & City of Helsinki, 2020).

within an organization or institution, such as that of algorithms and even the register within the municipality. It is meant to search as a starting point to guide future research questions and methods, such as approaches to gathering citizen input on algorithms moving forward.

The study consists of four complementary streams: policy analysis, literature review, expert interviews, and experimenting with citizen participation.

Policy analysis

The first phase of the study is a survey of policy documents, municipal agendas, city council meeting minutes, and more. This provides context on how the algorithm register fits into broader municipal policy goals and dynamics, and how it was presented both to civil servants and to the public. As such, the research question is framed as a way to evaluate how the register, which is a specific policy tool, can achieve a specific stated policy goal.

Literature review

A review of academic literature along with gray literature such as reports and white papers provides theoretical frameworks to understand both algorithmic governance and citizen participation. It also includes initial evaluations and best practices in the emerging field of urban algorithmic governance, in which Amsterdam is a key player.

Stakeholder/ expert interviews

Conversations with key stakeholders focused on digital policy, algorithms, and citizen participation within the municipality shed light on the challenges and opportunities shaping the implementation of the register, and the involvement of citizens in the municipality's adoption and use of algorithms. Expert interviews from the academic and private sectors provide an external perspective on what the role of the citizen can be in municipal algorithmic governance, and how to enable participation in innovative ways.

Experimenting with citizen participation

The final, and most substantial, piece of this research approach is gathering citizen input through experimenting with different channels of citizen participation. The aim is to investigate how to best engage with citizens on the topic of municipal adoption and use of algorithms. Three types

of citizen participation were tested : a 90 minute long small group citizen conversation, ad hoc conversations with citizens in the field in strategic locations such as parks and community centers, and finally, a survey distributed to citizens through digital channels. The data gathered includes the responses of citizens to specific questions about algorithms and citizen participation, but also feedback and observations about the effectiveness of the respective approaches.

The goals of this research are to provide insights on the challenges and opportunities presented by citizen participation in the city's development, adoption and use of algorithms, for use by Digital Rights House and the Municipality of Amsterdam. Desired outcomes include learnings and recommendations for the future design of citizen participation channels integrated into the municipal use of algorithms.

II.   POLICY ANALYSIS

Policy research and analysis are the first step in situating the algorithm register within the domains of digital policy and citizen participation in the Municipality of Amsterdam. This includes a sweep of policy documents, from municipal agendas to citizen council meeting minutes discussing digital governance, with a focus on those mentioning algorithms and AI. It also includes an evaluation of key frameworks shaping the municipality's approach to citizen participation.

In addition to providing context, this policy analysis aims to examine the political framing of the algorithm register and demonstrate that citizen participation has been a key policy aim since its inception. Furthermore, diving into the municipality's general participation policy approach surfaces key themes relevant to the register and citizen participation around algorithms.

Policy foundations for algorithmic governance

The first part of this policy analysis will focus on key policy frameworks that have shaped municipal algorithmic governance in Amsterdam, leading to the launch of the register.

I.Tada Manifesto for the responsible digital city; May 2018

The Tada manifesto for the responsible digital city establishes a foundation for the new digital policy of Amsterdam by serving as a guide for the municipality to make "conscious decisions about the possibilities and threats inherent in digital technologies". Notably, it was shaped by a wide-ranging coalition of citizens and organizations from the greater Amsterdam region. Of the six principles it sets forth for a responsible digital society, the following remain particularly pertinent to the issues of citizen participation and algorithmic transparency:

- *Inclusivity:* taking into account the differences in needs, experiences, and perspectives between individuals and groups.
- *Tailored to the people: "*Data and algorithms do not have the final say. Humanity always comes first."
- *Legitimate and monitored:* This principle prioritizes citizen control over the design of the digital city. The role of government and civil society organizations is to facilitate citizen control by monitoring both design processes and their resulting social consequences.
- *Open and transparent:* Transparency about the types of data collected and the purpose for which they are collected, as well as the outcomes and results.

II.   Principles and Declaration, Cities Coalition for Digital Rights; September 2018

The adoption of this declaration cements digital human rights as a policy priority for the Municipality of Amsterdam. "'Black box' algorithms used to make unaccountable decisions" are highlighted as a threat to democratic processes which center public opinion and (digital) human rights. The declaration centers both algorithmic transparency and inclusive participatory democracy through the following principles:

- *Transparency, accountability, and non-discrimination of data, content and algorithms*: "Everyone should have access to understandable and accurate information about the technological, algorithmic and artificial intelligence systems that impact their lives, and the ability to question and change unfair, biased or discriminatory systems."
- *Participatory Democracy, diversity and inclusion:* "Everyone should have the opportunities to participate in shaping local digital infrastructures and services."

III.   2018-2022 Coalition Agreement

Titled 'A new spring and a new voice', the coalition agreement between GroenLinks/D66/PvdA/SP announces the development of the Digital City Agenda "in which concepts will be developed for digital services and participation". Although algorithms are not specifically mentioned, this agreement demonstrates a commitment from the council to fair distribution of the benefits of digital technologies by addressing issues such as data rights and digital inclusion. Furthermore, transparency and citizen participation are underlined as key political priorities. Transparency is framed as a way to strengthen local democracy by empowering residents through information accessibility; as such, the coalition promises that the municipality of Amsterdam will publish more information on its own initiatives. As a result, "residents should be able to offer targeted input on policies" through participatory channels. The agreement announces the development of an "ambitious agenda" for democratic renewal through both participatory and representative democracy, to give citizens "greater control over their immediate surroundings, municipal services and the city as a whole".

IV.   Agenda Digital City; March 2019

The 2019 Digital City Agenda sets the ambitions of the municipality of Amsterdam regarding digitization, with the aim of strengthening democratic control over technology. It promises increased efforts to achieve digital rights awareness, data literacy, and digital inclusion. Adequate access to the internet and digital skills are identified as preconditions for full digital participation by citizens. The future development of algorithmic governance tools, such as a standard, a register, and an audit for fair algorithms is outlined alongside commitment to the transparency of municipal data use and digital services.

V. Agenda AI: Amsterdam Intelligence; 2020

In this agenda, Amsterdam states its ambition to become a leading city in the use and ethical application of AI. The document provides an overview of the Municipality of Amsterdam's governance strategy in the field of artificial intelligence, from investment in innovation, to addressing social challenges in the city. It highlights the increased application of AI in the municipality's own processes and tasks, as well as the need to establish ethical frameworks to prevent exclusion and discrimination; "we must make AI work for all Amsterdammers," it says.

The Agenda AI defines the varied roles of the municipality with regard to Artificial Intelligence, notably as a user of the technology , as a developer of legal and ethical frameworks, as a facilitator of information sharing, and as an advocate for citizens.

Furthermore, the Agenda clearly draws the link between algorithmic governance and digital rights by asking the following questions: "which algorithms do we actually use, and what do we consider fair?" In order to bring digital rights to the forefront in its use of AI, the municipality commits to transparency and collaboration, through the codevelopment of a register, for example.

The Agenda AI also clearly outlines Amsterdam's algorithm policy goals; in addition to a public register, a coherent policy would include a participation process and feedback in the algorithm development phase, purchasing conditions, and an objection procedure. It also considers the use of algorithms by non-governmental actors, stating the need to create governance frameworks that apply to those cases as well.

Introduction of the Algorithm Register

The development of an algorithm register is announced in April 2020 as part of the State of Affairs for the Amsterdam Digital City Agenda, in response to a September 2019 motion by city council members on instituting an algorithm reporting obligation. "We are developing the Algorithm Registry as part of the Digital Rights Coalition together with the City of Helsinki." The State of Affairs also mentions that citizens of Amsterdam were involved in the development of the register to ensure that it is user-friendly for them.

The launch of the register is announced in September 2020 through a press release titled "Helsinki and Amsterdam first cities in the world to launch open AI register". In it the register is framed as a tool to enable transparency, trust, and citizen participation

> "Helsinki and Amsterdam are aiming to be open and transparent about the use of algorithms and AI in the cities…Through the AI register, you can also provide feedback, participate in research and thus influence how Helsinki and Amsterdam will build reciprocal, human-centred AI in the future."

At the same time, a white paper is published by the City of Amsterdam, the City of Helsinki, and Saidot AI to "introduce the concept of a public AI register as a means for transparency and civic participation in government use of AI". This provides more detail on the purpose of the register in the broader context of ensuring more ethical use of AI. It states that regular citizens still have limited access to "understand, participate in and debate about AI developments", and that an algorithm register is a way to address this issue by giving every citizen access to "understandable and up-to-date information about how algorithms affect their lives and the grounds on which algorithmic decisions are made". Furthermore, it emphasizes that citizens should be able to voice their opinion on these matters, in the spirit of meaningful democratic participation and mutual trust. The white paper explicitly describes the white paper as a "channel to provide feedback…and participate" in the development and use of algorithmic systems by the government, as well as a medium for "influencing how algorithms impact their [citizens'] living conditions".

The Algorithm Lifecycle Approach

The Algorithm Lifecycle Approach is a policy framework comprising a set of tools aimed at making the use of algorithms fairer and more transparent for the citizens of Amsterdam. It is released in December of 2022 in a document titled *Grip on Algorithms: Approach and tools for a responsible use of algorithms in Amsterdam*.

The approach consists of seven tools for governing algorithms throughout their life cycle.
- Algorithm register
- Governance capture and life cycle model
- Contract conditions
- Objection procedure
- Human rights impact analysis model
- Bias analysis model
- Algorithm audit

These tools are meant to be complementary; for example, the contract conditions include an information requirement that subsequently allows the register to be populated, and the bias and risk evaluations are also displayed on the register.

> "The most prominent manifestation of the Algorithm Lifecyle Approach is the Algorithm Register. The Algorithm Register explains for each algorithm what it does, how it does it and whether it does it in an unbiased way. Including an algorithm in the register is an intensive process," writes the project leader of the Algorithm Lifecycle Approach.

The register, which is set to change from a beta version to a full-fledged register in the course of 2023, is meant to be a "a tool to for conversation with different stakeholders.

The policy document highlights the importance of providing complete information to citizens about the use of algorithms in order to build trust in the government and allow for democratic participation. This means that the register must contain "all the algorithms that affect personal life", including those not administered by the municipality. It also emphasizes the need to move past transparency to accountability in the municipality's use of algorithms, through the involvement of stakeholders ranging from citizens to technical experts.

Incorporating the Register into new policy

Since the register's launch, it has been included in multiple municipal strategies and policy agendas. Its implementation has also been a subject of discussion for budget hearings and municipal council and committee hearings.

I. *Data Strategy Municipality of Amsterdam 2021-2022 ; January 2021*

In its 2021 Data Strategy, the Municipality encourages the people of Amsterdam to use the algorithm register as a way to learn about the use of their data in algorithms, and to subsequently ask questions and provide feedback in order to shape the development of the register. It also serves to frame the register as a tool for data governance, to give Amsterdammers "more say over their data".

II.   *Initiative Proposal Council Meeting: Digital Municipality with Human Values; April 2021*

This proposal centers "bringing experiences and perspectives from both citizens and experts from different sectors with different ages, genders and backgrounds" into adoption of new technology by the municipality. It also argues that the use of technology by the municipality should be "transparent to all involved." As such, the launch of the register is described as a positive step towards increased transparency about the algorithms that are involved in decision-making that affects Amsterdammers.

Subsequently, the proposal calls for "public monitoring and testing of existing and new technological applications in all policy areas of the municipality", alongside more inclusive citizen participation.

III.   *Information needs of citizens about the use of algorithms by governments, Het Pon & Telos; September 2021*

A coalition of public actors including the G4, the 12 Provinces, the Police and Rijkswaterstaat jointly commission a study on the information needs of citizens about the use of algorithms by governments, with the aim of developing policy instruments for public control of algorithms.

The study asks the following questions: do citizens think that information about the use of algorithms should be public, would they like to see the information themselves and what information do they consider important? The idea of "information need" is framed as a prerequisite for citizen participation, more specifically for objections and appeals to decisions made by algorithms.

A survey of over 1000 Dutch people shows the following findings:

- More than three-quarters of citizens have a need for information about algorithms, especially if an algorithm directly affects them.
- Citizens want to know how the outcome of an algorithm led to an action or decisions.

- If the algorithm directly impacts a citizen, it is more important for them to have a human point of contact and to know how to object to decisions based on the outcome of an algorithm.
- How citizens want to be informed about the use of algorithms by governments also depends on the direct impact of an algorithm on citizens themselves. They are more likely to be personally notified if there is a direct impact, while they are more likely to prefer a website such as a register for algorithms which do not directly affect them.
- Based on this study, people with a lower level of education generally had a lower need for information than people with a medium or high level of education.

The commissioning of this study reflects national efforts to move towards using algorithmic transparency to empower citizens to better participate in the government use of algorithms. The findings have been used to inform the development of algorithm registers and other transparency efforts.

IV.   *2022-2026 Coalition Agreement*

In this agreement, the municipal council frames digitization as an opportunity to improve services and to "strengthen trust between government and citizens", through transparency initiatives such as the register, for example. The council commits to continue using the algorithm register to monitor algorithmic systems, and to test for integrity, discrimination and prejudice before, during and after the development of algorithms. Digital rights are also brought to the forefront, with an emphasis on the importance of educating citizens.

The document also includes a commitment to ongoing citizen participation efforts, with a focus on inclusivity and addressing the disparity in participation between neighborhoods. It also emphasizes a preference for "more personal contact and fewer forms" and underlines the value of informal organizations and networks in facilitating this contact.

V.   *ICT and Digital Progress Report 2021; June 2022*

The ongoing development and implementation of the Algorithm Lifecycle Approach is a key focus of this progress report. It also discusses the passage of a motion to make algorithm registers mandatory for governments across the Netherlands.

In the report, the municipal board commits to a framework for the creation of public value through digitization, based on three key concepts: need, permission, and ability. Permission (Mogen) addresses the preconditions for the use of technology, which includes transparency and accountability for the use of algorithms along with digital inclusion.

VI.   *Amsterdam Municipal Budget 2023*

The 2023 municipal budget outlines the administration's goal to significantly increase the number of algorithms on the register by the end of 2023, and to ensure that the register is 100% populated with all identified algorithms by 2026.

Amsterdam Participation Policy Framework

The Amsterdam Participatory Approach Action Plan 2020 lays out a framework for improving citizen participation in the municipality's policy making. It requires every new municipal project or policy to make explicit choices about how to involve citizens. This includes answering the following three questions:

- what the participation is for
- how and when citizens are involved
- what the frameworks are for that involvement

Inputs from citizens include wishes, ideas, and reservations regarding the policy or project.

This action plan is based on a research study called "Strengthening Participatory Democracy". Best practices from the research include open and transparent processes, good feedback mechanisms, and clear expectation management. It also highlights the importance of ensuring equal access to relevant and understandable information for citizens, so that they are equipped to participate. Furthermore, it argues for the inclusion of systematic reflection and monitoring, communicating the limitations of the participation process, and making visible what is done with the input after the fact.

According to the study, the following principles are particularly relevant to participation on the topic of algorithms:

- Early and transparent : "participation is initiated as early as possible in the process, and space and rules are transparent to each participant in the participation process from the start"

- Customizing participation: the form of participation chosen must match the nature of the issue (i.e. if it's an issue such as algorithms which is not well understood)

- Valuing experiential expertise: "the experiential knowledge of the Amsterdammers targeted by the policy is used in the formulation of the policies."

- Using digital applications: digital tools (such as the register) can facilitate participation as well as access to information. "The municipality makes as much digital information as possible openly and transparently available to the citizens of Amsterdam, with the aim of an equal information position for all Amsterdammers. This creates space for Amsterdammers to provide input."

Conclusion

The development of Amsterdam's municipal algorithm register is rooted in operationalizing key principles, namely transparency and (inclusive) democracy, to which the municipality has committed in its foundational agendas for digitization and artificial intelligence. As a citizen interface for the municipality's algorithm lifecycle approach, the register bridges the gap between the municipality's policies on algorithmic governance and on citizen participation. Transparency and information accessibility are core principles shaping both the participatory approach and the development of the register. Specifically, it reflects the municipality's commitment to using digital channels to increase information availability and create an equal information position for all citizens. This subsequently creates a foundation for citizens to participate and provide input on the municipality's use of algorithms. While the register is meant to facilitate participation, its implementation as a policy tool also requires participation to ensure that it best meets the needs of citizens. Furthermore, efforts have been made to build upon existing guidelines for participation in order to adapt it to the topic of algorithms, for example by investigating citizen information needs. However, much work remains to be done on this topic.

III. LITERATURE REVIEW

This literature review aims to provide theoretical grounding for key concepts such as algorithmic transparency and citizen participation and introduce critical perspectives that could influence future policy approaches to algorithmic governance in Amsterdam. Furthermore, it illustratea the relevance of linking citizen participation with algorithmic transparency by drawing connections through the literature. Finally, it highlights best practices and implementation challenges from beyond Amsterdam, from which local stakeholders can draw lessons and inspiration.

Theoretical frameworks for algorithmic governance

Algorithmic fairness

The concept of algorithmic fairness as framed by Wong (2020) serves as a basis for understanding how the government use of algorithms is not only a technical one, but also a political one[5]. This justifies the importance of including citizen participation, for example, in municipal decision-making about algorithms. Wong argues that algorithm design and implementation inherently involves choices between competing values, due to the fact that there is no universally agreed upon measure of algorithmic fairness. Different stakeholders affected by an algorithm have different priorities in measuring fairness, which may lead to conflicting interests. According to Wong, public discussion on what is "fair" is the only way to reduce disagreement and increase legitimacy in the design, adoption, and use of algorithms by the government. He highlights transparency (publicity) about priorities for algorithmic fairness and their rationales, as well as the establishment of revisions and appeals processes, as prerequisites for legitimate decision-making on algorithms.

Algorithmic Transparency

A large-scale survey conducted by Aysolmaz, Muller, and Meacham [6] indicates that Dutch citizens today are highly concerned about transparency in government use of automated

---

[5] Wong, P. H. Democratizing Algorithmic Fairness. Philos. Technol., 33, 225–244.

[6] Aysolmaz, B., Müller, R., & Meacham, D. The public perceptions of algorithmic decision-making systems: Results from a large-scale survey. Telematics and Informatics 79 (2023) 101954.

decision-making systems. This reflects a broader trend of citizens seeking increased transparency about the algorithms that affect them in their daily lives. Transparency ties together many key principles of algorithmic governance, such as trust, legitimacy, and accountability. It also addresses the information inequities which lead to "power inequities between governments and city dwellers"[7].

In the algorithmic governance literature, transparency must go beyond simply sharing or publishing information; in order to be meaningful, it must aid understanding and be actionable. In other words, transparency should not be an end in and of itself, but rather a means to do something else[8]. Alfrink et al argue that the information shared through transparency measures is expected to enable citizens to assess the fairness of an algorithm's decision-making. In order to do so, the transparency tool should include information on inputs, processes, justification, and algorithm ownership, among other fields[9]. Similarly, Ingrams and Klievink underline the importance of quality and visibility of information, alongside actionability to multiple stakeholders. In other words, "transparency is information that conveys something about a real state of human affairs with relevance to future situations and decisions," they write. They go on to emphasize the multi-actor nature of algorithmic systems and thus of algorithmic transparency. The process of acquiring, sharing, and regulating information about algorithms typically relies on multiple organizations and actors[10].

In their report evaluating tools for public sector algorithmic, the Ada Lovelace Institute, AI Now Institute, and Open Government Partnerships frame transparency as a "necessary condition for accountability". By rendering information publicly accessible, transparency tools can enable citizens to "hold public agencies and other actors accountable for their use of algorithmic systems." These mechanisms create opportunities for intervention both within organizations using algorithms, and externally through citizen participation, they argue[11]. Along the same lines, Ingrams and Klievink highlight the role of transparency in enabling both public deliberation and more effective governmental processes[12]. In reality, transparency does not inherently lead to

---

[7] Cath, C., & Jansen, F. Dutch Comfort: The limits of AI governance through municipal registers.
[8] Challis, L. D. The Citizens' Strain to See Through Transparency: Exploring Reciprocity As an Alternative in the Smart City of Amsterdam. University of Twente.
[9] Alfrink, K., et al. Designing a Smart Electric Vehicle Charge Point for Algorithmic Transparency: Doing Harm by Doing Good?

[10] Ingrams, A., & Klievink, B. Transparency's Role in AI Governance. In The Oxford Handbook of AI Governance.

[11] Ada Lovelace Institute, AI Now Institute, & Open Government Partnership. Algorithmic Accountability for the Public Sector.

[12] Ingrams, A., & Klievink, B. Transparency's Role in AI Governance. In The Oxford Handbook of AI Governance.

accountability or citizen participation. Rather, mechanisms and processes must be developed and institutionalized to move beyond surface-level transparency[13].

Algorithmic transparency also depends on its audience, what their needs are, and what they can understand. A critical audience who is able to respond to the information provided is necessary to achieve accountability. As such, the questions "transparency of what" and "transparency to whom" must be answered early on in the development of transparency mechanisms[14].

The audience of a transparency tool, as well as the desired "institutional locus" of its implementation, are key in defining the algorithmic transparency approach that is taken. Ingrams and Klievink go on to describe these approaches as follows.

- Constructivist approach: Highlights the importance of understanding the human relationships and networks that underpin an algorithm.
- Democratization approach: Highlights transparency of the decision-making process, with a focus on maintaining a proper standard of democratic legitimacy.   This approach links transparency with citizen participation, as transparency comes from opening up algorithms to greater input from the public. Here, the audience for transparency is a diverse range of stakeholders including the public and civil society. Decision-making should not be "politically exclusive".
- Capacity-building approach: Views transparency is a question of organizational capacity; overcoming organizational and capacity challenges such as communication, knowledge and awareness about algorithms, will help achieve improved transparency.

They also identify a number three types of barriers to transparency. Firstly, intentional barriers involve deliberate "covering-up or obfuscation" of information. On the other hand, "illiterate" barriers include "lack of understanding or technical knowledge on the part of public audiences of transparency". Finally, intrinsic barriers are inherent to the differences between "how technological and human systems process information"[15].

---

[13] Ada Lovelace Institute, AI Now Institute, & Open Government Partnership. Algorithmic Accountability for the Public Sector.
[14] Ada Lovelace Institute, AI Now Institute, & Open Government Partnership. Algorithmic Accountability for the Public Sector.
[15] Ingrams, A., & Klievink, B. Transparency's Role in AI Governance. In The Oxford Handbook of AI Governance.

Challis adds that full, unselective transparency about algorithms can lead citizens to be overwhelmed with information, and unable to decipher what is relevant and what is not. Furthermore, transparency can only be achieved when citizens use and engage with transparent data. As such, she highlights citizen awareness as a fundamental requirement for the success of algorithmic transparency tools[16].

Algorithmic Accountability

In the field of algorithmic governance, accountability is seen as the next step following transparency. It is defined as a "clear acknowledgement and assumption of responsibility and "answerability" for actions, decisions, products and policies"[17].
Similarly, the Ada Lovelace Institute describes algorithmic accountability policies as policies " "oriented towards ensuring that those that build, procure and use algorithms are eventually answerable for their impacts." These policies require governments to be transparent about goals, processes, and outcomes of using algorithms[18].

    Contestability

Contestability is defined as "making systems responsive to dispute..to ensure they respect human rights to autonomy and dignity"[19]. Alfrink et al have conducted extensive research on contestable algorithms in the urban context, specifically in Amsterdam. Their work highlights the need for creating opportunities for citizens to debate and intervene throughout the lifecycle of the algorithmic system in order to protect against incorrect or unfair decision-making. Contestability frames transparency as a means to fulfill an information need, allowing people to participate by contesting decisions at different points in the AI lifecycle. As such, citizens should first and foremost know that a decision has been made using an algorithm, then have access to descriptions and justifications of the use of an algorithm in order to show that a decision or outcome is inadequate.   In addition to transparency, contestability also requires "channels for

---

[16] Challis, L. D. The Citizens' Strain to See Through Transparency: Exploring Reciprocity As an Alternative in the Smart City of Amsterdam. University of Twente.

[17] "Accountability in AI: Promoting Greater Social Trust," Theme Paper for the G7 Multi-stakeholder Conference on Artificial Intelligence (CIFAR, December 6, 2018).
[18] Ada Lovelace Institute, AI Now Institute, & Open Government Partnership. Algorithmic Accountability for the Public Sector.

[19] Alfrink, K., et al. Contestable Camera Cars: A Speculative Design Exploration of Public AI That Is Open and Responsive to Dispute. In Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems (CHI '23), April 23–28, 2023, Hamburg, Germany

voice" and "forums for evaluation".[20]

Channels for voice allow citizens to challenge or provide feedback on a decision made by an algorithmic system, while a forum for evaluation is a space in which claims are evaluated and negotiated in. Alfrink describes contestability as "a way of giving voice to decision subjects, which increases perceptions of fairness, in particular for marginalized or disempowered populations"[21].

Reciprocity

While contestability focuses on enabling citizens to object to an algorithmic system and the decisions it makes, reciprocity allows citizens to have a say in the creation or adoption of an algorithm. Challis argues that gain, comfort, and trust are the three factors shaping the adoption of technology by citizens. As such, reciprocity focuses on mutual benefit between the municipality and the citizen through the use of algorithms. This requires a transparent exchange of information between the two parties in order to establish trust, and a clear justification of how citizens gain from the use of an algorithm in public space. Citizens can also have an active say in setting priorities for the use of new technologies and automation of processes, granting them more agency in the municipality's use of algorithms[22].

Towards meaningful citizen participation

Principles

Organizing citizen participation involves actively soliciting input and feedback from the public, and "increasing the sphere in which citizens can exercise influence" in order to strengthen participatory democracy[23]. In addition to improving communication between government and citizens, it is seen as a way to increase legitimacy and public trust of government. Berner, Amos, and Morse (2011) provide an overview of a few influntial schools of thought on citizen participation. Most influential is Sherry Arnstein (1969), whose ladder model indicates that "the

---

[20] Alfrink, K., Keller, I., Doorn, N., & Kortuem, G. Contestable AI by Design: Towards a Framework.

[21] Alfrink, K., et al. Designing a Smart Electric Vehicle Charge Point for Algorithmic Transparency: Doing Harm by Doing Good?
[22] Challis, L. D. The Citizens' Strain to See Through Transparency: Exploring Reciprocity As an Alternative in the Smart City of Amsterdam. University of Twente.

[23] Brandusescu, A., & Reia, J. (Eds.). Artificial intelligence in the city: Building civic engagement and public trust. Centre for Interdisciplinary Research on Montréal, McGill University.

greater the degree of empowerment, the better". In King, Feltey, and Süsel's model (1998), citizens are placed ahead of technical or administrative processes. Finally, the "Effective Decision Model" theorized by John Clayton Thomas (1995) prioritizes "utilizing participation techniques that are appropriate for the specific context of the decision"[24]

In their research on contestable AI, Alfrink et al ask why and how citizens should be able to influence the adoption and use of algorithmic systems[25]. A 2022 UN report on AI in cities states that "it is essential for citizens and communities to be involved in the development of an AI strategy," as the public is the primary stakeholder in the use of algorithms in the city[26]. Along the same lines, the Ada Lovelace Institute report on algorithmic accountability tools argues that citizen participation should be a core policy goal, "supported by appropriate resources and formal public engagement strategies"[27]. Input from citizens provides critical contextual knowledge and helps eliminate blind spots in the development and use of algorithms, ensuring that the needs of affected communities are met[28].

Throughout the literature, two common principles emerge for participation on the topic of algorithms: early, and inclusive. "It is generally accepted that the ability to influence a process decreases as the process progresses," write Berner et al in their 2011 paper on local citizen participation[29]. Floridi (2020) adds that participation in the early stages of design and decision-making for AI public services builds trust and acceptance among citizens[30]. At the same time, Alfrink highlights the issue of representation in citizen participation on public AI systems, emphasizing the need for more diversity and inclusion[31]. In their 2020 report on citizen listening, Seebohm and Smith argue that there is no such thing as "hard to reach" citizens, but

[24] Maureen M. Berner, Justin M. Amos, and Ricardo S. Morse, "What Constitutes Effective Citizen Participation in Local Government? Views from City Stakeholders," Public Administration Quarterly 35, no. 1 (Spring 2011): 128-163.
[25] Alfrink, K., et al. Contestable Camera Cars: A Speculative Design Exploration of Public AI That Is Open and Responsive to Dispute. In Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems (CHI '23), April 23–28, 2023, Hamburg, Germany.
[26] Koseki, S., et al. AI and Cities: Risks, Applications and Governance. UN Habitat.

[27] Ada Lovelace Institute, AI Now Institute, & Open Government Partnership. Algorithmic Accountability for the Public Sector.
[28] Alfrink, K., et al. Contestable Camera Cars: A Speculative Design Exploration of Public AI That Is Open and Responsive to Dispute. In Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems (CHI '23), April 23–28, 2023, Hamburg, Germany.
[29] Maureen M. Berner, Justin M. Amos, and Ricardo S. Morse, "What Constitutes Effective Citizen Participation in Local Government? Views from City Stakeholders," Public Administration Quarterly 35, no. 1 (Spring 2011): 128-163.

[30] Floridi, L. Artificial Intelligence as a Public Service: Learning from Amsterdam and Helsinki. Philos. Technol., 33, 541–546.
[31] Alfrink, K., et al. Contestable Camera Cars: A Speculative Design Exploration of Public AI That Is Open and Responsive to Dispute. In Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems (CHI '23), April 23–28, 2023

rather that many citizens are seldom heard due to the lack of engagement and accessible channels for participation[32].

'Meaningful' participation is tied to the ability to measurably influence decisions[33]. In the case of algorithms, this includes the "ability to change the implementation of tech or decide not to use a particular technology at all" [34]. Berner et al underline that citizens value two-way communication where they are seen as decision-making partners with the government[35]. However, there seems to be a lack of concrete policy interventions that have worked to establish meaningful citizen participation on the topic of algorithms. This remains closely linked to challenges around meaningful transparency and accountability[36]

Approaches

The following section will focus on approaches and best practices for achieving citizen participation.

Identifying the target audience of a participation effort, in this case namely communities affected by an AI system, is an important first step when developing an approach for citizen participation. The UN report on cities and AI suggests reaching out to citizens through "established community networks and processes"[37]. The role of community organizations in facilitating participation "from problem definition to implementation" is recurring in the literature.[38] Similarly, Seebohm and Smith argue that "the best listening typically builds on existing trusted relationships"[39]. Pallet et al highlight that citizen engagement with algorithms likely already occurs outside of formal streams, and that policymakers should engage with these efforts more proactively[40].

---

[32] Seebohm, L., & Smith, N. Learning to Listen Again: How people experiencing complex challenges feel about engagement and participation through the Covid-19 pandemic. Centre for Public Impact UK.

[33] Knobloch, K. R. Listening to the Public: An Inductive Analysis of the Good Citizen in a Deliberative System. *Journal of Deliberative Democracy*, 18(1), 1–13.

[34] Brandusescu, A., & Reia, J. (Eds.). Artificial intelligence in the city: Building civic engagement and public trust. Centre for Interdisciplinary Research on Montréal, McGill University.

[35] Maureen M. Berner, Justin M. Amos, and Ricardo S. Morse, "What Constitutes Effective Citizen Participation in Local Government? Views from City Stakeholders," Public Administration Quarterly 35, no. 1 (Spring 2011): 128-163.

[36] Ada Lovelace Institute, AI Now Institute, & Open Government Partnership. Algorithmic Accountability for the Public Sector.

[37] Koseki, S., et al. AI and Cities: Risks, Applications and Governance. UN Habitat.

[38] Brandusescu, A., & Reia, J. (Eds.). Artificial intelligence in the city: Building civic engagement and public trust. Centre for Interdisciplinary Research on Montréal, McGill University.

[39] Seebohm, L., & Smith, N. Learning to Listen Again: How people experiencing complex challenges feel about engagement and participation through the Covid-19 pandemic. Centre for Public Impact UK.

[40] Pallett, H., et al. Public Engagement with Algorithms in Public Services. 3S Research Group Briefing Note.

Once the target of a participation effort is identified and understood, the participation channel(s) and approach can be developed. Common approaches include public consultations, surveys, and town halls, among others[41]. However, in their study on citizen listening in the UK during the pandemic, Seebohm and Smith found that no single form of communication could be accessed by more than two-thirds of the participants. While many preferred face-to-face communication, some were only able to participate through digital channels. As such, they argue that participation processes should be "bespoke and flexible", and that "individuals should be free to choose the form of engagement that feels right for them and gives them a sense of agency". Furthermore, they suggest testing and experimenting with a listening process in order to ensure that it is best adapted to the topic and to the audience at hand. In general, they found that participants were motivated by the opportunity to help "improve services for themselves and others", as well as learning from one another and providing feedback. Processing citizen input and translating it into practical learnings is also a key step of the participation process. Seebohm and Smith experiment with collaborative sensemaking, which allows participants to reflect on themes and insights emerging from the participation process, and provide feedback and recommendations[42].

Other best practices from the literature on citizen participation and algorithms include leveraging technology to facilitate information sharing and collaborative governance[43], as well as training more staff to respond to citizen question and concerns about algorithms[44]. Berner et al show in their study that citizens expect clear follow-up showing that their input was heard, and that the role of municipal staff in this case is to work as mediators and information providers[45].

Challenges

Citizens face a number of barriers to participating on the topic of municipal use of algorithms. Alfrink highlights the skills and knowledge that are needed to participate on "equal footing", and the risk of encountering "reporting inequality", or unequal participation between different

---

[41] Koseki, S., et al. AI and Cities: Risks, Applications and Governance. UN Habitat.
[42] Seebohm, L., & Smith, N. Learning to Listen Again: How people experiencing complex challenges feel about engagement and participation through the Covid-19 pandemic. Centre for Public Impact UK.
[43] Duberry, J. AI and civic tech: Engaging citizens in decision-making processes but not without risks. In Artificial Intelligence and Democracy.
[44] Alfrink, K., et al. Contestable Camera Cars: A Speculative Design Exploration of Public AI That Is Open and Responsive to Dispute. In Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems (CHI '23), April 23–28, 2023, Hamburg, Germany.
[45] Maureen M. Berner, Justin M. Amos, and Ricardo S. Morse, "What Constitutes Effective Citizen Participation in Local Government? Views from City Stakeholders," Public Administration Quarterly 35, no. 1 (Spring 2011): 128-163.

groups[46]. More specifically, "more educated and higher-income segments of the population are more inclined to engage with ICT-led interventions"[47]. Beyond knowledge and understanding of technology and algorithms, other barriers to participation include costs of participation (including time lost), accessibility, lack of clear communication, and distrust of government[48]. Focusing participation efforts on what is efficient for the majority poses a danger for reinforcing exclusion of marginalized citizen groups (Seebohm & Smith).

City organizations also face challenges and limitations in organizing citizen participation on their use of algorithms. Berner et al show that increasing citizen participation is linked to a fear of increased staff workload and need for resources along with increased levels of public scrutiny. Similarly, Alfrink writes that "city organizations' fragmented and bureaucratic nature fights against adequately responding to citizen signals", and that designing the necessary channels for voice and forums for evaluation requires significant effort. He goes on to illustrate that responding to feedback on an algorithmic system may require policy changes rather than just technical ones[49].

Existing approaches to citizen participation commonly taken by municipalities have many shortcomings. Some rely too heavily on "benevolent organizations willing to listen to citizen concerns"[50], while others put most of the onus on citizens themselves[51]. Additionally, consultation with citizens often occurs very late in the process of algorithm design and implementation, which often results in "trying to convince people to accept an already developed technology". Once an algorithm is in place, it is difficult for citizens to convince decision-makers to make a change[52]. Along the same lines, through expert interviews, Challis finds widespread cynicism about the actual impact of current citizen engagement efforts, as citizens share their ideas but rarely have the opportunity to follow up. While representative democratic processes

---

[46] Alfrink, K., et al. Contestable Camera Cars: A Speculative Design Exploration of Public AI That Is Open and Responsive to Dispute. In Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems (CHI '23), April 23–28, 2023, Hamburg, Germany.
[47] Brandusescu, A., & Reia, J. (Eds.). Artificial intelligence in the city: Building civic engagement and public trust. Centre for Interdisciplinary Research on Montréal, McGill University.
[48] Bellantoni, A., Chwalisz, C., & Cesnulaityte, I. Innovative Citizen Participation and New Democratic Institutions: Catching the Deliberative Wave. OECD.
[49] Alfrink, K., et al. Contestable Camera Cars: A Speculative Design Exploration of Public AI That Is Open and Responsive to Dispute. In Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems (CHI '23), April 23–28, 2023, Hamburg, Germany.
[50] Alfrink, K., et al. Designing a Smart Electric Vehicle Charge Point for Algorithmic Transparency: Doing Harm by Doing Good?

[51] Challis, L. D. The Citizens' Strain to See Through Transparency: Exploring Reciprocity As an Alternative in the Smart City of Amsterdam. University of Twente.
[52] Brandusescu, A., & Reia, J. (Eds.). Artificial intelligence in the city: Building civic engagement and public trust. Centre for Interdisciplinary Research on Montréal, McGill University.

may present an opportunity for citizens to participate on the topic algorithms, few political parties currently have a clear platform on the issue[53]. For some, sharing input on the use of algorithms at the municipal level is simply not enough, as AI is a trans-jurisdictional issue that involves a multiplicity of stakeholders[54].

Conclusion

In the literature, theoretical frameworks for ethical use of algorithms are increasingly well developed. Design, adoption, and use of algorithms are seen as political, as they involve decisions about which values and outcomes should be prioritized. These decisions should involve the public as much as possible. Although transparency is seen as the foundational principle of algorithmic governance, there is a movement to hold transparency to a higher standard by making it "meaningful" or "actionable". In essence, transparency should be a means for accountability, participation, etc, but not an end in itself. For example, transparency underlies frameworks such as contestability and reciprocity, which flesh out different visions for making the use of algorithms more democratic and human centered.

Nevertheless, there is no clear roadmap linking algorithmic transparency to concrete processes for citizen participation. As municipalities increasingly face this daunting task, they can refer to key principles and best practices from the literature on citizen participation. Participation should be early and inclusive, and citizens should feel that they actually have an impact. Participation channels should be diverse and adapted to the target audience. Municipalities can also leverage existing community networks, as well as digital channels, to reach a wider audience. Common barriers to participation include limited citizen understanding of algorithms, and limited institutional capacity for organizing participation and processing input.

---

[53] Challis, L. D. The Citizens' Strain to See Through Transparency: Exploring Reciprocity As an Alternative in the Smart City of Amsterdam. University of Twente.

[54] Brandusescu, A., & Reia, J. (Eds.). Artificial intelligence in the city: Building civic engagement and public trust. Centre for Interdisciplinary Research on Montréal, McGill University.

IV. EXPERT INTERVIEWS

Beyond policy analysis and literature review, conversations with experts provide an inside perspective on the algorithm register, specifically around efforts at citizen participation. These aim to shed light on what has gone right, as well as what challenges have arisen. Additionally, they give civil servants the opportunity to share their vision for what is possible to achieve with the algorithm register, in the context of the broader algorithm lifecycle approach. What are their goals and priorities? On the other hand, they provide a critical perspective on the relationship between algorithmic transparency and citizen participation from experts in the field.

The participants in the interview phase included the following:
- 8 current employees and 1 former employee of the municipality of Amsterdam working on digital policy, innovation, and citizen participation
- 1 researcher working with a public/ private institute for urban innovation in Amsterdam
- 1 representative of a technology firm working on tools for AI transparency

 Below are the key themes extracted from these interviews.

Defining the Algorithm Register and its goals

The municipal algorithm register is meant to be a public facing "citizen interface" of a set of algorithmic governance tools addressing the entire algorithm lifecycle. Not only is it a documentation tool, it is also a governance tool meant to help the organization streamline its processes. Transparency is the register's primary goal, yet is still a work in progress as the register is being populated. Although citizen participation has been incorporated into the register's development, to date it has been a secondary goal to achieving increased transparency. It is not currently clear to internal stakeholders or to the public whether the register is achieving its stated goals.

The importance of transparency and trust

The implementation of an algorithm register reflects a culture of being transparent with a willingness to receive feedback. The reality is that citizens do not currently know about algorithms and their impact on their lives; "people should know that algorithms are running their

lives", said one civil servant. Transparency comes in many forms, and good transparency is "flexible", meaning that it is adaptable to different audiences. "I think you shouldn't have to understand exactly how an algorithm works, but you should understand how it impacts your situation," said one of the respondents.

 Citizens are typically not aware when a decision is made using an algorithm. The recurring example used is that of the parking ticket. When citizens are notified of the municipality's decision to issue them a parking ticket, they are not informed that the decision was taken by an algorithm. They are given instructions to object or respond to parking authorities, but can go through a whole objection process without knowing that an algorithm was used for the decision. Some civil servants have suggested informing citizens about the use of an algorithm on the parking ticket itself, but the change was deemed not feasible. It is, however, important to note that many algorithms used by the municipality essentially automate already existing policy rules, so it is sometimes more important to speak about the policies or criteria themselves rather than focusing only on the use of an algorithm.

The move towards increased transparency is seen as a way to increase legitimacy and trust in the government, and more specifically in its use of algorithms. This trust notably eroded after the national benefits scandal. The media also plays a key role in shaping trust, as they are a primary intermediary between the government and citizens in sharing information about the use of algorithms.

Limitations of the register in achieving transparency

 Inevitably, the register faces limitations in achieving complete, flexible transparency. To begin with, the audience of the register remains limited as many citizens have minimal knowledge and interest in the use of algorithms by the municipality. Understandability also remains a major challenge. One civil servant questioned if the register aims to do too much; it tries to speak to experts and civil society as well as to the broader public, but fails to do both well, they argue. The topic of algorithms remains abstract for citizens, and although the register aims to make it more concrete through examples, algorithms become most relevant for citizens when a decision actually affects them. While the register serves as a high-level source of information, it does not notify people about specific decisions made by algorithms.

The experts interviewed have varying opinions about what should be included in the algorithm register, or what is "missing". A few mentioned that the register does not include algorithms used by non-public actors, while citizens may not always know who manages the use of an algorithm in the public space. Another common theme is the need for further justification for the use of each algorithm. Some experts called for the inclusion of algorithms in the idea or design phase, as well as a "monitoring" element so that citizens may understand how an algorithm performs once it has already been implemented. Other suggestions included making the register immutable, so that changes and updates can be visible to the public.

Implementation challenges

The municipality has also faced implementation challenges since the introduction of the register. For example, populating the register with existing algorithmic systems has proven to be difficult and time consuming due to the lack of information on the systems, or lack of awareness that they exist. Awareness has been a challenge in working across different departments of the municipality, as many may not realize that they are using an algorithm, or they may see filling the register as an extra step or roadblock.

External factors are also at play, such as a reputational risk concern which comes with subjecting municipal decisions to scrutiny. This ties in with a fear of bad press coming to the city, playing on the existing public distrust of algorithms which has been fueled by past scandals. This dynamic has led to hesitation to put concept-phase algorithms on the register, as the municipality would face backlash if they decide to adopt an algorithm in spite of negative feedback. It also leads to the desire to communicate about algorithms in a way that prioritizes palatability, which may come at the cost of important detail.

Fulfilling the need for citizen participation

Citizen participation is a key priority for the municipality, leading to the development of a participation procedure. However, according to most of the interviewees, the municipality is still trying to figure out how to organize citizen participation specifically around digital technologies. Most of the experts saw the role of the register in citizen participation as allowing citizens to provide more informed comments and feedback about the use of algorithms.

Practically speaking, the link between the algorithm register and citizen participation processes has not clearly materialized. It is not yet clear how to bridge the gap between fulfilling the citizen information need, and concretely enabling citizen participation. Although some citizen feedback has been sought through the design of algorithms and of the register itself, participatory channels and processes have not yet been institutionalized.

As a result, one expert argued that the register can seem like a one-way communication channel. They felt that the feedback loop needs to be clearly visible, and that as it exists currently, citizens don't feel that they can give an opinion. This feedback loop is even less visible for algorithms in the design phase, as algorithms only appear on the register once they are piloted or implemented. Citizens also have limited opportunity to share their own priorities when it comes to the use of technology in Amsterdam; "how can algorithms help citizens and improve their contracts and services with the government? We are not used to thinking like that" said one civil servant. However, it is widely understood by experts that the register is not meant to exist on its own, but rather is part of a complete lifecycle of algorithmic governance. The municipality's current focus is on publishing and populating the register, while other things, although nice to have, can feel far in the future at this point.

Obstacles to organizing citizen participation.

The reality is that algorithm use is neither easily understood nor top of mind for a lot of citizens, especially those who are socially or economically marginalized. As such, the people who participate in municipal decision-making, whether it be on algorithms or other issues, are already part of a self-selecting group.

> "In certain areas, people will already call the municipality if there's one mattress from the ground. And in other areas, they may not trust the government, or they may be more used to things happening like that in their neighborhood, and they will not report it anyway," described one civil servant.

Propensity to participate is shaped not only by interest and existing knowledge on the topic, but also by accessibility of participation (i.e. time, place, and language), and feeling of legitimacy to

participate. Citizens will only feel that their participation is valuable if they have a baseline of trust in the government and belief that they aim to make things better for their citizens.

 Once participation takes place, processing and integrating citizen input presents another challenge, as there is not always a clear protocol. Sometimes, participation can be seen just as a box to check, with little to no follow-up. Even when the intention is there, things become complicated if there aren't organizational structures in place to properly deal with extra steps such as responding to feedback and appeals.

Limited capacity and lack of priority within the municipality remain significant obstacles to organizing participation on the topic of algorithms. Within the municipal leadership, a deputy mayor responsible for digital city, for example, cannot be responsible for every algorithm that is in use in the organization. Across departments, knowledge about (ethical) AI is not well distributed, and getting buy-in to organize participation across every department that uses algorithms presents a significant lift. Considering the plethora of responsibilities placed upon the local administration, communicating with citizens about algorithms is not necessarily top of mind. Nonetheless, "the municipality is still very much in the innovation phase – we have to start somewhere", said one civil servant.   They describe municipality as being in the first phase of a maturity model regarding citizen participation on the topic of algorithms; "our current state of citizen engagement on algorithms is quite low, about 4 out of 10, but without the register it would be even lower." In order to move to the next phase of maturity, participation efforts must be championed by a handful of departments, before including citizens in decisions about algorithms finally becomes mainstream across all departments.

Participation on algorithms to-date

 What participation efforts have already been made on the topic of algorithms? To begin with, the public facing part of the register was co-developed with citizens through design sessions focused on the information requirements and usability of the register interface. The municipality also held a citizen round table last year to discuss the controversial "top 400" algorithm, followed by a session in December 2022 to gather input on both the national and municipal registers. This input will be incorporated into the new version of the register coming out in 2023. Looking ahead, there are plans for an "Algorithm Week" and other efforts focused on

face-to-face communication with citizens, including and especially those that might not be looking at the register. Informational video content has also been developed for different user groups, from civil servants to citizens, to show them how algorithms appear in their work or how they impact them in their daily lives.

On the register itself, citizens can ask questions and provide feedback through two channels: through a feedback form, and through the contact information provided for each algorithm. The contact information for each algorithm owner used to be provided across the board, but enquiries are now primarily directed towards a centralized email address managed by the algorithm team, who then transmits the message to the responsible party. This allows the algorithm team to keep track of feedback on algorithm use across different policy areas.

For civil servants who receive feedback and objections from citizens, the objection procedure is a tool to escalate citizen concerns about the use of an algorithm and its effectiveness. Some argue that citizens should have a channel to object more directly without going through so many steps and intermediaries.

 From participation efforts thus far on the register, the municipality has received a wide range of questions from people with varying degrees of understanding of algorithms. Many of these questions have been about use of data and automated decision-making processes. They find that a group of experts regularly engage with participation efforts, coming from technical, academic, and civil society perspectives. Lawyers and journalists have also used the participation channels to get more detail on legal matters and otherwise, while city council members have used the register to better understand which algorithms are used by the municipality.

Guiding principles for participation on algorithms

 From the interviews, a number of ideals emerged for effective and impactful citizen participation on the topic of algorithms and on technology more broadly.   To begin with, input from citizens and experts should be incorporated into every phase of the algorithm lifecycle, creating a continuous feedback loop with the municipality. This should be rooted in mutual trust and benefit. Secondly, participation should be transparent in both its approach and impact. Key elements of a participation process include 1) defining the goal, 2) designing the approach for

gathering input, 3) determining what will be done with the input 4) deciding how citizens will be informed afterwards. It is important to set clear expectations on what is to be expected to come out of participation, and there should be a follow-up with participants after the fact.

Several experts emphasized the importance of early transparency, meaning that citizens should be informed about an algorithm much earlier in its lifecycle.   Although participation efforts by the municipality may be delayed due to the desire for everything to be perfect, waiting too long can be detrimental. Essentially, the earlier the participation, the better. Participation strategies should also be multi-pronged and multi-channel to ensure that different types of people are able to participate. This can be facilitated by the use of existing institutions, resources, and channels for participation.

 Participation efforts should not overlook the key role of city council members and other elected officials, as they are responsible for representing the interest of citizens. Political processes bring the use of algorithms into the public debate and vice versa. "There should be a way for input from the council members, citizens, and public debate to get back to the deputy mayors that are in charge of these topics," said one civil servant. At the same time, participation efforts should focus on high-risk uses of algorithms that have the greatest potential impact on citizens, while internal facing, low risk algorithms can be deprioritized. Furthermore, citizens should be able to express when they believe that the use of an algorithm is simply too risky, and have space to object to such systems being place.

> "I think meaningful participation is if we come to a common definition of what we find fair in the way that algorithms function in our public decision-making processes. So are the grounds and the consequences of algorithms acceptable to the people that are actually affected by them? … What should [the algorithm] improve and for whom?" - anonymous expert

Future strategies and ambitions for citizen participation

At the moment when the interviews were conducted, stakeholders expressed that they have moved beyond gathering feedback on the register as a tool and are now focusing on engaging citizens about the algorithms themselves. The focus of participation has specifically shifted to

high-risk algorithms and ensuring that their use is understood by as many citizens as possible. This means also populating the register with more high risk algorithms and increasing citizen dialogue alongside it.

The municipality can also leverage its relationships with external stakeholders in order to facilitate citizen engagement. For example, community organizations have existing networks and are also usually more issue focused, making them beneficial for targeted citizen outreach. Tech activist organizations and NGOs can also play a more critical role, holding the government accountable on behalf of citizens. The media can also impact the opinion of citizens and shape their reactions to the municipality's use of algorithms. Finally, the private sector also has the opportunity to better incorporate citizens into discussion and design processes.

Conclusion

Transparency has been the primary focus of the Algorithm Register to date, as identifying algorithms in use by the municipality and populating the site with the necessary information has proved to be challenging. Although citizens have been involved in the design of the register, much work has yet to be done to institutionalize citizen participation processes in the adoption and use of algorithms.

Citizen participation on the topic of algorithms faces both internal (within the municipality) and external barriers. Internal barriers include lack of capacity and lack of awareness across departments. Processing and operationalizing the input gathered from citizens also presents an organizational and procedural challenge. The most significant external barrier is that citizens are not sufficiently aware of the municipality's use of algorithms, and the extent to which it impacts their lives. The register is a means to increase citizen awareness about algorithms, but it does not inform citizens in the moment when an algorithm is used to make a decision which concerns them. This presents a significant transparency gap.

Despite the challenges, civil servants and other stakeholders are ambitious about increasing citizen participation on the municipality's adoption and use of algorithms moving forward. Ideally, participation efforts will be timely, transparent and accountable, and use diverse channels in order to maximize accessibility. Furthermore, they will be incorporated into different

phases of the algorithm lifecycle, with a specific focus on high-risk/ high impact algorithms. Civil society and community organizations serve as key partners to help the municipality reach as many citizens as possible.

V.   EXPERIMENTING WITH CITIZEN PARTICIPATION

Approach & reasoning

The final phase of this exploratory case study is investigating how to best engage with citizens on the topic of the municipal adoption and use of algorithms. It consists of testing three different types of citizen participation: a 90-minute-long small group citizen conversation, a survey distributed to citizens through digital channels, and finally, ad hoc conversations with citizens in the field in strategic locations such as community centers. The data gathered includes the responses of citizens to specific questions about algorithms and citizen participation, but also feedback and observations about the effectiveness of the respective approaches.

Outcomes include learnings and recommendations for the future design of citizen participation channels on the topic of municipal use of algorithms. The thematic focus of the participation through these different channels was not on the register itself, but on understanding what citizens want and need when it comes to participation on the topic of algorithms. Nevertheless, the register was presented to participants as a resource to gain more understanding about the municipality's use of algorithms.

I.   Citizen Conversations

In the context of this research, Citizen Conversations are small group discussions coordinated and hosted by the municipality and/or a partner organization, intended to facilitate dialogue and knowledge sharing with and between citizens on a chosen topic, in this case the municipality's use of algorithms.

Goals

Citizen Conversations are meant to allow for a dialogue with citizens where information about algorithms can be communicated in an accessible way, and where they can share their thoughts

and ideas in a low-pressure setting. Sessions consist of a relatively small group of people, and are structured in a way that encourages people to participate freely but purposefully. For this study, the idea was to test out a citizen conversation model that could be iterated upon and replicated by different stakeholders and on different topics. For example, findings could be incorporated into future citizen dialogues hosted by the municipality or by its partners such as Digital Rights House.

The Conversation aimed to address broader questions such as perception of algorithms in general and perception of algorithms used by the municipality. The algorithm register was incorporated into the conversation in a natural way by using it to show examples of algorithms in use by the municipality. This then prompted more discussion about the citizens' desire to be informed about and participate in the municipality's use of algorithms.

Description

 The first citizen conversation was held on April 12, 2023, and was framed as a "trial run" to help Digital Rights House and the Municipality of Amsterdam determine how to organize such sessions moving forward, as well as to gather initial data on how to engage citizens on the topic of algorithms. A 90-minute-long agenda was created with ice-breakers, an informative presentation on algorithms using two examples from Amsterdam's algorithm register, guided group discussion, and collaborative sense-making.

Overview of session

The first question we asked was "what do you think of when you think of algorithms?"

Social media was the most common response, which reflects the fact that it is one of the most commonly known uses of algorithms that affects the average person on a daily basis. None of the responses specifically reflected the use of algorithms in public space or for public services. Many answers focused on the technical nature of algorithms, such as "coding", "computers", and "data analysis", with some highlighting their innovative qualities, i.e. "new technology", "smart tech", and "automated". At the same time, others focused on their complexity ("hard to explain what it is", "difficult technology"). This exercise also brought to light participant concerns about the impact of algorithms and their potential risks; for example, "influence our thoughts",

"manipulation", and "data breach". One participant brought up the citizen "right to know" as a key element of the governance of algorithms. In the discussion that followed, participants self-reflected on how the first things that came to mind regarding algorithms were shaped by their own exposure and experience.

The moderator then provided the following definitions of algorithms and algorithmic systems.

- Algorithm: A process which generates an output from an input *(UN Habitat)*
- Algorithmic System: A system that uses one or more algorithms, usually as part of computer software, to produce outputs that can be used for making decisions.
  - Functional definition: a system that uses automated reasoning to aid or replace a decision-making process that would otherwise be performed by humans *(Ada Lovelace Institute)*

After establishing a common definition of algorithms, the moderator then shifted the focus to the local context by asking "what do you know about the use of algorithms in Amsterdam? What comes to mind?"

In general, participants did not know much about the use of algorithms by the municipality, and didn't realize many public services were powered by algorithms. However, the examples brought up by some participants sparked very engaged discussion and a number of follow up questions, showing a curiosity and interest to learn more about this topic. The topic that brought up the most debate was the use of surveillance cameras in public space. Participants wondered if these cameras used algorithms to identify and track people. They felt that what the cameras film, how they collect data, and what they are for is not transparent. Other examples that came up were the automated traffic light system, which was seen as a potential positive use of algorithms for increased efficiency, along with parking enforcement. Participants shared their negative experiences with automation, arguing that it is not always as "smart" as you think, and is often incapable of detecting nuance or dealing with exceptions. As such, they highlighted the value of speaking to a human from the municipality, as opposed to a robot or machine.

At this point, participants were introduced to Amsterdam's Municipal Algorithm Register as "a tool that citizens can use to learn more about how the city uses algorithms". The register was

then displayed on a large screen, and participants were quickly walked through two algorithms in use by the municipality: Automated Parking Control, and Top 400/600.   This was used as a jumping off point for the main discussion activity of the session. All participants were given time to answer the following questions, each on a sticky note:

1. If an algorithm is being used in your city to make decisions that could affect you or people you know

    a)   How would you want to learn about it, and what would you want to know?

    b)   Do you care that the decision is being made using an algorithm?

2. If the municipality is thinking about using a new algorithm in Amsterdam

    a) What should they take into consideration?

    b) Who should they talk to?

3. Do you want to give your input on the use of technology in and by the municipality? Do you feel that you are able to?

Afterwards, participants split into groups of two. Each group was responsible for interpreting and synthesizing the responses to one of the questions, then presenting their conclusions to the rest of the participants. This approach was inspired by the concept of collaborative sense-making described by Seebohm & Smith[55].

1. If an algorithm is being used in your city to make decisions that could affect you or people you know
        a. How would you want to learn about it, and what would you want to know?

Participants emphasized the need to know the purpose and goal for the municipality's use of an algorithm, as well as what data is collected and how it is used. One brought up the desire to

---

[55] Seebohm, L., & Smith, N. Learning to Listen Again: How people experiencing complex challenges feel about engagement and participation through the Covid-19 pandemic. Centre for Public Impact UK.

be informed about their (digital) rights and how to protect themselves from the potential harms of using algorithms. Regarding *how* they would like to learn about the use of algorithms in their city, participants underlined the importance of honesty and transparency, and mostly favored a multi-channel approach - "a website alone is not enough". Ideas included campaigns on different channels, such as social media, television, flyers, print ads, newspapers, and in public space (billboards and trams). They also suggested direct communication such as letters. Although media, specifically social media, were seen as powerful communication tools by participants, some said it can also lack credibility, especially if news does not come directly from the municipality.

b. Do you care that the decision is being made using an algorithm?

Almost all of the answers to this question were nuanced and conditional, showing that participants are willing to accept the use of algorithms if certain criteria are met. Some brought to light the limitations of algorithmic decision making, such as the lack of sensitivity and nuance, and called for human controls and checks. Others emphasized that the use case of the algorithm matters; while the automation of simple decisions for increased efficiency may be acceptable, dealing with more sensitive personal information and decision-making is less accepted. In addition to human oversight, other key conditions included transparency and ethical use.

2. If the municipality is thinking about using a new algorithm in Amsterdam

a) What should they take into consideration?

The importance of centering citizens, and humans more broadly, was the salient theme in the responses for this question; "[the citizens] are their city so they and their wellbeing should be taken into account". The group tasked with commenting on this question separated the answers into the risks and rewards that should be identified before an algorithm is rolled out, along with who may be affected. "Risks can be misuse of privacy, violation of human rights, and long-term safety in public space. Benefits like citizen well-being and the obvious efficiency/ accuracy should also be considered" they wrote.

b) Who should they talk to?

Along the same lines, participants felt that the municipality should initiate open discussion with citizens and affected communities when considering using a new algorithm in the city. They suggested involving other stakeholders such as civil society, activists, and people representing citizens and working for human rights. Furthermore, the municipality's strategy could involve going to community centers and housing developments at the neighborhood level, as well as reaching out to people by mail.

3. Do you want to give your input on the use of technology in and by the municipality? Do you feel that you are able to?

Although the responses varied, the participants summarized them well: "In general, everyone wants to have the right and ability to be included. While not everyone feels like they can, they would like to have the option to engage and give their opinions." Even those who did not necessarily feel the need to participate wanted to have the option to do so. Some specifically mentioned that everyone should be able to participate through channels such as the algorithm register or through surveys. While one respondent stated that they do not currently feel able to participate, most felt that they could, although they were not clear as to how.

The session was concluded by asking participants what meaningful citizen participation means to them. One described it as a process "whereby a representing group of citizens is actively engaged, made aware/ educated and involved in the decision-making towards a particular outcome (and that their impact actually carries weight)". This definition involves three phases: the awareness-raising that is required before participation is possible, participation which takes the form of involvement in decision-making, and follow up on the participation. These themes were recurrent in many of the answers, particularly the desire for citizens to have impact or influence. One response also emphasized the need for complex topics such as algorithms, and how they are used, to be explained to citizens in an accessible way in order to enable meaningful participation. Others described the nature of the participation more specifically; for example, conversation should be open, it should be at the neighborhood level, and it should occur in person and online. Furthermore, citizens should be 'representative', meaning that "the people involved in participation efforts represent/ reflect the people affected as well as possible."

Finally, one respondent added that citizens should be able to directly speak and ask questions to someone from the municipality as part of the participation process.

Participant Feedback

Participants were also invited to provide feedback on the session's content and structure. To begin with, it is helpful to ask questions to evaluate people's baseline level of understanding before diving into example. Defining key terms such as algorithms and algorithmic systems is also critical. Participants also found a walk-through of the algorithm register helpful, albeit information-dense. The approach to presenting the register within the time constraints at hand needs to be further developed. For this type of in-depth discussion, participants favor small groups from 6-8 participants. Larger sessions should be broken up into smaller breakout sessions in order to better facilitate conversation. Approaches where people are given time to write down their ideas (ie using post-its) then share them with the group can make it easier for people who are shy and hesitant to participate. After the session, resources should be provided for participants who want to learn more about the topic.

They also provided the following input about participating on the topic of algorithms in general. Citizens may be more likely to participate on this topic via surveys or other virtual channels than in person sessions such as this one. They would want to participate in more involved, in person discussions on issues that immediately impact them, their family, and their immediate community or neighborhood (for example, the local school attended by a family member). With technology and algorithms that are not necessarily visible and present, it's harder to feel that there's an immediate impact, and therefore it is harder to feel the need to participate in a more engaged way. Citizens might be just as, if not more, concerned about the use of algorithms by the private sector than by the municipality, and may want to know the municipality's response to those concerns.

Conclusion

When participants think about algorithms, public services do not immediately come to mind. As such, most did not realize that many public services in Amsterdam are powered by algorithms.

However, once examples were brought to the table participants were very interested and curious about the topic, opening up a space for questions and discussion. Concerns that emerged related to the use of algorithms were the risks of surveillance and lack of human oversight. When an algorithm is being used to make a decision that could affect them, citizens want to know what data is being collected, whether there are privacy measures in place, and whether the use of the algorithm is properly justified. Their acceptance of algorithmic decision-making in general is conditional upon factors such as human oversight and ethical use. They value transparency and communication from multiple channels about when an algorithm is being used. If the municipality is considering implementing a new algorithm, participants feel that they should strongly consider risks and benefits to impacted citizens. They should also initiate open dialogue with these citizens along with other interested stakeholders, such as civil society and advocacy groups.

Participants believe that everyone should have the opportunity to give their input on the municipality's use of algorithms, but not all felt that they are currently able to. To the group, meaningful participation is accessible, allows for open dialogue, and has a clear impact and follow up. It is also as inclusive as possible.

Overall, the Citizen Conversation was conducive to fostering more in-depth dialogue as well as information sharing. This participation format allows citizens to learn from each other and reflect on their experiences. However, it is quite involved and time-consuming, which means that it would probably only attract people who have the time and who are interested in the topic. In this case, the session was hosted by Digital Rights House; working with partner organizations in the future could make this approach more scalable, but only if there is a clear way for citizen input to reach relevant stakeholders in the municipality. Furthermore, these sessions could benefit from having a representative of the municipality available to answer questions and concerns about the use of algorithms.

II. Survey

The second citizen participation method which was tested as part of this study was an online survey focused on if and how citizens would like to learn more and participate on the topic of algorithms in the municipality.

Goals

Due to the fact that the municipality had never conducted a survey specifically on the topic of algorithms, there was a great interest in figuring out how to approach gathering input on the topic from citizens who may not even know what an algorithm is.

The thought behind conducting a survey was to use online channels to reach a wider audience than the other participation methods, through a format which takes relatively little time. Similar to the citizen conversations, this method included an explanation of algorithms and examples of those used by the municipality, before diving into deeper questions about the if/ when/ how of citizen's desire to participate on the topic of municipal use of algorithms. Not only are the findings meant to provide insight into citizens' perspectives on participating on the topic of algorithms, the survey itself can be adapted or built upon to be distributed by the municipality to a wider audience.

Description

A 15-question survey was developed specifically on the topic of citizen participation and municipal use of algorithms. It was distributed online for a period of two weeks to 200 randomly selected participants from an existing panel managed by the Office of Research and Statistics. Of the 200, 99 participants completed the survey.

The survey is divided into 5 sections. The first section aims to evaluate the participant's awareness of algorithms and their use within the municipality. The second section provides definitions of algorithms, alongside three examples of algorithms used by the municipality. The examples are purposely chosen to represent the diverse use-cases for algorithms in municipal governance. This is followed by questions gauging the participants' sentiments about the use of algorithmic decision making by the municipality, as well as their desire and ability to participate on this topic as citizens. The third section dives deeper into how citizens would like to provide input on the municipality's use of algorithms, both in terms of participation channel and in terms of phase in the algorithm lifecycle. The fourth section introduces the idea of the algorithm register, followed by questions to gauge the participant's knowledge of and interest in using the

tool. Finally, the last section is meant to give participants an opportunity to provide feedback on the survey as a whole, and to leave any additional comments.

Building the survey

Developing the survey was an iterative process, with multiple rounds of feedback from both Digital Rights House and the Research and Statistics department of the municipality. The following were the key themes of the feedback.

Firstly, the purpose of the survey should be introduced from the start. In terms of structure, it should be relatively short and digestible, and participants should have the opportunity to opt out of a question or to elaborate on a response, depending on the question. Additionally, it is crucial to provide definitions and examples. Because we assume that most citizens have limited knowledge of algorithms and their use by the municipality, definitions and examples help level the playing field and provide a good starting-off point to anchor their answers in something real and specific. These explanations should not use technical terms that may not be understood by all participants. Similarly, when asking about participation in different phases of the algorithm lifecycle, citizens might not understand what these phases are and what they entail. It is important to explain, for example, what happens in the algorithm design phase and how citizens could participate.
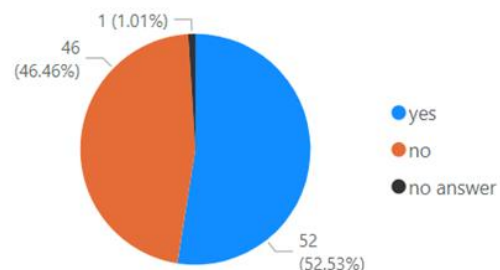
Findings

The start of the survey focuses on citizen awareness about algorithms and their use by the municipality.
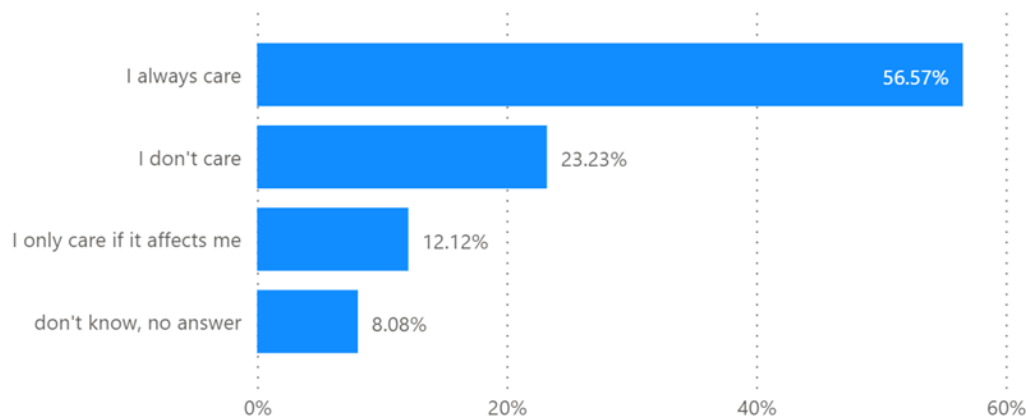

Do you know what an algorithm is?

- 17 (17.17%)
- 81 (81.82%)
- yes
- no
- no answer
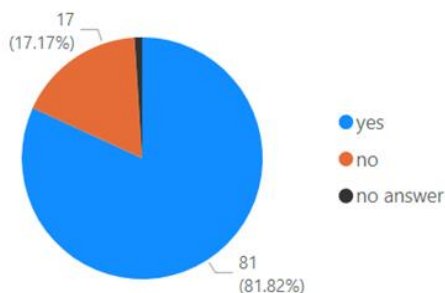
Were you previously aware of the fact that the municipality uses algorithms?

- 1 (1.01%)
- 46 (46.46%)
- 52 (52.53%)
- yes
- no
- no answer

As such, 82% of participants say that they know what an algorithm is, while only 52% say that they were previously aware that the municipality uses algorithms. This shows a significant gap in awareness that presents a fundamental obstacle to citizen participation on the topic. It also aligns with comments from other participation efforts which indicate that citizens have a very limited perception of what algorithms can be used for, but also of what the municipality actually does.

Do you care if a decision by the municipality is made using an algorithm?

Response	Percentage
I always care	56.57%
I don't care	23.23%
I only care if it affects me	12.12%
don't know, no answer	8.08%

Participants were then asked if they care if a decision by the municipality is made using an algorithm. More than half (57%) said yes, which supports the idea that citizens should be informed when an algorithm is in use, especially when it is used to make a decision that affects them.

Respondents were then given the opportunity to elaborate on their responses. Their comments have been grouped below.

Concerns about the use of algorithms

Respondents had several recurring concerns about the potential harms of using algorithms. Prominent among them was concern about prejudice and bias, specifically in the "characteristics, parameters, and predetermined goals embedded into the algorithms". This bias is linked to profiling people or dividing them into groups, leading to disparate treatment and unjustified

intervention, as seen in the childcare benefits scandal. The scandal is referenced multiple times as a reason for decreased confidence in algorithms and in the government.

In general, respondents questioned whether the use of algorithms in public services is ethical and desirable. This relates to the perception that algorithms are limited and lack "empathy and human thinking", along with nuance and context. Blind trust in computers and algorithms, with no regard for errors or exceptions, is seen as dangerous; "when no appeal or human intervention is possible, it becomes scary," wrote one respondent. There is a common fear of generalization when "every situation is different", and "citizens are people not protocols". Some even linked the use of algorithms to oversimplified policy. There is also discomfort at the idea of humans being replaced by systems: "the world is cold enough without this approach".

Beyond linking the use of algorithms to a lack of empathy, some respondents felt that algorithms are a way for the government to control citizens "from above". "Algorithms can lead to a tyrannical dictatorship", one respondent argued. This sentiment was also linked to concerns about privacy and the use of data.   As such, respondents argued that there must be checks in place and legal limits to the use of algorithms. Furthermore, algorithms and the assumptions embedded into them should be open for public scrutiny; "I want to know how I and my fellow Amsterdammers are observed and analyzed."

Acceptance of algorithms

However, not all respondents shared the same perspective on the use of algorithms. Many expressed an accepting attitude towards the use of algorithms, although it was typically nuanced or conditional. They saw algorithms as convenient and even necessary in some cases. One participant wrote that "using this technology makes many processes much more efficient. I like the idea of knowing that the government and municipalities keep up with the times." Another described algorithms as "specific and precise", and a way to overcome administrative bottlenecks. Yet another emphasized that algorithms follow the same assessment and decision-making steps as humans. Some were more measured with their responses, expressing that algorithms can be beneficial in most situations, but not all. Another consideration was whether the algorithm was sufficiently checked, and if and how citizens could appeal decisions. "I am

not against algorithms", one wrote, "but I am against them if they become an extra bureaucratic hurdle for citizens."

Transparency and awareness

"The use of algorithms is unavoidable and also of social importance, but the use must be transparent and adequately documented," wrote one respondent, highlighting the importance of transparency efforts by the municipality. They continued to say that some level of accountability exists when a human makes a decision, in that they can be asked to explain their reasoning. However, with algorithms, decision-making becomes a black box. To that point, several respondents asked questions about how algorithms work and how they may impact a decision-making process, highlighting the need for awareness and education about algorithms in order to achieve transparency.

The next two questions were about desire and perceived ability to give input on the use of algorithms by the municipality.

Do you want to give your input on the use of algorithms by the municipality?
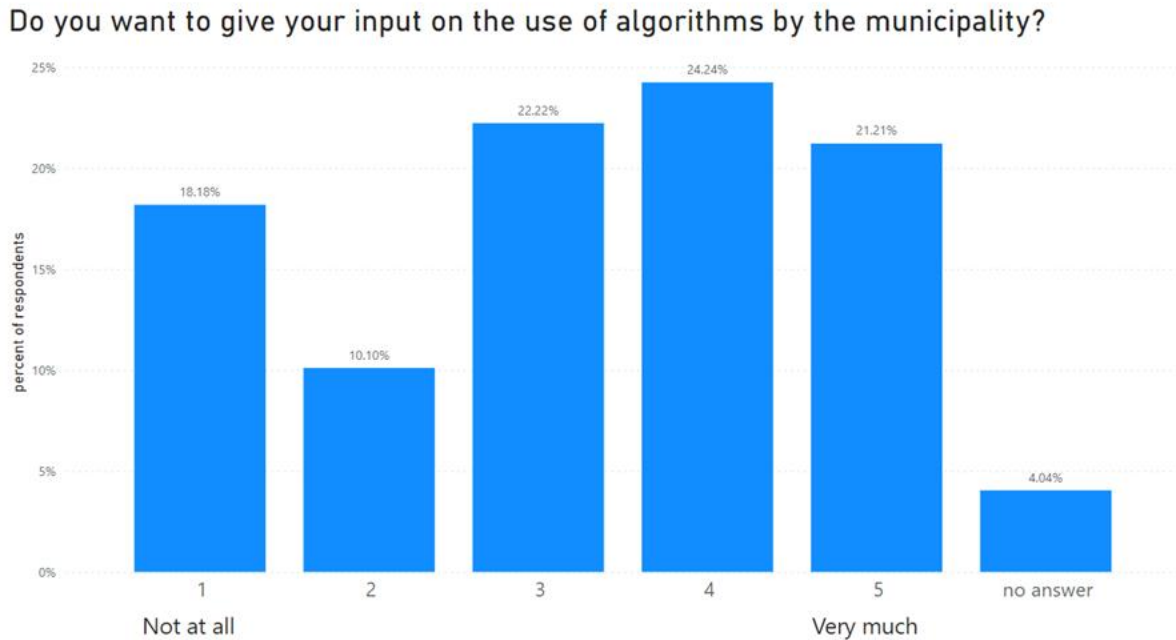
Do you feel that you are able to give your input on the use of algorithms by the municipality?
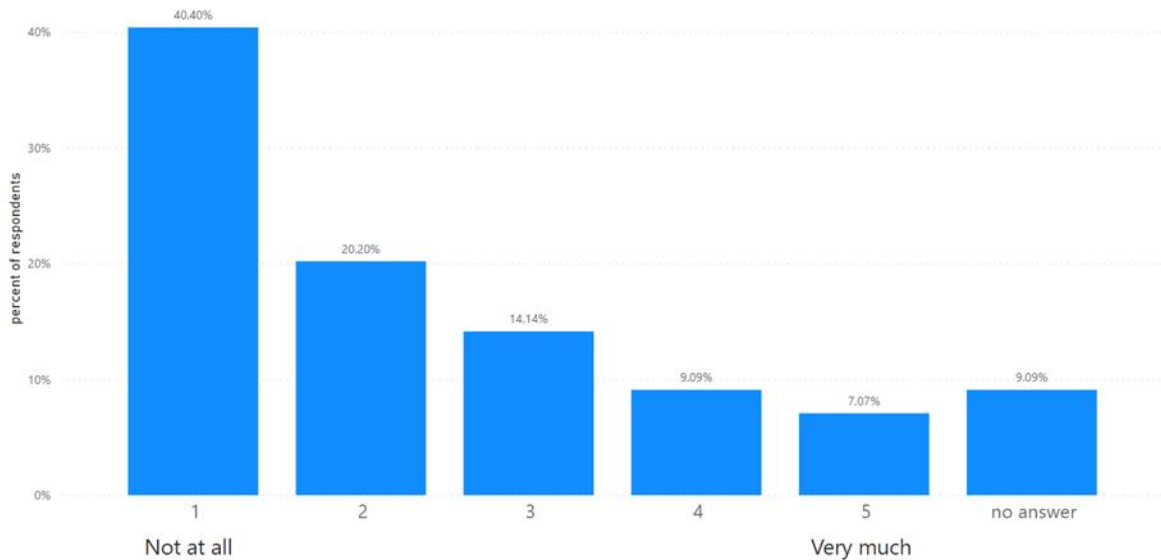
68% of respondents were at least somewhat interested in giving input on the use of algorithms by the municipality, with 21% being very interested; only 18% said that they were not interested at all. However, 40% of respondents said that they did not at all feel able to give their input on the use of algorithms by the municipality. This highlights the importance of removing barriers to participation and creating awareness of opportunities to provide input.

Respondents were given the opportunity to elaborate on their answers. Many of them were interested in participating but either didn't know how to participate or didn't feel they knew enough about the topic. Others were pessimistic about the lack of impact- they essentially felt that their contribution would be useless. The comments have been grouped into a few common statements below.

I have never looked for opportunities to give input, but I would like to.

These respondents are interested or have an opinion on the topic, but don't know how to participate. One wrote the following: "I want to remain involved in decision-making about the neighborhood where I live, and about Amsterdam". Another said that "input from residents about its use is, I think, desirable; not about you and without you, but with you!"

I would not be able to make an impact. Nothing can change now.

A couple of respondents felt that citizens have no influence on the use of algorithms by the municipality. In particular, they felt that once an algorithm has been adopted, nothing can be done. This is because they believe that algorithms are built on behalf of the municipality, which makes them beyond the control of citizens.

I am not sure what participation entails.

"I have no idea what kind of input the municipality expects," said one of the respondents. Others wondered how their contributions would be used, and even if their information would be incorporated into an algorithm.

I know nothing about algorithms and/or about what the municipality is doing in this area.

Respondents feel that algorithms are difficult to understand, and some even stated that they don't want to make the effort to understand them. Because they are not experts, they feel that they may not be able to give well-substantiated input. They also wouldn't know where to start or who to go to; one asked whether there is someone "handling" algorithms. Transparency is also a key concern- "I have no insight into the use of this in the various departments of a municipality, so I cannot give an opinion on this," one respondent wrote.

The municipality has not asked me to participate.

One respondent asserted that no one is currently commenting or participating on the topic of algorithms. "So far, the municipality has not asked citizens anything, perhaps until now," another added.

I am not interested, or I am not sure how this is relevant to me.

Some respondents simply did not want to participate on this topic or were not sure why they should. Others specified that the responsibility of dealing with issues of algorithmic governance should not fall upon citizens: "this is a task of the municipal council within legal frameworks… I
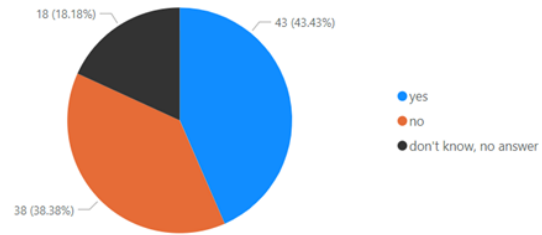
would not want individual citizens to participate in decisions about whether or not to use algorithms."

The following series of questions aims to understand in what phase(s) of the algorithm lifecycle citizens are interested in participating, and illustrating to respondents the different forms that participation could take.
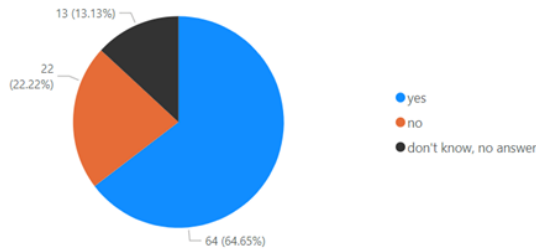
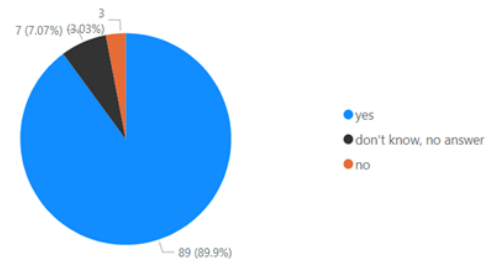**I would like to have a say in shaping the city's priorities for developing new algorithms.**

47 (47.47%)
25 (25.25%)
27 (27.27%)

● yes
● no
● don't know, no answer
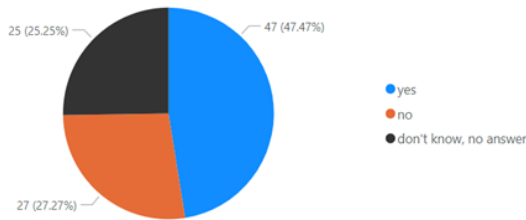
I would like to provide input on how an algorithm is designed.

18 (18.18%)
43 (43.43%)
38 (38.38%)

● yes
● no
● don't know, no answer

I would like to have a say in whether or not the municipalty decides to use an algorithm

13 (13.13%)
22 (22.22%)
64 (64.65%)

● yes
● no
● don't know, no answer

I would like to be able to contest a decision made using an algorithm.

3 (3.03%)
7 (7.07%)
89 (89.9%)

● yes
● don't know, no answer
● no

 Overall, it appears that citizens feel the most strongly about participation in the later phases of the algorithm lifecycle. Specifically, 90% said that they would like to be able to contest a decision made using an algorithm (only 3% said no). 64% said they would like to have a say in whether the municipality decides to use an algorithm.

Still, a significant number of respondents expressed interest in shaping the city's priorities for developing new algorithms and providing input into how algorithms are designed (47% and 43% respectively). What is interesting about these questions is the number of respondents who said don't know/ no answer. This likely indicates a lack of understanding of what happens in these early phases of the algorithm lifecycle, and what citizen participation could entail.

What would you see as the primary obstacles to participating on the topic of algorithms in the municipality?
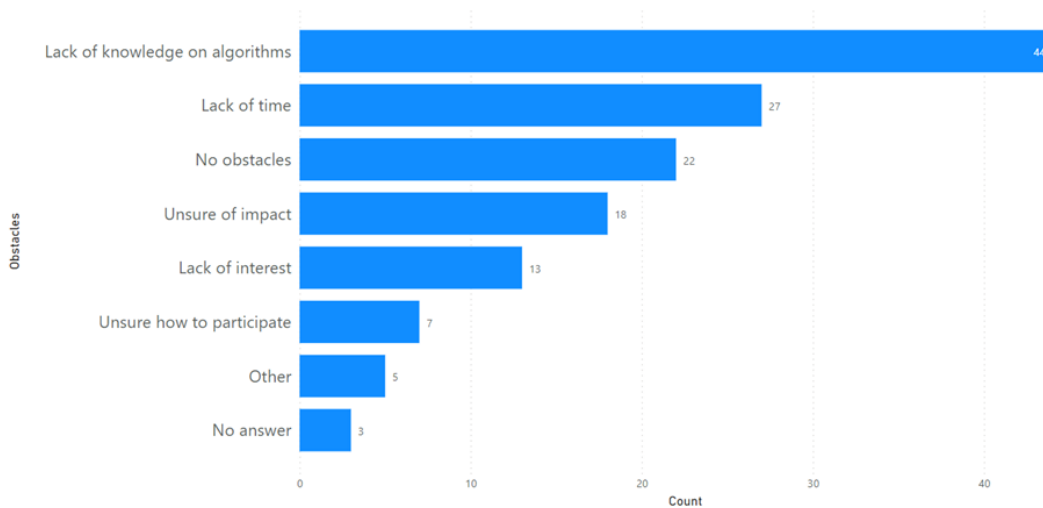
Respondents identified the lack of knowledge about algorithms and their use as their primary obstacle to participation. This highlights the importance of the register and other transparency initiatives in increasing awareness, and as a result, enabling participation.

Those who answered "other" were given the chance to explain what they perceive as obstacles to participation. Here, several mentioned the role of the municipal council. One mentioned that they preferred not to participate personally, but would rather leave the decision to experts and elected representatives. In contrast, another expressed that they had "wasted a lot of time" trying to give input through the council, but that nothing was ever done, and they were often "not even listened to". Similarly, one respondent added that there is no space for respondents to share their opinion to the municipality.

What channels specifically would you like to use to participate about the use of algorithms by the municipality?
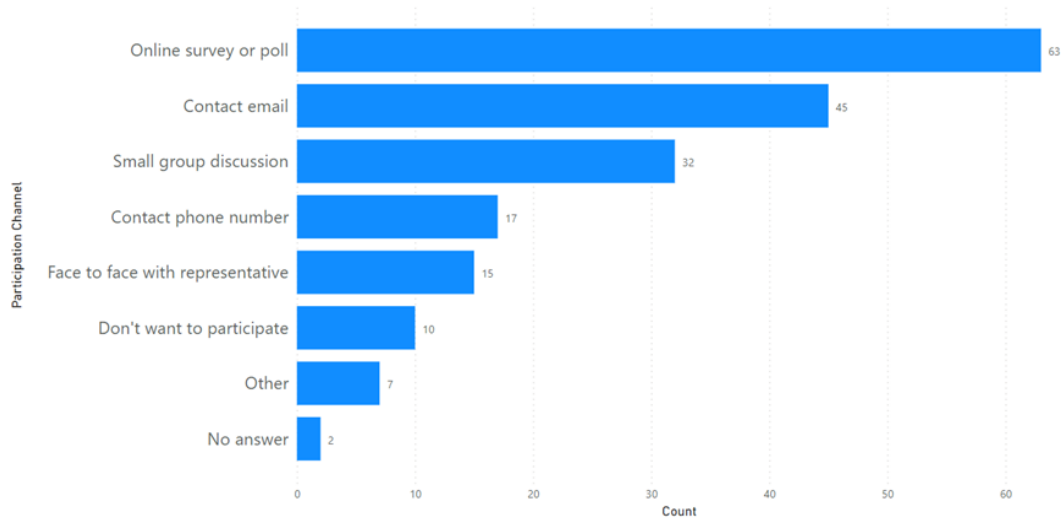

In terms of how they would like to participate, most respondents preferred online channels, especially online surveys or polls. However, this result is probably biased by the fact that the respondents are already used to taking online surveys. Of the in-person options, small group discussions were the most popular, at 32%. In the "other" box, participants were interested in participating through elected council members and appointed officials such as the ombudsman, or through more permanent bodies such as a committee or council. They also expressed interest in educational events such as conferences.

The focus of the survey then shifts to the algorithm register.

Have you heard of Amsterdam's algorithm register before?
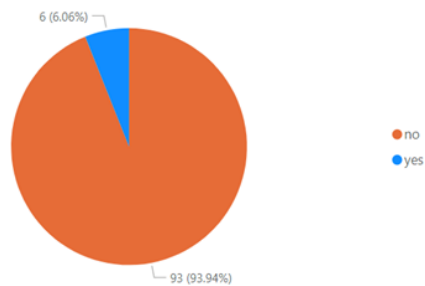
Would you see yourself using this tool?
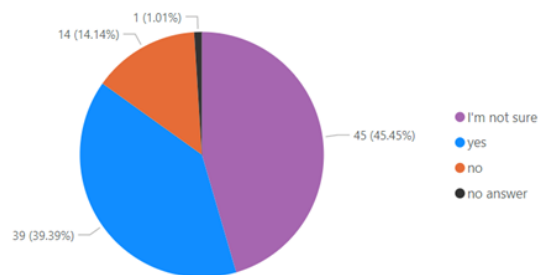
94% of respondents had never heard of the algorithm register. When asked if they would use the tool, 39% said yes, while 45% said they were not sure. Respondents were then asked to clarify. Overall, many still didn't understand what the register is and what it contains. However, some highlighted its potential importance as a source of information to enable them to better participate.

While one respondent was still unsure if the register actually exists, most others expressed confusion about what the register actually contains: "I now have no insight into what this register presents to me". Despite the short explanation provided in the survey, they still found it difficult to understand. Others expressed that they could use it, but they didn't know when or for what. One specified that they would find the register useful if it explains "the algorithm does and how it arrives at its advice and how it is checked".

While some respondents directly said that they would not use the register because it is too complicated and lacks a concrete impact, others were more interested. They said that it seems useful as a source of information and would allow them to better participate and "exert influence". "I do want to know which algorithms are used in the system and also the motivation behind it," emphasized one respondent.

A few responses also reiterated the need for citizens to know whether a decision has been made using an algorithm, so that they may then participate. "If I would like to challenge a decision, I first want to know whether the decision was made on the basis of an algorithm," said one respondent, while another stated that the register would only be useful to them if they already knew that a decision was made using an algorithm.
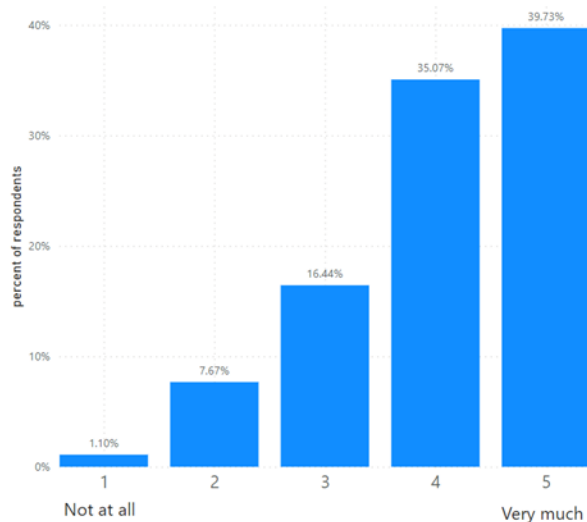
Because this survey is exploratory and meant to shape future research, respondents were invited to give feedback on the survey itself.

Feedback on the survey

Were the questions easy to understand?
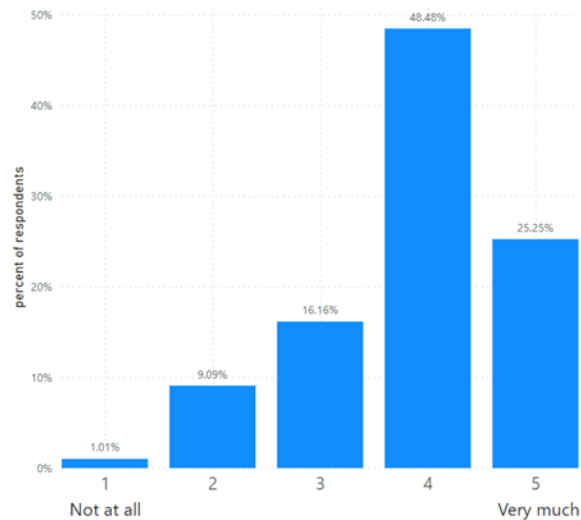
Was the topic of the survey one that interests you?

`

The most common feedback was on the clarity of the topic and making things easier to understand/ providing more examples. At the same time, 74% rated the ease of understanding questions as a 4 or 5 out of 5.

Similarly, 75% answered 4 or 5 when asked if they are interested in the topic of this survey. This is encouraging with regard to citizen interest in participating on this topic. It must be taken into account that this is already a self-selecting group who already responded to the whole survey.

Respondents were also given a final opportunity for feedback, from which the following themes emerged:

The survey could be more clear.

Some respondents commented that the explanations provided in the survey were not understandable for everyone, specifically regarding the purpose and deployment of algorithms. "I saw opportunities to explain it more clearly," said one, while another suggested providing more examples.

"I would have found figures on this subject useful; for example, how many objections have been declared well-founded after cases that have been established using algorithms (think of parking fines, etc.)"

Overall, the topic was found by many to be "difficult and laborious", and remains vague despite the information provided on the survey.

The framing of the survey is biased

" I think this is a weird survey that seems very biased to me. Working with algorithms is made suspicious, while you wouldn't ask me to assess an employee's working method." This respondent felt that the survey was too critical of algorithms, and implied that algorithms should be treated in the same way as human decision-making.

The survey is a step in the right direction.

"Understanding what can be done with algorithms and AI and how it works is of great importance," shared one respondent. They felt that efforts such as this survey could help to prevent misinformation about the use of algorithms.

A follow-up to the survey is required.

A few respondents had follow-up questions after the end of the survey, expressing an interest in learning more about the municipality's use of algorithms. One highlighted the need for "feedback and follow-up plans".

Conclusion

To begin with, there seems to be a gap in awareness among respondents about the municipality's use of algorithms, which presents a fundamental obstacle to citizen participation on the issue. Furthermore, citizens do care if a decision by the municipality is made using an algorithm and would want to be informed when the decision is made. This is due to concerns about the use of algorithms leading to prejudice, bias, and lack of empathy. Lack of visibility into the municipality's use of algorithms is also a source of concern.

Furthermore, most participants are at least somewhat interested in giving input on the municipality's use of algorithms, but feel that they are not currently able to. Although there is significant interest in participating at every step of the algorithm lifecycle, respondents feel the most strongly about being able decide whether or not the municipality uses an algorithm, and being able to contest a decision made by an algorithm. Lack of knowledge on algorithms and their use is seen as the primary obstacle for citizen participation. This underlines the importance of efforts to increase citizen awareness on the topic, and to ensure that transparency tools such as the register are more widely accessible. In fact, almost none of the respondents were aware of the existence of the register, and many were unsure of how it would be useful to them. This presents an opportunity to increase awareness of the register once the new version is published, and to show citizens how this tool can best serve their needs.

Respondents prefer to participate through online channels such as surveys, but this result is not necessarily generalizable to the wider public. Most of them also expressed that the topic of this particular survey was of interest, and some even mentioned that it was the first time they have been able to give their input on the topic of algorithms in the municipality.

III. Outreach interviews

The defining characteristic of an "outreach interview", which is the final participation method tested in this study, is that citizens are met where they are, whether it be a park, community center, or other public space. The "interview" takes the form of an informal conversation led by guiding questions, varying in length depending on the interest of the participant.

Goals

The guiding principle behind this approach is meeting the citizens where they are, instead of asking them to go out of their way to participate. As such, it allows for access to a different, and potentially more diverse audience than the other channels. It also prioritizes utilizing existing neighborhood spaces, from parks to community centers, in order to build a trusted, localized network, and as a result, better reach citizens. This presents an opportunity to work with partner organizations, such as Digital Rights House, who has a focus on citizen listening and is well positioned to quickly roll out this type of participation/research approach.

Description

Groups of two or three representatives from Digital Rights House were sent to a local park and a community center with the goal of speaking to citizens about their views on algorithms, and whether or not they are interested in in participating on the topic. Three of the conversations were held with groups of two citizens, for a total of seven participants over four conversations. Potential participants were approached and asked if they would be willing to speak to us as part of a research project on digital human rights. The following served as the guiding questions for this research method, but the conversations were adapted to the context and participants.

1. Have you ever heard about the use of algorithms by the municipality of Amsterdam? What comes to mind?
2. Do you care if an algorithm is used to make a decision that would affect you? (Be prepared to give examples listed below if people need clarification)
3. Would you want to give your input on the municipality's use of algorithms? Do you feel that you're able to? (If no and there is time, ask why not)

Typically, a broader question, such as "what comes to mind when you think of algorithms?" was used as an ice breaker to ease into the conversation.

Findings

 Interview 1

In general, this participant seemed to have a good understanding of algorithms. Their attitude towards algorithms was nuanced, depending on the purpose, who was using it, and what data would be collected. They expressed some distrust of the government, and the idea that they would try to influence citizens using algorithms. Another key concern was the risk of surveillance. Nevertheless, they needed to hear examples of algorithms used by the municipality before giving their opinion.

They viewed the use of algorithms to identify and help people who are at risk of falling into debt, for example, as positive. Although it was not personally relevant to them, they saw this as an

application that helps citizens, especially because people who are struggling financially or are marginalized are less likely to ask for help from the government.

To them, who was responsible for collecting and processing data made a difference. For the example of the parking control algorithm, they would prefer if an external firm owned the data, rather than the government. The motive behind collecting the data was also an important factor.

Although they thought the register was a good thing, they didn't think that they would try to use it. They felt that they were too old to keep up with new technological changes. They also felt that participation should be the choice of every citizen. They should have opportunities to participate, and they should be informed of these opportunities, but it should be up to each person.

Interview 2

In contrast, the two participants in the second interview did not know much about algorithms. They expressed a general uneasiness around technological change, as well as a distrust of government and banks. They felt stuck in a state of frustration and lack of understanding with everything becoming digital and automated. They were afraid of being controlled by algorithms and did not understand that they could be used to make services more efficient. While they were worried about privacy broadly speaking, they also felt that they had nothing to hide from the government, and don't take any precautions with regard to their data.

Once they were given examples of algorithms from the register, they were more concerned about the outcome of an algorithmic decision – such as receiving a parking fine- than about the use of an algorithm itself. They were not particularly interested in the algorithm register because they felt that they would not use it.

Interview 3

In general, the two participants in this conversation were very skeptical about the use of algorithms, although the topic remained a bit mystified to them. However, they were more worried about the commercial use of algorithms, for example in advertising, than about their municipal use. This was partially because they did not expect the municipality to use algorithms.

After hearing about the examples from the register, they maintained a negative view on algorithms, and preferred that the same decision/ task be done by humans. They felt that decisions on issues such as parking are quicker and harsher when they are automated. Regarding welfare-related algorithms such as Vroeg Eropaf, they would rather the government stay out of their business instead of trying to intervene.

They were primarily concerned about privacy and what would be done with their information, such as parking data, for example. It was important for them to know if their data is handled by the municipality or by a private company. Regarding the use of crowd sensing algorithms, they were concerned that cameras would be used for surveillance and facial recognition even if that wasn't their stated purpose.

In general, they liked the idea of the register and said that they would use it, because they do not currently feel that they know what the government is up to. They were also curious if the register was populated by the government or by an external party, and as such whether it would be accurate. They felt that they would want to know up front whether a decision affecting them is made using an algorithm.

These two participants immediately expressed that they had an opinion to share on the topics of digital rights and algorithms. Although they would be interested to participate on this topic, they felt that they don't know enough. Furthermore, they are open to different channels of participation, from a survey to a face-to-face conversation.

Interview 4

The only example of an algorithm used by the government that these participants knew about was the welfare fraud detection algorithm that was at the center of the benefits scandal. Due to the fact that their interactions with the municipality were essentially limited to administrative paperwork, they were surprised that they would have a need for algorithms. Their primary worries regarding the use of algorithms concerned the collection of sensitive data by the government, along with privacy and the impact of technology on children.

When discussing examples of algorithms from the register, their reactions varied significantly depending on the purpose of the algorithm and the data used. Concerning the parking control

algorithm, one mentioned that their spouse had gotten multiple tickets in a row from a scan car. Nevertheless, they found that using an algorithm for this purpose is honest and straightforward, because the rules for parking are clear and you should follow them regardless.

However, in the case of Vroeg Eropaf and other algorithms that deal with sensitive information and outcomes, this participant expressed fear that discriminatory decisions would be made based on their financial situation, for example. They felt that the use of algorithms to make social decisions could reinforce the same cycle of disadvantage, and were concerned about which data is being collected and how it is being used – what happens if you are identified by this algorithm? They were afraid that they would have a "record" that would stay with them, and that decisions would be made about their life and their children's lives without their say.

When asked about sharing their opinion with the municipality on the topic of algorithms, this participant responded that "nobody asked". Although they would be interested in sharing their thoughts and opinions, they did not know that their point of view could be valuable to the municipality. Furthermore, they felt that they do not currently have the opportunity to participate.

Conclusion

Many participants did not realize that the municipality uses algorithms, partially due to a very limited view of the municipality's functions. While few said that they would use the register, its existence was seen as a positive step towards transparency. Participants did not feel that they currently have a say in the municipality's use of algorithms, but they believe that everyone should have the opportunity to participate. At the same time, most of them felt that they did not know enough about the topic or did not feel legitimate to share their opinion.

Regarding their attitude towards algorithms, participants were concerned about the use of sensitive data and being profiled by the government. However, some felt that the social benefit of using algorithms for purposes such as welfare allocation might outweigh the costs. Overall, privacy and control were key concerns about both public sector and commercial use of algorithms. In fact, the lines were often blurred about algorithm and data ownership, indicating a need for further transparency on the issue.

This participation approach proved to be valuable in reaching people who have less knowledge about algorithms, and who wouldn't otherwise think to participate. It also ended up including more older people, as well as busy moms who shared their insights while watching their kids. This shows the importance of meeting citizens where they are in order to achieve more equitable and inclusive participation.

Conversations were most insightful when they were shaped around people's concerns. Furthermore, providing examples of algorithms used by the municipality was crucial in establishing the baseline level of understanding necessary for the conversation. As such, if this approach is to be scaled, the interviewers on the field would have to be trained to be able to provide examples, and even answer questions or refer people to resources.

Based on the conversations, it seems that this approach may be best implemented through partner organizations as opposed to directly by the municipality. Firstly, multiple participants expressed distrust of the government, and asked if the interviewers were representatives of the municipality. Secondly, working with partner organizations would allow access to different neighborhoods and local community networks, and could also be integrated into existing citizen listening efforts, as was the case with Digital Rights House.

VI.   Conclusion

Discussion

Amsterdam's municipal algorithm register aims to operationalize principles of transparency and (inclusive) democracy which have been key priorities in municipal agendas on digitization and citizen participation. Although the register is primarily a transparency tool, it is framed as a means for the municipality to facilitate citizen participation. This aligns with a trend in the algorithmic governance literature towards making algorithmic transparency "meaningful" or "actionable", essentially framing it as a means to achieve accountability and citizen engagement. However, there is no clear roadmap linking algorithmic transparency to concrete processes for citizen participation.

In the municipality of Amsterdam, achieving algorithmic transparency has proven to be a continuous challenge, due to the difficulties of populating the register, especially with high-risk algorithms. Furthermore, although citizens have been involved in the design of the register, much work has yet to be done to institutionalize citizen participation processes in the adoption and use of algorithms. In their efforts to date, civil servants have found that the most significant external barrier to participation is that citizens are not sufficiently aware of the municipality's use of algorithms, and the extent to which it impacts their lives. Internally, organizing citizen participation and operationalizing the resulting input presents an organizational and procedural challenge.

Experimenting with different methods for citizen participation on algorithms through this study has not only proven the importance of citizens having a voice on this topic, but also confirmed the fundamental link between transparency and participation. Additionally, it demonstrates the importance of using multiple channels for participation, because each approach attracted different types of participants and responses. While the Citizen Conversation was a longer format that allowed for more in-depth discussion, the survey reached more participants and was efficient in gathering quantitative data. Through the Outreach Interviews, citizens were met where they were, allowing for access to citizens who are less often heard to share their thoughts and experiences. What tied these approaches together was the desire to make the topic of algorithms as accessible as possible, which meant using the algorithm register as a resource for concrete examples and definitions.

Although each participation method was different, common themes emerged across the board. Firstly, there is a lack of awareness about the municipality's use of algorithms, let alone about the existence of transparency tools. Secondly, while some citizens hold a complete distrust of algorithms, for many, their acceptance is conditional upon factors such as the purpose of the algorithm, the data it collects, and the presence of human oversight. Surveillance, control, and lack of empathy were recurring concerns about the use of algorithms. Furthermore, participants across the board agreed that they would like to know when a decision affecting them is made using an algorithm. This highlights a major transparency gap and barrier for participation. Finally, citizens often want to participate on the topic of algorithms, but don't feel that they are

able to do so. Lack of understanding about algorithms and their use is seen as the primary obstacle to citizen participation.

So how can the municipality use the algorithm register as a tool to enable citizen participation in its development, adoption, and use of algorithms?

The use of transparency tools such as the municipal algorithm register does not inherently lead to increased or meaningful participation by citizens in the adoption and use of algorithms by local governments. When implemented effectively, these tools are a means to fulfill an information need on the use and impact of algorithms on citizens; however, channels for participation must be in place for citizens to have a say in how algorithms are used in their urban context.

Based on this research, below are five recommendations for using the algorithm register to enable citizen participation on the municipality's development, adoption, and use of algorithms

Recommendations

1. Increase citizen awareness of the algorithm register, and of the use of algorithms in general.

This is quite straightforward, but a transparency tool is only effective if people know about it. Only then will it be effective in equipping citizens with the information they need in order to be more engaged on the topic of algorithms. This should be only a part of broader efforts to increase citizen awareness and understanding of the municipality's use of algorithms.

2. Inform citizens when a decision about them is made using an algorithm.

Citizens want to know when they have been affected by algorithmic decision-making, but they are usually not informed. Not only is this a key transparency gap, it is also an obstacle to citizen participation. If citizens know how a decision has been made, they are in a better position to contest that decision, which is a key democratic process. Furthermore, citizens are more likely to use the register as a resource if they already know that an algorithm has affected them directly.

3. Design a multi-channel, multi-stakeholder participation strategy on the topic of algorithms.

Transparency does not inherently lead to citizen participation. Rather, channels for participation have to be created, and citizens have to be made aware of them. In order to be as inclusive and

accessible as possible, participation channels should be diverse and adapted to their target audiences, which are primarily the people who are impacted by the use of an algorithm. Partnering with community organizations and others who work directly with citizens presents an opportunity to reach a wider range of citizens and to scale participation efforts more effectively.

4. Create opportunities for citizen input throughout the algorithm lifecycle.

One of the major critiques of algorithm registers is that they only inform citizens when an algorithm has already been adopted. However, one of the key principles of citizen participation is that it should happen early in the decision-making process in order to maximize impact. In the field of algorithmic governance, experts go a step further to say that participation should occur throughout the algorithm's lifecycle, from the design phase to after implementation. In this study, citizens expressed particular interest in having a say in whether or not an algorithm should be in use (adoption phase), as well as being able to contest a decision being made by an algorithm (after implementation). These two types of participation present different information needs, which can be addressed through the algorithm register.

5. Create a circular relationship between citizen participation efforts and the algorithm register.

As shown in this study, citizen participation efforts on the topic of algorithms must include explanations and examples so that citizens are able to provide input. As such, the register can serve as a key resource both during participation, as a way to provide context, and after participation, if citizens want to learn more. At the same time, the register can provide more visibility to ongoing participation efforts, and direct citizens towards channels where they can provide input.

Opportunities for further research

The findings of this exploratory case study present a number of topics for further research. A few are outlined below.

Developing an approach for engaging with citizens in neighborhood and public spaces on the topic of algorithms

This topic is based on the initial outreach interviews that were conducted as part of this study. More research should be done on how the municipality can best partner with community centers and organizations to reach citizens who are underrepresented in participation efforts.

From input to impact; how the municipality can best follow through on citizen input on the topic of algorithms.

As a continuation of this project, which focuses on creating opportunities for citizens to participate, it is important to investigate what the next steps should be once participation takes place. Internally, how can the municipality process the input and make it actionable, and externally, how can they best follow up and communicate effectively with citizens?

Finally, once the algorithm register is updated and populated with more high-risk algorithms, and public awareness of the tool has increased, it could be valuable to conduct the survey a second time, and see if there are any differences in the results.

Opportunities for Digital Rights House

This research can also serve as a stepping-stone for future initiatives by Digital Rights House on the topic of citizen participation and technology.

Explore the same research topic in different cities

Similar studies on citizen participation on municipal use of algorithms should be conducted in different urban contexts with different policy landscapes. The scope of the research can be broadened beyond the use of algorithm registers, but the link between transparency and citizen participation should still be explored further.

Use the outcomes of this research as input for an "unsolicited advice" to the Municipality of Amsterdam.

As part of the formal partnership between the two organizations, Digital Rights House gives "unsolicited advice" to the Municipality on the topic of digital human rights and the governance of technology in Amsterdam. As such, this research can provide key contributions on the topics of algorithmic transparency and citizen participation.

VII. Bibliography

Policy Analysis

"A NEW SPRING AND A NEW VOICE" COALITION AGREEMENT,
GROENLINKS/D66/PVDA/SP. May 2018. Gemeente Amsterdam, translated from Dutch
by Elisabeth IJmker.

Gemeente Amsterdam. "Agenda AI: Amsterdam Intelligentie." 2020.

Gemeente Amsterdam. "Coalitieakkoord 2022-2026." March 16, 2022.

Gemeente Amsterdam. "Datastrategie." January 2021.

Gemeente Amsterdam. "Grip on Algorithms: Approach and tools for a responsible use of
algorithms in Amsterdam." December 2022.

Gemeente Amsterdam. "Initiatiefvoorstel voor de raadsvergadering van." April 14, 2021.

Gemeente Amsterdam. "Routekaart Amsterdamse Participatieparagraaf, Actieplan Amsterdamse
Participatieve Aanpak." 2020.

Gemeente Amsterdam. "Termijnagenda portefeuille 'ICT en Digitale Stad'." January 13, 2023.

Gemeente Amsterdam. "Voortgangsrapportage i-domein gemeente Amsterdam 2021." June 21,
2022.

Helsinki and Amsterdam first cities in the world to launch open AI register. September 28, 2020.
news.cision.com/fi/city-of-helsinki/r/helsinki-and-amsterdam-first-cities-in-the-world-to-
launch-open-ai-register,c3204076.

Het Pon & Telos. "Information needs of citizens about the use of algorithms by governments."
September 2021. Dr. Ellen Dingemans, Fenna Bijster, MSc., Drs. Mirjam Smulders,
Britte van Dalen, MSc.

Het Tada Manifest. May 2018. tada.city.

Principles and Declaration, Cities Coalition for Digital Rights. September 2018.
citiesfordigitalrights.org/declaration.

"Stand van zaken Agenda Digitale Stad 2020." April 2020. Gemeente Amsterdam.

Literature Review

"Accountability in AI: Promoting Greater Social Trust." Theme Paper for the G7 Multi-
stakeholder Conference on Artificial Intelligence. CIFAR, December 6, 2018.

Ada Lovelace Institute, AI Now Institute, & Open Government Partnership. Algorithmic
Accountability for the Public Sector.

Alfrink, K., et al. Contestable AI by Design: Towards a Framework.

Alfrink, K., et al. Designing a Smart Electric Vehicle Charge Point for Algorithmic
Transparency: Doing Harm by Doing Good?

Alfrink, K., et al. Contestable Camera Cars: A Speculative Design Exploration of Public AI That
Is Open and Responsive to Dispute. In Proceedings of the 2023 CHI Conference on
Human Factors in Computing Systems (CHI '23), April 23–28, 2023, Hamburg,
Germany. ACM, New York, NY, USA, 16 pages.

Aysolmaz, B., Müller, R., & Meacham, D. The public perceptions of algorithmic decision-
making systems: Results from a large-scale survey. Telematics and Informatics, 79,
101954.

Bellantoni, A., Chwalisz, C., & Cesnulaityte, I. Innovative Citizen Participation and New
Democratic Institutions: Catching the Deliberative Wave. OECD.

Berner, Maureen M., Justin M. Amos, and Ricardo S. Morse. "What Constitutes Effective
Citizen Participation in Local Government? Views from City Stakeholders." Public
Administration Quarterly, vol. 35, no. 1, Spring 2011, pp. 128-163.

Brandusescu, A., & Reia, J. (Eds.). Artificial intelligence in the city: Building civic engagement
and public trust. Centre for Interdisciplinary Research on Montréal, McGill University.

Cath, C., & Jansen, F. Dutch Comfort: The limits of AI governance through municipal registers.

Challis, L. D. The Citizens' Strain to See Through Transparency: Exploring Reciprocity As an
Alternative in the Smart City of Amsterdam. University of Twente.

Duberry, J. AI and civic tech: Engaging citizens in decision-making processes but not without risks. In Artificial Intelligence and Democracy.

Floridi, L. Artificial Intelligence as a Public Service: Learning from Amsterdam and Helsinki. Philos. Technol., 33, 541–546.

Ingrams, A., & Klievink, B. Transparency's Role in AI Governance. In The Oxford Handbook of AI Governance.

Knobloch, K. R. Listening to the Public: An Inductive Analysis of the Good Citizen in a Deliberative System. Journal of Deliberative Democracy, 18(1), 1–13.

Konig, P. D., & Wenzelburger, G. The legitimacy gap of algorithmic decision-making in the public sector: Why it arises and how to address it. Technology in Society, 67, 101688.

Koseki, S., et al. AI and Cities: Risks, Applications and Governance. UN Habitat.

Pallett, H., et al. Public Engagement with Algorithms in Public Services. 3S Research Group Briefing Note.

Seebohm, L., & Smith, N. Learning to Listen Again: How people experiencing complex challenges feel about engagement and participation through the Covid-19 pandemic. Centre for Public Impact UK.

Wilson, C. Public engagement and AI: A values analysis of national strategies. Government Information Quarterly, 39(2022), 101652.

Wong, P. H. Democratizing Algorithmic Fairness. Philos. Technol., 33, 225–244.