

Open data policy development: How can municipalities take account of residents' perspectives?

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ABSTRACT

In many countries, governments encourage municipalities to develop open data policies and subsequently open up data. Municipal open data policies are often supply-driven and not based on residents' wishes. Municipalities lack insight into residents' perspectives on opening up municipal data and often do not know how to take them into account when developing their open data policies. This paper aims to reveal residents' perspectives on municipal open data policies and provide recommendations for municipalities on how to account for them when developing future open data policies. Using Q-methodology and applying it to the municipality of Delft in the Netherlands, we elicited the perspective of four main groups of residents on the development of the municipal open data policy as follows: 1) 'the oblivious residents', 2) 'the distrustful residents', 3) 'the trusting, passive residents', and 4) 'the open data advocates'. We found that all residents considered transparency important for the quality of public administration, and that municipal transparency is currently lacking. We then provide recommendations for policy makers responsible for municipal open data policies and suggest directions for open data theory development concerning municipal open data policy.

Author Keywords

Open data; open government data; OGD; policy; municipalities; perspective; view; profile; Q-methodology.

ACM Classification Keywords

Theory of computation: Data exchange; Information systems: Information extraction, Digital libraries and archives; Applied computing: E-government; Social and professional topics: Government technology policy.

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INTRODUCTION

Prompted by directives from national governments, many local governments have begun developing open data policies [16]. For example, the City of Amsterdam developed an open data policy that addresses data availability, quality, privacy, protection, and technical maintenance [24-26]. In 2016, the City of New York [15] developed an open data policy and a technical standards manual that describes the city's policies concerning governance and oversight, technology projects, tools, datasets, data standards, maintenance, ownership, terms of use and other matters. As a third example, in 2012, the City of Chicago [14] issued Open Data Executive Order No. 2012-2, which sets out policies on dataset availability, the data portal and governance issues.

Increasingly, as part of implementing their policies, these and many other municipalities are actively publishing their data via online portals, making them available to residents as open data. Information and communication technologies (ICTs), including those that support opening up government data, offer new opportunities for research, public planning and societal participation [35]. By opening up data, municipalities aim to achieve objectives such as increased transparency and accountability and more streamlined operations [54]. Open data can be accessed at no charge and is intended to be usable without restrictions [19, 20, 23, 30, 56].

Some literature concerning municipal open data policies has already been published. It primarily focuses on portals and technical features developed by municipalities [e.g., 13, 28, 69]. Although some cities specifically involve residents in the development of their open data policies [e.g. see 54 for an example about New York], previous research also demonstrates that open data policies are often supply-driven and not based on the wishes and needs of data users [67]. In general, E-government projects are completed via top-down administrative mechanisms, usually without any input from civil society [41], and this is certainly the case with municipal open data policies. At the same time, however, municipalities assume that residents support their open data policy and will use the available data. The expectation is that open data policies will automatically achieve those benefits [74]. Residents' perspectives are rarely taken into account in the development of such policies. Moreover, in their open data policies municipalities often refer to 'residents' without differentiating between the different opinions and views that

individual or groups of residents may hold. As a result, municipalities lack insight into those perspectives. This is problematic, since residents may not in fact support the municipal open data policy, which could result in decreased support for or trust in the municipality or low usage of the opened data, and ultimately the intended benefits of such policy may not be achieved.

This paper aims to investigate how to take account of residents' perspectives in the development of municipal open data policies. Applying Q-methodology, we elicited and categorized the perspectives of a sample of residents of the municipality of Delft in the Netherlands, and formulated recommendations for municipal open data policy-making. In the following sections, we first discuss relevant literature on municipal open data policies. We then outline the approach used in this study and provide an overview of the main perspectives of Delft residents on municipal open data policy-making. Finally, we set out our recommendations for municipal open data policy-makers and discuss our conclusions.

RESEARCH BACKGROUND

To date, little systematic or empirical research has been conducted on the subject of residents' perspectives on open data policies at the municipal level. This section provides an overview of relevant studies on open data policies and municipal open data initiatives and portals.

Open Data Policies

Building on the policy definition of Stewart, et al. [66], Charalabidis, et al. [12] define open data policies as policy-making cycles consisting of the following stages: open data policy environment (context); open data policy content (input); open data policy implementation: performance indicators (output); open data policy evaluation: open data public values attained? (impact); and open data policy change or termination (assessing feedback). Open data policies do not merely consist of written documents describing the municipality's intentions, choices and actions, they also describe its broader open data regime and how this regime is implemented and – crucially – produce the actual impact of the regime [74].

Altogether, the different elements of open data policies set out the objectives and the benefits they aim to provide. Whatever the administrative level, government open data policies usually aim to achieve objectives such as increasing transparency and openness [17, 20, 21, 34, 36, 37, 53], increasing trust [29, 42, 61, 70], building smarter cities [2, 6, 45, 72], providing access to government data [31, 37, 55] and stimulating innovation [39, 52, 62, 68]. Since municipalities generally have fewer resources than governmental organizations at higher administrative levels, they may need to be more selective about what their open data programs can feasibly achieve [27].

Municipal Open Data Policies

Some literature concerning municipal open data policies has already been published but it primarily focuses on portals and technical features developed by municipalities. For instance, Chatfield and Reddick [13] examined open data portals as supply-side service capabilities at local government level in Australia. Their longitudinal cross-sector analysis revealed that open data policies and dedicated open data portal investments are important predictors for open data portal service capability improvements over time. Furthermore, Thorsby, et al. [69] studied open data portals in American cities and found that most are at a very early stage of development. The authors conclude that much work remains to be done to increase user support. They also recommend including analysis tools and other features to help residents understand open datasets, such as charting and analysis. The findings of Thorsby, et al. [69] are confirmed by Gill and Corbett [28], who developed and tested an evaluation tool and applied it to all of the municipal open data portals in British Columbia, Canada. Their research demonstrated that there is still significant room to improve the design and usability of municipal open data portals. Population size was found not to be a factor in determining the efficacy of open data initiatives [28].

Some cities do involve residents in the development of their open data policies. For example, Okamoto [54] describes how the Mayor of New York City introduced the Open Data For All initiative to provide residents with no programming experience with tools to find and use open datasets [49]. In addition, Nordell [50] describes how the City of Stockholm endeavors to involve residents in designing digital government solutions and services. However, a significant amount of previous research also shows that open data policies are often supply-driven and not based on the wishes and needs of users [74]. In his study on the open data policies of three Swedish municipalities, Nordell [50] confirms this and emphasizes that such policies should be investigated further from the perspective of open data users. If no understanding is gained of these users' interests and needs, the benefits of open data may go unexploited.

To conclude, the literature concerning open data policies chiefly focuses on open data policies at the national and international levels. The few studies that consider policies at the municipal level primarily concentrate on the technical implementation thereof in the form of municipal open data portals. The literature provides barely any insight into residents' perspectives on municipal open data policies, since it is the portals rather than the residents under investigation. The following section describes how our study endeavors to fill this gap.

RESEARCH DESIGN: Q-METHODOLOGY

The Q-method procedure

Q-methodology was originally developed by Stephenson [65] and can be used to reveal and understand the variation in subjective perspectives on a particular topic. It is well

suited to our objective of discovering residents' perspectives on open data policy and has been used before in the open data context [76]. Since many factors influence residents' perspectives on municipal open data policies, Q-methodology is a critical step needed before large-scale testing can take place to assess the statistical occurrence of these perspectives in a certain population (as done by [7]). After identifying the shared perspectives using Q-method, a survey can be sent out to examine quantitatively how common certain perspectives are in a specific population, but this is outside the scope of this study.

Broadly, the Q-method procedure involves four steps [9]. First, the "Q-sample" is defined, which reflects the variety in statements of opinion that are expressed in written or verbal communications regarding the topic under investigation [9]. In the second step, a set of strategically-selected respondents perform a rank-ordering task on the Q-sample. The statements do not have to be completely ordered – a partial ordering, using a forced distribution, will suffice [9]. The purpose of the ranking task is to force the respondents to evaluate each statement vis-à-vis the other statements in order to decide which are most important to them. The ranking task therefore ensures that the respondents actively construct their perspective. The resulting rank-orderings (typically referred to as "Q-sorts") can be regarded as individual "perspectives" on the topic. In the third step, shared perspectives are identified by subjecting the Q-sorts to a by-person factor analysis [9], which clusters together respondents who produced similar Q-sorts and therefore have similar perspectives (i.e. they load on the same factor). Next, a rotation method can be applied to achieve a simple structure. Based on the resulting factor loading matrix, shared perspectives can be revealed by computing factor scores. In the fourth and final step, the factor scores are used to interpret each perspective. Ideally, the interpretation of the factors is supported by responses to open questions from respondents who belong to (i.e. load on) the respective factors.

The data collected through these steps is publicly available at the Data Repository of the 4TU.Centre for Research Data [60].

Q-set creation

We took a common approach to creating our Q-set; we derived Q-set statements from communications from people concerning the topic. We searched Google using keywords including "open data", "open data policy", "open datasets municipality", "open data government", "what do residents think?", "resident panel open data", "privacy open data", "resident participation", "what is done with tax money?" and "how transparent is the government?" From these statements, we concluded that there were four important areas of belief with regard to municipal open data policies, namely preservation of privacy, transparency of the municipality, open data user experience and participation by open data users.

Preservation of privacy

The literature confirms that privacy and open data are strongly interconnected [5, 38, 46]. The concept of privacy is increasingly influenced by legislation and policy, culture, social norms and values [38]. On the one hand, the communications that we found on open data indicated that municipalities would like to open up as much data as possible, as quickly as possible [73]; on the other, data protection legislation stipulates that open data must not contain personal privacy-sensitive data and residents' privacy should be guaranteed (idem).

Transparency of the municipality

The literature shows that open data can help increase the transparency of governmental organizations [33, 51, 58]. This is also confirmed by grey literature and by the open data-related communications we obtained. By using open data, residents can gain more insight into what the municipality knows and the way it works [4]. This may also lead to a better understanding of residents, but depends on which topics the municipality chooses to be transparent about and how residents experience this transparency [22]. Guidelines already exist as to how data should be opened to increase transparency [3, 48]. For example, data should be freely available and machine-readable. However, national and local government data is often incomplete and not systematically updated [32]. Furthermore, the speed of opening, for infrastructure and environment data for instance, and the volume of this type of open data are disappointing [57]. These factors influence the level of transparency of open municipal data.

Open data user experience

To create value from open data, it is essential to account for user perspectives [40, 75]. Research shows that open data users tend to experience various obstacles related to access to data, usability of data, data quality and metadata [44]. The Open State Foundation (2016) stated that each governmental organization in the Netherlands creates its own open data portal, which results in fragmentation and difficulty finding open data. What is more, opened datasets are not always particularly valuable (idem), although residents may have different views on this issue.

Participation by open data users

The public sector can develop further by soliciting and using input from various perspectives [8]. Residents can obtain data opened up by government and use it to develop applications that provide insight into government functioning [59]. Feedback from residents can help improve government activities [64] and lead to new collaborations [8].

We created Q-set statements for each of these four areas based on the following sources: Ministerie van Binnenlandse Zaken en Koninkrijksrelaties [47], Van Steenberghe [71], Maatschappelijke Coalitie voor een Open Overheid [43] and Capgemini [11]. We made our selection of statements by focusing on topical and practical issues concerning privacy,

transparency, user experience and participation that could be of interest to Delft residents. Table 1 sets out an overview of the 33 statements selected for the Q-Set.

Statement	Factor scores				Statement	Factor scores			
1. I am familiar with the concept of open data.	0	-3	3	3	22. Open data improves contact with the municipality.	1	0	0	0
2. The municipality makes data publicly available.	-1	-2	1	-2	23. Residents should receive training in the use of (open) data.	-2	1	-1	1
3. The municipality's website is user friendly.	-1	-1	0	-1	24. Informing residents about the municipality in a comprehensible way will improve their understanding of the municipality.	0	2	3	-1
4. The municipality takes steps to strengthen the relationship between the municipality and its residents.	0	-1	-2	-2	25. Open data encourages residents to participate in the municipality's decision-making processes.	2	-1	0	2
5. The municipality should speed up data provision.	0	-2	0	2	26. The municipality making data publicly available makes me feel watched.	-3	1	-2	1
6. I believe that openness about decision-making processes in the municipality is important.	1	1	2	0	27. I am aware of all of the personal and other data I share through applications.	-1	0	1	1
7. The municipality offers useful digital services.	-1	-4	0	-3	28. My privacy has been reduced by municipalities sharing more information and data.	-2	1	-1	-2
8. The municipality should aim to inform residents in a simple way.	0	3	1	2	29. I am concerned about my privacy-sensitive data which is held by the municipality.	-4	2	-2	-1
9. Openness of the municipality is important for developing new ideas.	2	-3	1	4	30. Open data makes it increasingly important for residents to be aware of their privacy.	-2	0	1	-1
10. Openness is important to identify mistakes by the municipality.	3	2	2	0	31. There is an imbalance between data disclosure and respect for residents' privacy.	-1	1	-1	-1
11. I would like to know how the municipality spends my tax money.	1	3	0	-3	32. I am worried about the fact that anonymous data is sometimes traceable.	-2	-1	-1	0
12. The municipality should increase the transparency of its work processes.	1	-1	-1	-1	33. Privacy-sensitive data is insufficiently protected by legislation.	-3	1	1	0
13. Transparency on the part of the municipality improves the quality of public administration.	2	0	2	1					
14. Transparency increases the legitimacy of public administration.	3	-1	2	-1					
15. My expectations of the municipality are greater due to technological developments.	1	2	-4	2					
16. I would like to participate in decision-making processes and help develop municipal policy.	-1	0	-2	-2					
17. Governments should establish a register of government information to make it easier for residents to search for information.	1	-1	-1	0					
18. Government data is collected at residents' expense and must therefore also be made available for their use.	0	4	-3	-4					
19. Municipal transparency leads to better and smarter solutions.	2	0	0	3					
20. Digital technology enables large-scale dissemination of data to the public.	4	0	4	1					
21. Residents play an important role in opening up government.	0	-2	-3	0					

Table 1. Statements and factor scores of the four factors.

Respondent Selection

Instead of using random sampling techniques to select respondents which is typical in survey research, Q-methodology prescribes selecting respondents in a strategic manner [9]. The selection is based on certain characteristics of respondents that can be presumed to affect their perspective in order to ensure that the full range of perspectives on the topic are captured.

When selecting our respondents, we decided to focus on Delft in particular because the municipality is already actively developing an open data policy and has published a strategy which states that the municipality aims to gradually become open [18]. Other important reasons for selecting this municipality included the fact that information concerning Delft's open data policy is openly available online and that respondents in Delft were very accessible to us.

To ensure that the respondents had a basic level of awareness of the topic, we set two criteria: respondents had to be familiar with the municipality of Delft (e.g. because they live there) and have basic ICT skills [1]. This enabled us to draw conclusions concerning residents who might be familiar with the municipality of Delft's open data. Respondents that did not meet these criteria fell outside the scope of this study.

Next, we decided to select respondents based on age and level of education, since we considered it highly likely that these characteristics would influence perspectives on opening municipal data. We defined two levels within each of these variables (younger/older and lower/higher level of education) which made four categories (see Table 2). We sampled five respondents from each category, leading to a total sample size of 20 – sufficient for Q-methodology purposes.

Level of education	Number of respondents	
	Younger (18-40 years old)	Older (40-65 years old)
Lower (elementary school degree, secondary school degree, college or associate's degree, professional/vocational degree)	5	5
Higher (Bachelor's degree, Master's degree, postgraduate/graduate degree, Ph.D.)	5	5

Table 2. Selection of respondents.

The Q-sorting task

We interviewed our selected respondents face to face according to a protocol to ensure consistency between interviews (obtainable from the authors upon request). Each interview commenced with a number of questions concerning demographic details, such as how long the respondent had lived in Delft, their age and level of education. These were followed by questions concerning ICT skills. One respondent appeared not to have the required skill level and was therefore left out of the study.

We subsequently asked the respondents who lived in Delft and had the required level of ICT skills to perform the Q-sorting task by rank-ordering the 33 statements (Table 1). In line with Q-method conventions, we used a quasi-normal distribution to reduce the complexity of the sorting task (i.e. no complete rank-ordering was required).

The scheme including the 33 cells in which statements had to be sorted is shown in Figure 1. The condition of instruction for the Q-sorting task was formulated as follows: ‘To what extent do you agree or disagree with the following statements?’ The scale ranged from -4 (strongly disagree) to +4 (strongly agree). This resulted in a 9-point scale which is common for Q-methodology, since it provides the space for participants to think thoroughly about their assessment of statements and to ‘weighing’ them against each another. After the Q-sorting task, we asked respondents what motivated the choices they made, and used the answers for factor interpretation.

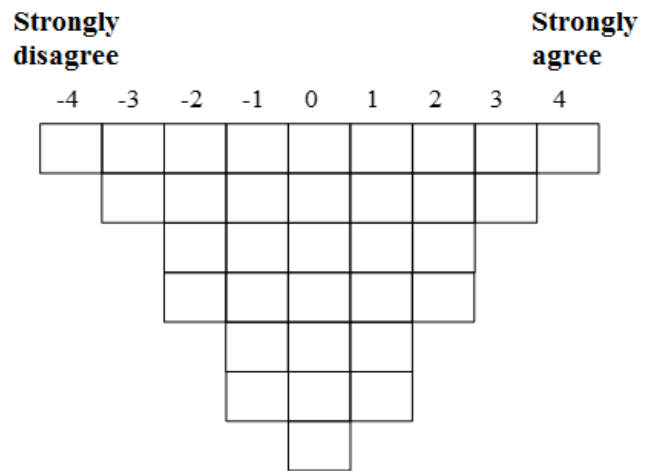


Figure 1. The Q-sorting scheme.

Factor analysis

To identify shared perspectives, we factor analyzed the 20 Q-sorts using Centroid Factor Analysis, following which we applied Varimax rotation to achieve a simple structure using the dedicated software package PQmethod [63]. We tested solutions with different numbers of factors extracted (1-7). Based on the criterion that at least two respondents should significantly load on a factor to qualify as a shared perspective, we concluded that the 4-factor solution was optimal.

To compute the factor scores, we identified “factor exemplars”, which are respondents/Q-sorts that load solely and significantly on a particular factor and can therefore be considered representative of the thought pattern in that factor. In total, 17 respondents loaded solely on one factor and three respondents loaded on none of the factors. Hence, we used 85 per cent of the data to compute the factor scores. For each factor, we calculated the factor scores by computing a weighted sum score of the Q-sorts belonging to its factor exemplars (using the factor loadings as weights). We then recoded the resulting scores to match those in the Q-sorting task. Thus, the highest weighted factor score was recoded as +4, the next two highest scores to +3, and so on.

The recoded scores for each of the four factors are shown in Table 1. In the next section, we use these scores to interpret each viewpoint. We further substantiated our interpretations by considering the motivations signaled by the respondents for the different factors.

RESULTS: RESIDENTS’ PERSPECTIVES ON THE MUNICIPAL OPEN DATA POLICY

Consistent perspectives

In this section, we discuss further the four main perspectives that we elicited. The four perspectives represent 17 out of the 20 respondents and therefore cover the interviewees’ responses well, since only three respondents’ responses could not be allocated to a perspective. The characteristics of each perspective are determined by the most extreme values. Based on these characteristics, we gave each perspective a

Characteristics	Consistent perspectives (P)			
	P1: The oblivious residents	P2: The distrustful residents	P3: The trusting, passive residents	P4: The open data advocates
Typical phrases	<i>I do not care about privacy.</i> <i>I have nothing to hide.</i> <i>I am barely in touch with the municipality.</i> <i>I have no idea what the municipality does.</i>	<i>The municipality is partly funded by my tax money, so I have the right to access data that it collects.</i> <i>Privacy should be guaranteed.</i>	<i>I voted and therefore I trust the municipal administration.</i> <i>I assume open data is important.</i>	<i>My expectations of the municipality are growing.</i> <i>Open data has enormous potential.</i> <i>What is the municipality waiting for?</i>
No. of respondents	7	4	4	2

Table 3. Overview of the consistent perspectives.

label based on typical phrases used by the respondents: 1) the oblivious residents, 2) the distrustful residents, 3) the trusting, passive residents, and 4) the open data advocates. Table 3 provides an overview of the main characteristics, which are discussed further below. The perspectives are ordered decreasingly by the number of respondents that they represent

Perspective 1: The oblivious residents

Privacy - The defining statement for this perspective was ‘I have nothing to hide’. The oblivious residents acknowledged that there may be privacy risks, but they were not concerned about possible privacy violations (as revealed in their answers to statements 32, 33, 26 and 29). There are two reasons for this. Firstly, all these respondents stated that they trust the municipality and believe that the municipality takes great care when handling privacy-sensitive data. Secondly, they stated that they have nothing to hide and do not mind if their data is opened up to the public. They typically had no fear that the municipality would violate their privacy.

Transparency - The ranking of statements revealed that these respondents believed that transparency plays a particularly important role in increasing the legitimacy of public administration. They also believed that openness will increase the quality of administration and lead to the development of better and smarter solutions. For instance, one respondent stated: ‘*Transparency makes it possible for residents to have an influence and provide suggestions. In addition, it functions as a type of check*’ (respondent #4).

Residents’ experiences - All these respondents indicated that they were not familiar with municipal activities in the digital area. From the interviews, we identified two possible explanations for this. Firstly, the majority of the respondents stated that they were independent from the municipality. For instance, respondent #20 stated: ‘*I only go to the municipality to collect my passport. If I needed a social security benefit or something else the situation would be different*’. Another possible explanation is the age of the respondents. ‘*I am barely concerned about how the municipality takes*

decisions. I do not consider this important. This could be because of my age,’ said respondent number 2 (21 years old).

Participation by residents - These respondents typically had limited contact with the municipality and were not familiar with its digital services. However, they strongly agreed that open data encourages residents to participate in municipal decision-making processes (statement 25). And yet, the oblivious residents did not believe that openness of information will increase understanding of the municipality: ‘*Better information provision will lead to less lack of information, but the relationship between comprehension and ignorance will not change,*’ (respondent #4). One possible explanation for this is that more information could also lead to more resistance for opening data from residents.

Conclusions - The perspective of oblivious residents is characterized by indifference towards potential privacy risks. They considered the legitimacy and quality of public administration important; they were unfamiliar with digital municipal services but had a positive attitude towards open data. Our interpretation is that these positions can be explained by the fact that these respondents wholly trusted the municipality of Delft to safeguard their personal data. In addition, the respondents’ lack knowledge with regard to the information the municipality collects and the digital services it offers is due to their limited contact with the municipality.

Perspective 2: The distrustful residents

Privacy - The respondents represented by this perspective valued privacy highly, as shown by their agreement with statement 29 (*I am concerned about my privacy-sensitive data which is held by the municipality*). By contrast, the other three perspectives all disagreed with this statement and were remarkably more positive about other statements related to privacy (statements 26, 31 and 33) than the distrustful residents. One distrustful resident said: ‘*It is scary how much the municipality knows about me. By pressing only a single button, the municipality can complete all my forms for me,*’ (respondent #12).

Transparency -With regard to transparency, it was striking that the distrustful residents considered statements concerning money important. They strongly agreed with statement 18 (*Government data is collected at residents' expense, and must therefore also be made available for their use*). This statement proved extremely important for these respondents compared to the other perspectives. For instance, these respondents scored highest on statement 11 (*I would like to know how the municipality spends my tax money*). One explanation for the importance placed on transparent finances was put by one respondent as follows: *'I pay a lot, but what do I gain?'* (respondent #8).

Residents' experiences - We found that the distrustful residents were familiar with the municipality's website and digital services. They use them regularly, but were very dissatisfied since limited information is available and information that they need is often missing. One resident said: *'Often the information is incorrect. Then you should call the municipality, but they refer you to their website. Yes, of course that does not work,'* (respondent #12). Although the distrustful residents were familiar with the municipal website and digital services, they were not familiar with the term open data.

Participation by residents - These respondents had a positive attitude with regard to resident participation and agreed with statement 24 (*Informing residents about the municipality in a comprehensible way will improve their understanding of the municipality*). Some indicated that they are interested in participating in municipal decision-making, depending on the topic. Respondent #14 said: *'I often do not understand their considerations. If I were involved more, then I would understand this better.'*

Conclusions - This group of respondents highly valued the protection of personal data and considered financing and administration important. They had limited experience with open data, but had a significant amount of contact with the municipality and valued being involved in and informed about internal municipal decision-making. This may be explained by the fact that they were dissatisfied with the municipality's digital services, particularly with regard to matters in which they had a specific interest, such as financial transparency and privacy. Their lack of familiarity with open data made it difficult for them to evaluate the opportunities of openness.

Perspective 3: The trusting, passive residents

Privacy - Privacy was not a major concern for the respondents represented by this perspective. Surprisingly, however, they did recognize that their personal data may be at risk (statement 33). One possible explanation is that they think that the municipality opens up data on a smaller scale and is therefore better able to safeguard privacy. These trusting respondents did not feel much at risk of privacy violations.

Transparency - These residents felt that transparency primarily increases the quality of public administration. They most strongly agreed with statement 20 (*Digital technology enables large-scale dissemination of data to the public*). One possible explanation of this positive attitude towards large-scale dissemination of data is indicated by another statement that they strongly agreed with, statement 24 (*Informing residents about the municipality in a comprehensible way will improve their understanding of the municipality*). Two of the four respondents from this perspective made a remarkable comment concerning statement 18 (*Government data is collected at residents' expense, and must therefore also be made available for their use*): *'There is more information collected at residents' expense. Sometimes it is better if things remain secret.'* In summary, the trusting, passive residents considered transparency important but only to a limited extent.

Residents' experiences - These respondents did not have high expectations of the municipality due to technological developments. Nor were they particularly familiar with the municipality's website or digital services, and only used them for functional purposes.

Participation by residents - Interestingly, all these respondents stated that they trusted the municipality. This was confirmed by respondent #13 who gave a possible reason: *'I voted for a reason; I do not want to be involved more in municipal policy-making.'* Three of these four respondents stated that they did not want to co-create or be involved in municipal decision-making: *'I do not need information that I did not ask for; that is not my interest,'* (respondent #19). This illustrates the passive attitude of these respondents.

Conclusions - This perspective incorporates a remarkable contrast: a belief that better information from the municipality would create more public support, but no particular need for such themselves. These respondents seemed to believe that the current digital services and level of information provided are adequate. They considered transparency important for the quality of administration and trusted the municipality to safeguard their privacy. Our explanation for this perspective is that the respondents were not interested in municipal activities and assumed that open data is of greater interest to other residents or companies.

Perspective 4: The open data advocates

Privacy - Respondents from this perspective attached little value to privacy. This was illustrated by respondent #5 who said: *'Privacy does not exist anymore. Multinationals should be blamed for this, not the municipality.'*

Transparency - Transparency was very important to the open data advocates. They agreed more strongly with statement 9 (*Openness of the municipality is important for developing new ideas*) than the other three perspectives (+4). They believed that transparency leads to smarter solutions and that the municipality should make information available

more quickly. Respondent #5 stated: *'It is old-fashioned to not be transparent and it's an admission of weakness on behalf of the government.'* These respondents believed that transparency presents an opportunity for innovation, which may be the reason for their positive attitude. In summary, they are strong proponents of open data.

Residents' experiences - These respondents were clearly familiar with the concept of open data. They felt that the municipality does too little with open data and that data should be made available and accessible more quickly. Their expectations of the municipality have grown along with increasing digitization. One possible reason for this is that they were well-aware of open data at the national level and wished to see a similar approach in Delft.

Participation by residents - Open data would increase how much these residents participate in municipal decision-making. Both respondents emphasized that the first step should really be initiated by the municipality, resulting in low agreement with statement 22 (*Open data improves contact with the municipality*). This is reinforced by respondent #5's statement that: *'Open data is in principle something passive but it could work in a stimulating way. It depends on the line of approach of the municipality.'* The open data advocates believed that the way the municipality communicates about open data is important.

Conclusions - The open data advocates did not value privacy overly much; they expected government organizations to be transparent and were familiar with open data. They also held a particular view with regard to contacting residents about open data. Since these respondents had some understanding of open data, they were more aware of the possibilities and opportunities it presents. They were therefore better able to critically assess the municipality's open data policy than residents with less knowledge in this area.

Comparison between perspectives

We examined the level of agreement and disagreement in respect of certain statements. This revealed that respondents from all perspectives agreed that the municipal website is not user friendly (residents' experience), that municipal openness is important to help identify mistakes and review municipal decision-making (transparency), that transparency increases the quality of public administration (transparency), that making open data available is a passive process and would not increase or improve residents' contact with the municipality (participation). The agreement statements can be considered 'quick wins' [10].

There was no agreement across the perspectives on any privacy-related statement, indicating that residents differ in their views on privacy. The respondents also disagreed on the costs and objectives of open data (transparency), their expectations of the municipality (transparency), whether open data can be used to develop new ideas (participation), concerns regarding privacy-sensitive data (privacy), and on opening up municipal spending (transparency). It will be

important to take account of these disagreement statements in order to draft an open data policy that is supported by the majority of Delft residents. Municipal decisions relating to areas covered by the disagreement statements will generate some resistance from certain slices of the population and can therefore be considered 'sensitive' [10].

Relationship between the perspectives

The four perspectives reveal both similarities and differences and the relationship between them is illustrated in Figure 2. The size of the circles represents the explained variance of each perspective (18, 9, 11 and 6 per cent for perspectives 1, 2, 3 and 4 respectively), meaning that the perspective with the most explained variance is the largest and the perspective with the least explained variance is the smallest. Residents from perspective 1 appreciated the value of transparency and were unconcerned by potential privacy risks. They trusted the way the municipality operates. This trust was echoed by the residents from perspective 3, who did not actively participate in municipal policy-making. They acknowledged that, while they had some concerns about privacy, they did not value it overly much. Perspective 2 residents valued privacy much more and were very dissatisfied with the municipality's website and digital services. Perspective 4 was characterized by an openhanded attitude to privacy and municipal transparency, which resonated with perspective 1. But these residents emphasized that the municipality should communicate clearly with residents about data, otherwise there is little point in opening up data. This view was also stressed by perspective 3.

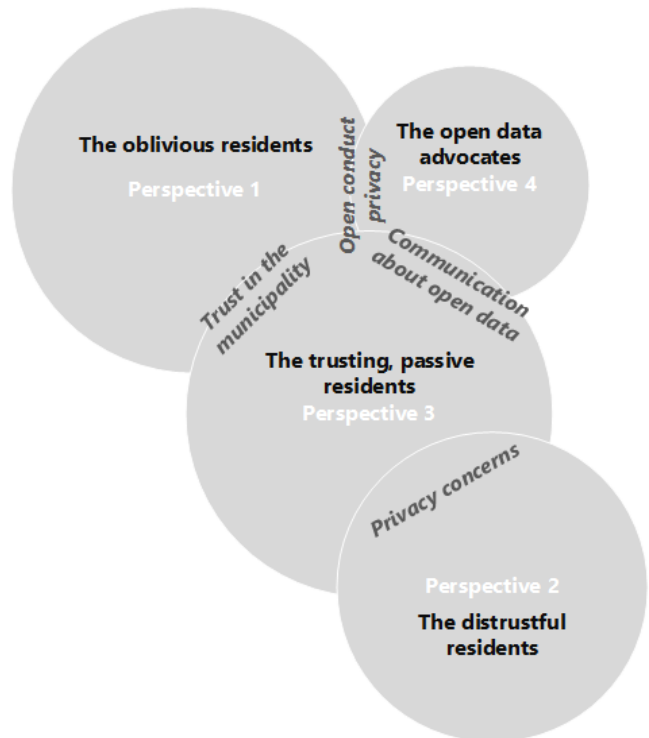


Figure 2. Graphical representation of Delft residents' perspectives on the development of municipal open data policy.

The differences between the perspectives could be related to varying levels of contact with the municipality. It is likely that level of knowledge about open data influences residents' views. The similarities we identified led us to conclude that the municipality of Delft is not completely transparent towards its residents. The residents themselves suggest that this could be improved by communicating more clearly and providing more information. Based on the differences between the four perspectives, we concluded that the municipality should expect a degree of resistance in respect of privacy and cost and that it will have to manage residents' expectations.

RECOMMENDATIONS FOR MUNICIPAL OPEN DATA POLICY MAKERS

In this section, we provide recommendations for policy makers developing municipal open data policies that are related to each of the perspectives described in the previous section and listed in order of priority. Our recommendations are based on the qualitative and quantitative data we collected via the Q-methodology.

Recommendations per Perspective

Oblivious residents have a positive attitude towards the municipality. They are open to new developments such as data disclosure but are unaware of the possibilities of open data. Municipalities should find a creative way of reaching out to these people. It is important for residents to be informed about the activities of their municipality and the opportunities afforded by open data. It is remarkable that, although the municipality of Delft publishes information regarding open data on its website, this group remains insufficiently aware of this. Municipalities could also try another channel, e.g. social media and should strive to use practical applications that appeal to this group.

Distrustful residents are the most concerned about their personal information. They also like to contribute to policy. It is therefore important to increase the confidence of residents by specifying exactly which data municipalities are processing and how. Municipalities could also ask these residents for input on topics they consider sensitive.

Trusting, passive residents have little interest in their municipality. Municipalities are therefore unlikely to encounter resistance from these residents because they trust their local representatives and feel that they have provided sufficient input by exercising their right to vote. Our recommendation is not to approach this group of respondents about open data.

We recommend that municipalities clearly communicate with open data advocates about the availability and general use of open data. This should increase this group's understanding of open data further and potentially prompt them to use it. Municipalities will have to strike a balance between simply informing residents and actively engaging with them.

Prioritizing our Recommendations

In the previous section, we set out the potentially conflicting ways in which we believe the various perspectives of residents should be taken into account in the development of municipal open data policies. Whereas distrustful residents may strongly wish to be involved in the policy development process, oblivious residents may have no interest in this whatsoever. To determine the relative importance of each recommendation, we examined the weight of each perspective. To generate greater support for open data policies, we advise municipalities to likewise examine the weight of each perspective depending on the size of each group in their region. The group sizes in our sample varied significantly (7:4:4:2 out of 20). A further issue is that municipalities often have limited resources to commit to reaching out to residents, which restricts the possibilities.

We recommend that municipalities identify which residents hold which perspective by conducting a large survey involving all residents. In this survey, residents should be asked to indicate their agreement or disagreements with a number of statements that characterize each perspective (e.g. their agreement with statements about privacy issues), so that the municipality can determine who holds which perspective. After the perspectives of responding citizens have been identified, we recommend that municipalities first focus on oblivious residents since this group has the greatest potential to become open data proponents. This group is unfamiliar with the information made available by municipalities and the digital services they offer but still consider the legitimacy and quality of public administration important and have a positive attitude towards open data. Municipalities should endeavor to provide this group with more information and boost their knowledge to enable them to start using open data, perhaps by organizing courses. Municipalities can generate enthusiasm for open data among oblivious residents by developing interesting applications based on open data and/or by using such applications as examples. They could also research best practices identified by other municipalities.

DISCUSSION AND CONCLUSIONS

Although some literature concerning open data policies in general is available, it rarely addresses policies at municipal level. The limited literature that does so mainly focuses on the technical implementation of these policies in the form of municipal open data portals. Research into residents' perspectives on municipal open data policies is lacking. This study investigated ways of taking account of residents' perspectives in the development of such policies, and suggested directions for theory development concerning municipal open data policy.

Using Q-methodology and applying it to the specific municipality of Delft in the Netherlands, we elicited and defined separate perspectives that characterize four distinct groups among 20 residents on the development of the municipal open data policy, as follows:

1) the oblivious residents, who do not care about privacy, say they have nothing to hide, are rarely in touch with the municipality and lack knowledge about what the municipality actually does;

2) the distrustful residents, who feel that privacy should be guaranteed and that, since the municipality is partly funded by their tax money, they should have the right to access data collected by the municipality;

3) the trusting, passive residents, who vote and therefore trust the municipal administration, and also assume that open data is important;

4) the open data advocates, whose expectations of the municipality are growing due to increasing digitization, and who are convinced that open data has enormous potential and are wondering what the municipality is waiting for.

Based on these perspectives, we developed recommendations for municipal open data policy makers on how to open data provision and improve use processes. We offered tailored advice for each group of residents, including: inform oblivious residents about the municipality's activities and the possibilities offered by open data in order to increase transparency; bring oblivious residents and open data proponents together; assuage the suspicion of distrustful residents by explaining clearly what data the municipality processes and how, as well as how personal data is protected; ask distrustful residents which topics are sensitive to them; communicate with open data advocates regarding the availability and general use of the open municipal data; and finally, do not approach trusting, passive residents on the subject of open data. We further recommend that municipalities focus on oblivious residents first, since this group has the greatest potential to become open data proponents.

This study should specifically enable the municipality of Delft to take various concrete measures, which we believe will make it easier to achieve the benefits listed in its open data policies. This would help realize the potential of local government projects as advocated by Kassen [41], who stated that *'using open datasets from the local governmental portal, these independent projects could potentially encourage citizens to participate in the decision-making process by harnessing their collective opinions and knowledge of local issues, i.e. could transform traditional communication channels between citizens and local governments'*.

This study discovered some existing perspectives in relation to open data policy, but not the extent to which each perspective is held in the broader population. To this end, a large-scale survey should be conducted among a random subset of the population. The application of Q-methodology to reveal residents' perspectives on municipal open data policies was a critical step needed before large-scale testing can take place to assess the statistical occurrence of these

perspectives in a certain population, since many factors influence these perspectives.

To elicit the existing perspectives, we strategically selected respondents from different age groups and with different educational backgrounds. It may be that other dimensions also affect the likelihood of holding one perspective or another. For example, several of our respondents stated that they have professional experience with open data, which may have influenced their views on the municipal open data policies. In future (Q-)research, this could be included as an additional selection criterion.

More generally, we recommend that further research be conducted to examine whether the perspectives we discovered are also held in other municipalities both in the Netherlands and abroad, and whether there are other common perspectives. Finally, our selected Q-set gave a comprehensive representation of the literature, which resulted in a relatively generic series of statements. Future research could repeat our approach with a larger sample of respondents and a more specific Q-set and focus on how residents discuss various aspects of municipal open data policy.

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