JANUARY 2017

DATA AND THE CITY

HOW CAN PUBLIC DATA INFRASTRUCTURES CHANGE LIVES IN URBAN REGIONS?

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Data and the City: How Can Public Data Infrastructures Change Lives in Urban Regions?

Jonathan Gray and Danny Lämmerhirt[1]

Executive Summary

The development of urban regions will significantly affect the lives of millions of people around the world. Urbanization poses new challenges including housing shortages, the growth of slums and urban decay, inadequate provision of infrastructure and public services, poverty and pollution. Data can play an important role in tackling these issues - enabling citizens and policy-makers to follow progress and take informed action.

Cities around the world publish a wide variety of data, reflecting the diversity and heterogeneity of the information systems used in local governance, policy-making and service delivery. This paper looks at the role of city data infrastructures in advancing progress around a range of societal issues - from tackling air pollution and corruption to the provision of green spaces and public services. It aims to address questions such as: What is the action repertoire available to civil society actors to open up local data and to enlist it into the service of tackling urgent issues in their cities? What can government officials do to make public data infrastructures more responsive to the interests and concerns of different civil society actors?

Instead of considering how technical and legal openness can enable the use of open data in urban regions, we wish to present the many ways in which civil society interacts with public data infrastructures, including creatively repurposing and participating in the making of city data data – and what these practices can teach us about how to increase public participation around city data initiatives.

The paper is based on six case studies looking at civil society participation around data infrastructures in cities around the world . It concludes with a set of recommendations for civil society and public institutions to make urban data infrastructures more responsive to the needs of civil society.

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Introduction

According to the United Nations, 6 out of 10 people will live in metropolitan areas by 2030.[2] Urban regions in Africa, Asia, Latin America and the Caribbean are expected to grow most sharply, bringing a host of new challenges.

The United Nations has called for a "data revolution", suggesting that data may play a vital role in achieving the Sustainable Development Goals (SDGs) as well as in addressing other social concerns.[3] The Other organisations like the World Bank Group, the Open Government Partnership (OGP) and the G8 suggest that open data may facilitate progress towards a range of goals – including transparency, accountability, public participation, public service delivery, technological innovation, efficiency and economic growth - and have specified principles for opening data.[4]

This report is about the social and democratic potential of city data. Like national governments, city authorities generate and publish a wide variety of different kinds of data, reflecting the heterogeneity of the information systems used in local governance, policy-making and service delivery. Those data range from geo-referenced data about the locations of public facilities to information about environmental conditions, from local election data to information about local revenues, expenditures and public sector contracts.[5] We are interested in how city data infrastructures can support public participation around local policy-making and create new kinds of relationships and public spaces between public institutions, civil society groups, and citizens.

This paper presents a selection of six case studies describing how civil society actors create and use city data in order to tackle social, political and environmental issues. There is a growing body of research about the impact of open data which has been measured from different perspectives –

[2] See also: http://unhabitat.org/about-us/un-habitat-at-a-glance/.
[3] See also: SDSN Thematic Group on Sustainable Cities (2013): Why the world needs an urban sustainable development goal. Accessed at: https://sustainabledevelopment.un.org/content/documents/2569130918-SDSN-Why-the-World-Needs-an-Urban-SDG.pdf and http://www.data4sdgs.org/#intro
[4] See also: IEAG (2014): A world that counts. Mobilising the data revolution for sustainable development. Accessible at: http://www.undatarevolution.org/wp-content/uploads/2014/12/A-World-That-Counts2.pdf; World Bank Group (2015): Open Data for Sustainable Development. Available at: http://pubdocs.worldbank.org/pubdocs/publicdoc/2015/8/999161440616941994/Open-Data-for-Sustainable-Development.pdf or Francoli, Mary; Alina Ostling and Fabro Steibel (2015): From informing to empowering. Best practices for improving government - civil society interactions within OGP. Accessible at: http://www.opengovpartnership.org/sites/default/files/FromInformingToEmpowering_FullReport.pdf
G8 Open Data Charter: Accessible at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/207772/Open_Data_Charter.pdf
[5] For instance, UN-Habitat runs the Urban Data portal providing open data on urban indicators such as slum prevalence, health, transport, city prosperity or resilience. A selection of city data portals can be found at: http://dataportals.org/

counting how many civil society organisations per country use particular data[6] or regarding context-specific cases that teach us about the outcomes of using open data under specific conditions.[7] This paper looks at how mobilisation around city data infrastructures has enabled civil society actors to secure progress around a range of issues affecting urban regions – including through raising awareness of an issue, mobilizing civic protest, engaging around local fiscal policy, and influencing public policy at city level.

We draw on ongoing research around **participatory data infrastructures**, foregrounding how governments may take steps to make public information systems responsive to the interests and concerns of different publics.[8] As it will be shown, urban initiatives often use a mix of data, some of which is open while others is not. In some of the case studies citizens use Freedom of Information law to acquire data and combine it with publicly available data.[9]

The case studies are based on desk research and qualitative, semi-structured interviews and were shortlisted through 'snowball sampling'. The paper is commissioned by the International Development Research Center (IDRC), Ottawa, Canada and informs the Open Data for Development Group.

[6] Francoli, Mary; Alina Ostling and Fabro Steibel (2015): From informing to empowering. Best practices for improving government - civil society interactions within OGP. Accessible at: http://www.opengovpartnership.org/sites/default/files/FromInformingToEmpowering_FullReport.pdf

[7] Both the Sunlight Foundation as well as the Governance Lab in collaboration with Omidyar Network group have designed case studies measuring the impact of open data, defined as the uptake of open data that causes effects within a larger social ecosystem. For further details see: http://thegovlab.org/open-data-impact-case-studies/ and https://sunlightfoundation.com/blog/2015/05/05/a-new-approach-to-measuring-the-impact-of-open-data/

[8] See also: Fighting Phantom Firms in the UK: From Opening Up Datasets to Reshaping Data Infrastructures? Accessible at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2610937 and Changing What Counts: How Can Citizen-Generated and Civil Society Data Be Used as an Advocacy Tool to Change Official Data Collections?. Available at: http://civicus.org/thedatashift/wp-content/uploads/2016/03/changing-what-counts-2.pdf

[9] Fumega (2015) provides a detailed debate on the differences and similarities of FOI and OGD and where both approaches can learn from each other. As Fumega argues: Some of the usual concerns from the FOI and transparency circles relate to the lack (in most cases) of legal support of users' right to demand certain datasets in the context of open data initiatives." On the other hand, open data advocates emphasize that only the re-use for any purpose enables citizens to employ open data with an impact. Fumega, S. 2015. "Understanding Two Mechanisms for Accessing Government Information and Data Around the World": http://webfoundation.org/about/research/understanding-two-mechanisms-for-accessing-government-information-and-data/

Acknowledgements

The following list presents people whom we interviewed and consulted in order to gather information for our case studies.

- Alberto Abella, Open Knowledge Spain
- Temi Adeoye, Code for Nigeria
- Dave Arter, mySociety
- Alex Aylett, INRS Université de Recherche
- Oludotun Babayemi, Connected Development
- Joel Benjamin, Debt Resistance UK
- Carla Bonina, University of Surrey
- Prof. Dr. Gisele S. Craveiro, University of São Paulo
- Daniel Chino, DataUY
- Skye Dobson, Know your City
- Carole Excell, World Resources Center
- Silvana Fumega, University of Tasmania
- Yamilia García, Open Knowledge Argentina
- Richard Gevers, Code for South Africa
- Tatjana Atanasovska Grozdanovska, Vozduh Sega
- Hazwany Jamaluddin, Sinar Project
- Gaelle Janvier, ecoHack
- Nicolas Kayser-Bril, J++
- Callum Kirkwood, Future Everything
- Laura Kurgan, Columbia University
- Jean-Noé Landry, Open North
- Brittany G. Lane, World Resources Institute
- Hamzat Lawal, Connected Development
- Mary Loitsker, The Public Knowledge Workshop
- Mikel Maron, Humanitarian OpenStreetMap
- Ricardo Matheus, Technical University Delft
- Natalia Mazotte, University of Texas
- Andrea Nelson Mauro, Dataninja.it
- Katarina Ott, Institute of Public Finance
- Nkechi Okwuone, School of Data Fellow
- Olesun Onigbinde, BudgIT
- Sierra Ramirez, Open Contracting Partnership
- Ludovica Rogers, Debt Resistance UK
- Mario Roset, Wingu
- Jared Rossouw, Ndifuna Ukwazi
- Mor Rubinstein, Open Knowledge
- Ganiyu Rufai, Center for Information, Technology and Development (CITAD)
- Rebecca Rumbull, mySociety
- Kristina Sassenscheidt, Leerstandsmelder
- Fabrizio Scrollini, Iniciativa Latinoamericana por los Datos Abiertos and DataUY
- Paula Z. Segal, 596 Acres
- Nisha Thompson, Data Meet
- Florence Toffa, Code for Ghana
- Nir Yariv, The Public Knowledge Workshop

Open Data for a Greener New York City - Using Open Land Data to Turn Empty Spaces into Community Gardens

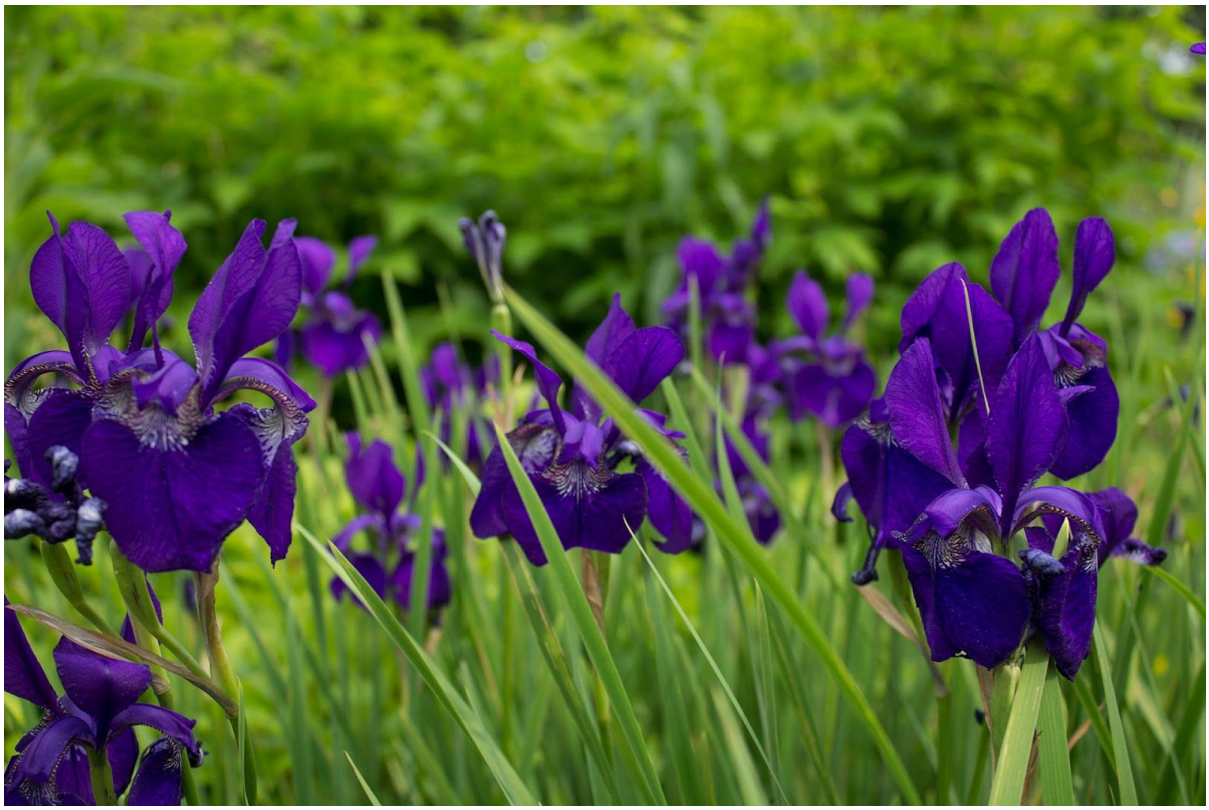


Figure 1: https://www.pexels.com/photo/flowers-garden-7285/

Background

In New York City about 600 acres (roughly 2,4 km^2) of city-owned lots are vacant, mainly situated within low-income communities.Many of them are not currently used by the city, by the private sector, or by local communities. The lots are partly a legacy of previous urban renewal programmes. These plans, firstly initiated by the City of New York in the 1950s, proposed the removal of real estate in neighbourhoods that were characterised as 'blighted' or 'slums' in order to create empty spaces for public and private investment.[10] Some of the empty lots have been used for new constructions, in other cases the intended investments have yet to be made.[11]

[10] Interview with Paula Segal, See also: http://www.fastcoexist.com/3038089/mapping-new-yorks-vacant-lots-to-use-them-to-create-a-more-vibrant-city, http://www.urbanreviewer.org and http://www.nyc.gov/html/records/downloads/pdf/urban_renewal.pdf

[11] See also: http://technical.ly/brooklyn/2014/06/25/urban-re-viewer-launches-documenting-urban-renewal-era-maps/

Many of these areas are not be accessible to the public - protected by fences and carrying legal penalties for trespassing. The 596 Acres NYC Community Land Access Project (henceforth:"596 Acres") aims to transform these areas into green, living public spaces.

Approach

596 Acres describes itself as a 'grassroots strategy' helping New York City's communities to organize around and gain access to vacant city-owned land. By combining open municipal data about vacant land areas with grassroots outreach, the project strives to 'turn municipal data into information useful to the public, and to help neighbours navigate city politics, and connect neighbourhood organizers to one another through social networking and in-person collaboration'.[12] The main goal of the platform is to raise awareness amongst New York City's residents about the possibilities of turning vacant city land into green areas in neighbourhoods that lack them and thereby to foster civic engagement and bottom-up interventions.

Firstly, 596 Acres gathered data from various databases published by the Department of Citywide Administrative Services[13] and complemented them with information accessed via Freedom of Information requests about urban renewal plans that indicated how the City was planning to re-use the spaces. Members of 596 Acres analysed the data describing ownership and use of the lots in order to identify city-owned, vacant, and currently unused lots. One step to verify the vacancy of lots included cross-referencing official open data with a database of existing community gardens published by the organisation GrowNYC. This allowed to identify already existing community gardens falsely classified as 'vacant' by the City.[14] In a second step public accessibility and usability were verified using Google Maps and property shapefiles available at OASISNYC.net as well as data about recent ownership transfers to see whether land was still city-owned. The 596 Acres team thus identified and still updates currently unused lots, re-usable by the public and accessible from the street.[15]

Paula Segal, Executive Director & Legal Director of 596 Acres says that,

'One key to our success transforming open data into actual open space managed by locals is our practice of putting information about the city's vacant land portfolio where people most impacted by vacant lots will find it - on the fences that surround [them]. The signs announce clearly that the

[12] See also: Segal, Paula (2015) "From Open Data to Open Space: Translating Public Information Into Collective Action". Available at: http://digitalcommons.lmu.edu/cate/vol8/iss2/14

[13] The exact databases are the IPIS database and the Local Law 48 database of 2011.

[14] See also: http://596acres.org/en/about/our-data/

[15] The clearing of data was necessary since a large part of the lots classified vacant are so-called "gutterspaces", that is land not accessible from the street (i.e. between two properties) or a very small piece of land practically not re-usable.

land is public and that neighbours, together, may be able to get permission to transform the vacant lot into a garden, a park or a farm".[16]

Figure 2: Information material installed on a City-owned vacant lot in the Bronx.

In order to increase outreach to as many residents and community members as possible, 596 Acres utilizes various communication channels and community platforms, from online newsletters to face-to-face communication. 596 Acres also enables residents to virtually organize community projects by signing up on 596 Acres' website. A newsletter keeps them updated about other people interested in organizing around the same lot. Once a community project is formed, community partners and neighbours plan the reuse of empty spaces autonomously. The use may range from community gathering or growing food to meeting and playing.

[16] See also: Segal, Paula (2015) "From Open Data to Open Space: Translating Public Information Into Collective Action,". Available at: http://digitalcommons.lmu.edu/cate/vol8/iss2/14

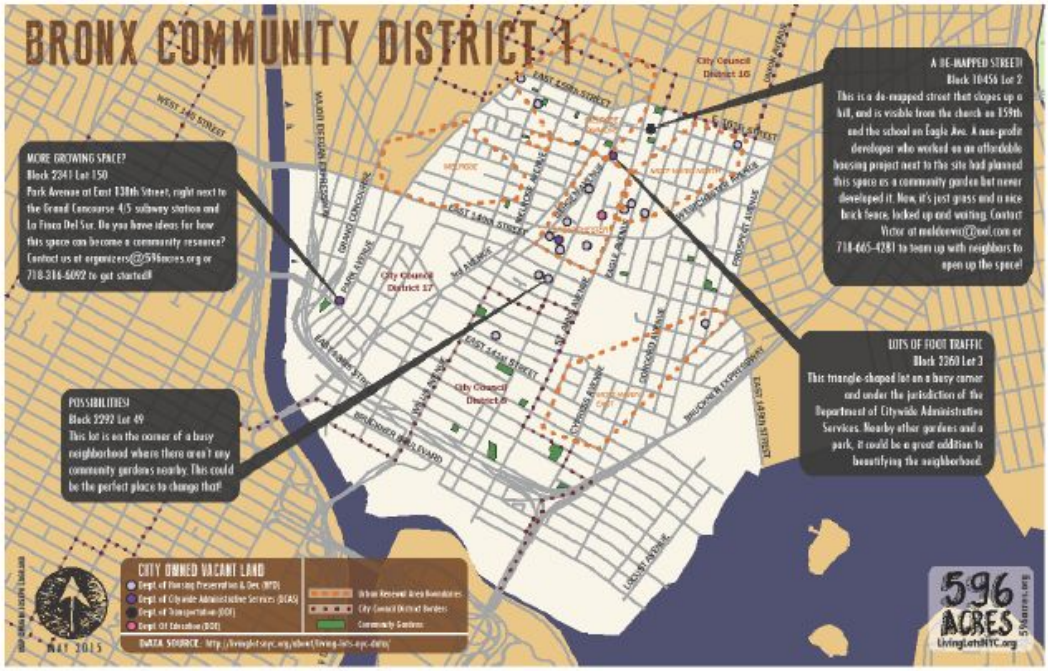


Figure 3: Community map used for print distribution in the district.

Besides providing data to engage with different communities about the possibilities of vacant land, 596 Acres provides legal advice and technical assistance in order to inform residents about possible political interventions – from applying for approval of community spaces from the local Community Board to winning endorsement from locally elected officials, and negotiating with the responsible agency holding titles to a lot. Paula Segal says that both the provision of data and legal advice are equally important to mobilising local communities and enabling them to influence urban spatial planning.

The Impact

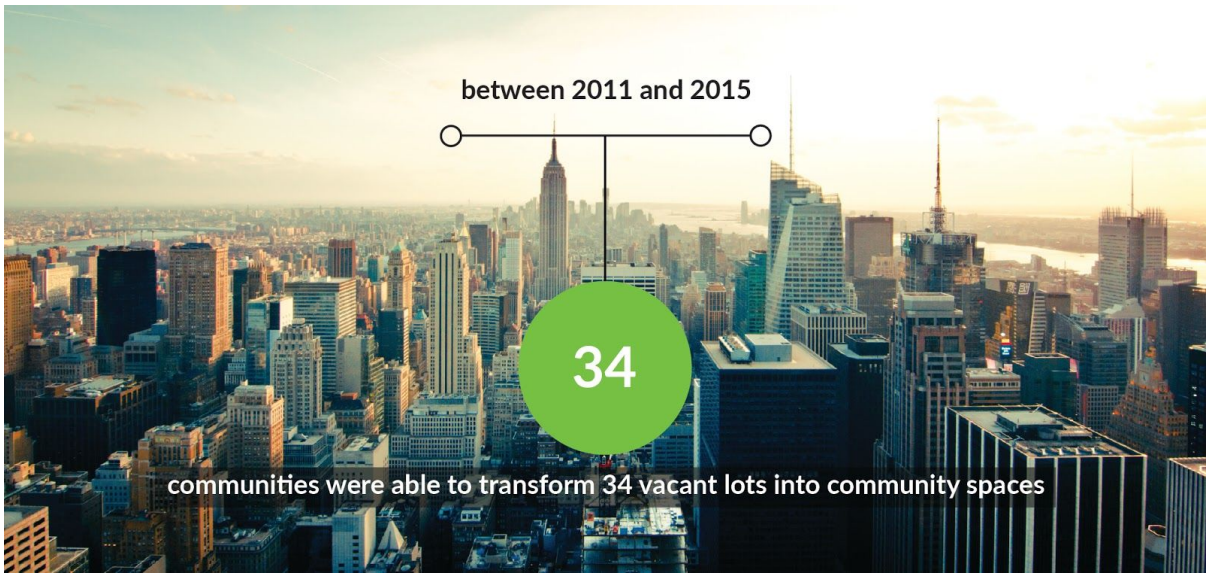


Figure 4: Photographer Philip Henzler

Between 2011 and 2015, communities were able to transform 34 vacant lots into community spaces out of which 28 were turned into protected spaces.[17] In 2015 alone, 17 vacant lots that neighbours were able to open up with the support of 596 Acres have been put under permanent preservation by the City's Parks Department.[18] In other cases, data on vacant lots has served as an advocacy tool to ensure the use of land complies with the Department of Housing Preservation and Development.[19] Paula Segal argues that many neighbourhoods who manage community-owned areas are a long distance from the next green space. Being able to establish green areas is therefore an important achievement to improve life quality in these neighbourhoods.

[17] Interview with Paula Segal.
[18] See also: 596 Acres (2016): News from the Acres - January 9, 2016. Accessible at: http://596acres.org/en/news/2016/01/09/news-from-the-acres-january-9-2016/
[19] See also: Segal, Paula (2015) "From Open Data to Open Space: Translating Public Information Into Collective Action,". Available at: http://digitalcommons.lmu.edu/cate/vol8/iss2/14

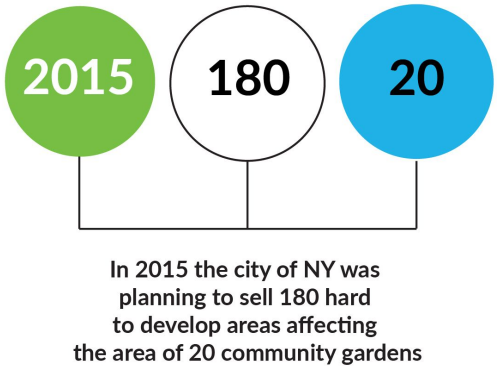


Figure 5

In 2015 the municipality of NYC was planning to sell about 180 hard-to-develop areas, affecting the area of 20 community gardens. Using accurate geo-location data based on New York City's parcel identifier system, 596 Acres was able to identify which community gardens were affected by the plans. They informed community members about the City's plans so they could negotiate with local community boards, the City Council and the Mayor's office in order to protect their gardens and community spaces. As Paula Segal states:

> *'By raising awareness of land use policy, helping residents navigate the political and legal processes that shape public policy, and directly encouraging community involvement in government land disposition decisions, we have built a constituency that is ready to engage with the mechanisms that shape the city and decide the fate of our shared assets."*[20]

596 Acres therefore is not only an example of how open data on vacant spaces can be used for evidence-based advocacy work which aims to turn them into community-owned spaces. It also shows that an integrated approach is necessary for effectively mobilizing communities - namely combining the provision of open data that is correctly classified and presented meaningfully to a community with a broad outreach to different user groups and consultancy about the municipality's legal framework and institutional routines. 596 Acres demonstrates how open data, if utilized in addition to other educational and advocacy measures, can support dialogue between civil society and local authorities and lead to mutually beneficial spatial planning decisions that are in line with municipal projects but do not neglect the voices and interests of the people most affected by these decision: the residents living in these neighbourhoods. The project platform is

[20] See also: Segal, Paula (2015) "From Open Data to Open Space: Translating Public Information Into Collective Action,". Available at: http://digitalcommons.lmu.edu/cate/vol8/iss2/14

open source and is being actively used byadvocates in Philadelphia (groundedinphilly.org), New Orleans (livinglotsnola.org) and Los Angeles (laopenacres.org).[21]

[21] See also: http://596acres.org/en/about/other-cities-copy/

Follow the Money Nigeria – Tracking the Provision of Public Infrastructure through Budget Data

Figure 6: Photographer Shardayyy

Background

Nigeria's public finances rank amongst the least transparent in sub-Saharan Africa. The availability of budget data varies significantly across federal states so that the public does not have access to the information necessary to participate in the budget process and to hold government to account.[22] The Civil Resource Development and Documentation Centre (CIRDDOC) argues that 'the lack of [budget] transparency encourages inappropriate, wasteful, and corrupt spending'.[23] Fiscal opacity also affects infrastructural projects in urban regions which are sometimes financed by federal state departments. A lack of access to budget data obfuscates public procurement and delays project execution and service delivery. The result is that in some urban regions constructions of school buildings, water supply systems, sanitary facilities or traffic routes are delayed or remain unaccomplished.[24]

Connected for Development (henceforth: CODE) is an NGO aiming to improve access to information in order to empower local communities in Africa. CODE runs 'Follow the Money (FTM)

[22] See also: http://www.internationalbudget.org/2016/01/subnational-budget-transparency-in-nigeria/
[23] See also: http://www.internationalbudget.org/wp-content/uploads/2015-nigerian-states-budget-transparency-survey.pdf
[24] Interview with Oludotun Babayemi, co-founder of Follow the Money Nigeria.

Nigeria', an initiative to enhance the efficiency of public procurement and service delivery in Nigeria's urban and rural areas. FTM Nigeria uses available budget data for evidence-based advocacy work. It provides analyses of budget data with public outreach engaging with beneficiaries, responsible politicians, fiscal oversight agencies, news media and local communities. By making budget data intelligible FTM Nigeria aims to highlight inefficient public service delivery, and to offer a platform for different stakeholders to get into dialogue and negotiate solutions.

Approach

To do so, FTM Nigeria identifies issues related to the waste or disappearance of committed funds, compares planned expenditures with the current state of a project, and engages with responsible persons managing budgets or receiving investments in order to highlight how people are affected by different aspects of fiscal policy.[25] The organisation gathers crowdsourced feedback from citizens in local communities or other information channels such as news sources. Crowdsourced feedback is a vital element of this work, both to identify an issue 'on the ground' and to provide FTM Nigeria with indications of what kinds of fiscal data needs to be acquired in order to support further advocacy work.[26]

Afterwards FTM Nigeria searches in different government sources to find and analyse all available fiscal datasets enabling to understand the planned and realised expenditures of public projects. Those datasets serve as benchmarks to evaluate the size of infrastructural investments based on planned results and money invested. The team scrutinizes multiple online data sources in order to identify the government body managing project budgets, the allocated money per project, the date of budget allocation, the project start, as well as the money that has already been spent on a project. Sometimes the planned date of project completion is used, too. This facilitates analysis of the progress of a project.

The data sources can be manifold. In order to investigate how far the construction of a school hostel in the federal state capital Gusau progressed FTM Nigeria gathered data from the Federal Government Budget of 2014. The organisation regarded granting institution, budget size and the state in which the budget was allocated, but could not find actual spending data nor data about the project status. In another case in a regional capital, FTM Nigeria followed the completion of a water supply system for a school through the budget of the Federal Ministry of Education, which have been accessible in PDF format. In both cases these datasets were made machine-readable and translated into more accessible visualizations.

[25] See also: http://www.internationalbudget.org/2016/01/subnational-budget-transparency-in-nigeria/
[26] Interview with Oludotun Babayemi.

Given that spending data are often not available FTM Nigeria organizes on-site visits together with local communities and stakeholders directly affected by a public project. This 'ground-truthing' method entails the collection of video footage, pictures and interviews with community members in order to document the current status of a public project. On-site visits are considered to be an essential channel for gathering contextual knowledge about the effects of inefficient service delivery for different interest groups. On-site visits are also useful to flag spending issues to key interest groups and to secure their support.

After budget data analyses are combined with evidence through 'ground-truthing', FTM Nigeria organises stakeholder meetings to present the findings in a format every stakeholder can understand, and to offer all actors an opportunity to collaborate with each other around further activities. These meetings involve local communities and public institutions affected by an issue, beneficiaries hired by government to provide a public service, government agencies responsible for budgeting and execution, as well as news media.

Stakeholder meetings are used by FTM Nigeria to confront responsible parties with evidence, to exchange different perspectives on the topic, to understand which obstacles delay service delivery and which actors are responsible for the delay. Most importantly, the meetings aim to achieve commitments for future steps guaranteeing the finalization of a project.[27] Afterwards FTM Nigeria reports on different media channels about the meeting results. As Oludotun Babayemi says media coverage is a key means to pressure public bodies and contractors to finalize a public project, but also for communities and larger publics to become aware and engaged in topics related to their immediate surroundings.

If projects do not visibly progress after a stakeholder meeting, FTM Nigeria collaborates with the Independent Corrupt Practices Commission (ICPC), Nigeria's federal corruption agency. The ICPC mandate is 'to prohibit and prescribe punishment for corrupt practices and other related offences' by receiving and investigating complaints from the public on allegations of corrupt practices. The ICPC may therefore utilize FTM Nigeria's investigations to examine 'the practices, systems and procedures of public bodies and where such systems aid corruption'.[28]

[27] As Olutun Babayemi says the meetings helped to clarify why a budget was not budgeted to a project or why the completion of the project was delayed, such as in the case of a contractor delaying his service provision.
[28] See also: http://icpc.gov.ng/our-role/

The Impact

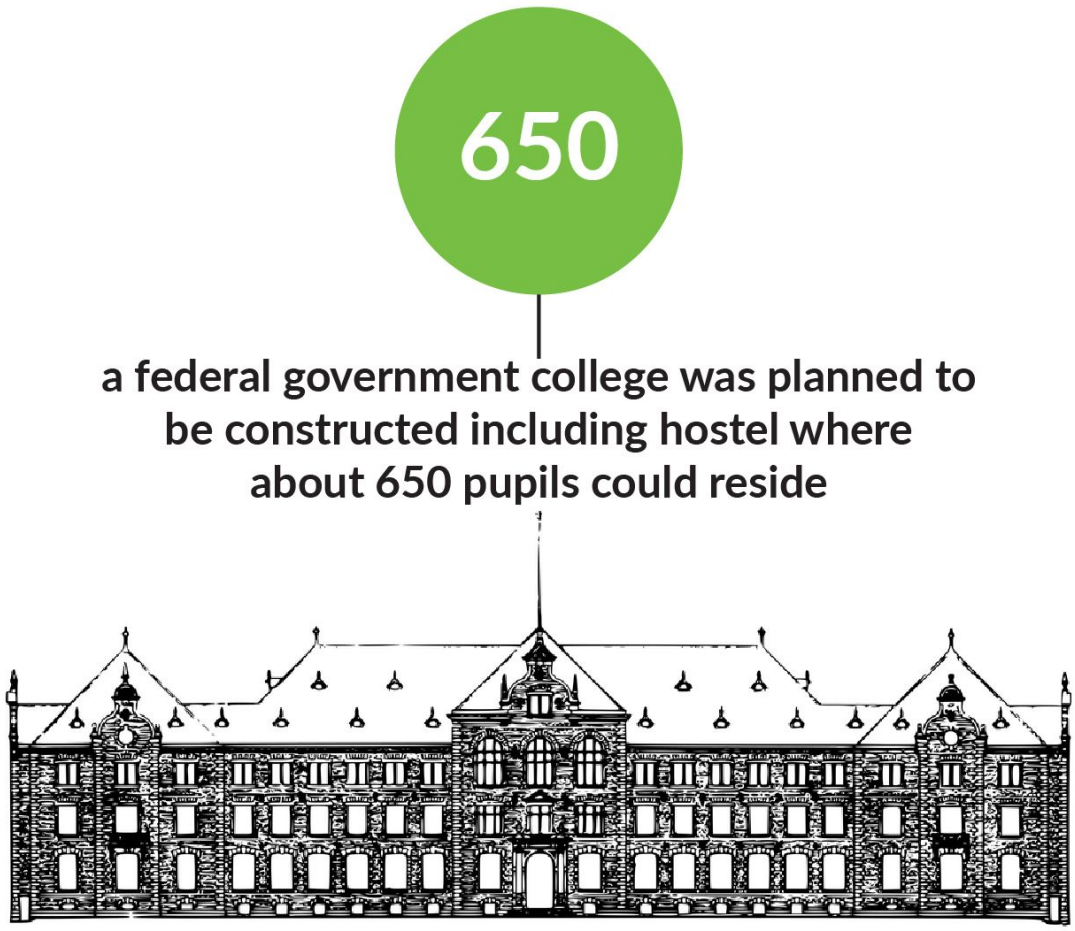


Figure 7: https://pixabay.com/en/architecture-building-college-house-1297381/

Figure 8

Different success stories arose from this model. In Anka, the capital city of Nigeria's state Zamfara, a federal government college was planned to be constructed including a hostel where about 650 pupils could reside. 20 million Nigerian Naira (about 64.000 US Dollars) had been budgeted to the project, but only parts of it were allocated when FTM started its investigations.

Figure 9: Photographer DWilliams

After a stakeholder meeting FTM Nigeria organized two radio shows with Zamfara Radio and a "Tweet-a-Thon" engaging 170,000 users. This led to a meeting between community stakeholders, the federal Ministry of Education and the Universal Basic Education Committee, Nigeria's 'intervention, coordinating and monitoring Agency' aiming to 'progressively improve the capacity of states, local Government Agencies and communities in the provision of unfettered access to high qualitative basic education'.[29] Engaging the committee in this matter helped to enforce the construction of the hostel.

These findings suggest that the specific impact of FTM Nigeria lies in its function as a catalyst for the concerns of civil society, navigating, collecting and analysing otherwise hardly comprehensible or patchy budget data – and complementing those data with on-site investigations and stakeholder meetings to engage all responsible parties and to encourage their collaboration around an issue. By catalysing and conducting investigations into the concerns of civil society, FTM Nigeria also provides evidence for government-run oversight agencies whose responsibility it is to increase the efficiency of government programs as well as to prevent fraud, corruption and other institutional issues. The evidence gathered by FTM Nigeria has been used several times by ICPC for its own investigations.

[29] See also: http://ubeconline.com/

Using Public Service Data to Audit Sanitary Facilities in Cape Town

Figure 10: https://upload.wikimedia.org/wikipedia/en/b/b7/CapeTPano123.jpg

Background

Many people living in Cape Town's informal settlements do not own private sanitary facilities, but have to use public flush toilets shared with many other slum dwellers. The City of Cape Town is legally obligated to deliver basic sanitary facilities for its residents. The City therefore installed temporary toilets as an ad hoc solution in the settlements and, after long-lasting dialogues between communities and the municipality, also initiated a first janitorial service pilot that was put into place in May 2012. However, in some settlements the ratio of toilets per inhabitant is still low. Also maintenance and monitoring of the toilets' functionality are not executed on a regular basis. This is due to the fact that the janitorial service, like other municipal cleaning operations, does not require the publication of detailed plans or procedures that stipulate how they should be executed. Many of the installed toilets are unusable, not hygienic or unsafe, limiting the access to functioning sanitary facilities in the settlements.

Approach

In order to inform the municipality about the state of the sanitary facilities, the civil society organisations Social Justice Coalition (SJC) and Ndifuna Ukwazi initiated a social audit based on public data about the City's janitorial program.[30] The aim was to monitor how the janitorial service is working on the ground compared to how it should be working according to government documentation. Getting access to and using data about the janitorial service was the necessary

[30] A definition of social audits can be found here: http://www.socialaudits.org.za/

starting point for holding the town hall accountable for not fulfilling their obligations to provide sanitary facilities.

Firstly, SJC and Ndifuna Ukwazi requested documents describing service specifications through Freedom of Information requests. As a result they gained access to a 'system procedure' documentation, the relevant labour, health and safety legislation and letters obtained from City officials.[31] The organisations used this information, together with documents defining the City's legal obligations to provide sanitary infrastructure, in order to raise awareness amongst local communities about their rights and possible actions to demand better service provision.

Official documents have been used in order to derive a set of questions that could evaluate whether the City's service descriptions are realized on the ground. Three questionnaires were set up – one to physically verify the state of a toilet, the other two containing standardized interview questions for janitors and residents. The janitor question list was designed to investigate whether the City was managing the service in an effective way so that a sufficient amount of janitors had the tools, protective equipment and training to do the job. The residents list evaluated the community's experiences and satisfaction with the service.[32]

In order to allow for a standardized data gathering procedure members of SJC and Ndifuna Ukwazi organised training sessions with local communities. The training sessions were used to in order to standardise data gathering practices in order to ensure the comparability of results. For example, SJC and Ndifuna Ukwazi handed out photos of clean, dirty and very dirty toilets to community members, asked them to evaluate the cleanness of another toilet based on these photos and discussed unclear cases in groups in order to establish a shared understanding between those undertaking the social audits. Together with community members SJC and Ndifuna Ukwazi then gathered the data over a period of one week.

Their findings showed that almost half of all toilets analysed were dirty or very dirty, one fourth of the toilets did not work, janitors were not repairing minor faults and were missing training, cleaning equipment, vaccination and other health protection. Also some areas were provided with more janitors than others. Based on the findings the SJC and Ndifuna Ukwazi were able to advocate for the implementation of regular site visits by janitors - including defining a certain

[31] Interview with Jared Rossouw, member of Ndifuna Ukwazi.
[32] A comprehensive list of questions, as well as the results of the questionnaires are openly accessible at: http://www.sjc.org.za/social-audits

number of janitors maintaining a certain amount of toilets per area and equipping janitors with sufficient protection tools and training them to be able to do minor repairs on their own. They also demanded an effective and easy system for reporting faults ensuring that toilets are easily located and can be fixed. These demands were communicated to City representatives during a public hearing.

The Impact

The training sessions to learn about the City's legal obligations, the social audit procedure and the public hearings by the municipality were intended to give community members a feeling of empowerment. A report released by SJC and Ndifuna Ukwazi states that 'social audits are as much about empowering communities to understand government budgets and documents as they are about the audit findings and efforts to hold government to account. The process is as important as the end result.'[33]

Figure 11: Photographer Karolina Grabowska

The social audits have also generated large press coverage and have brought the issue of access to sanitation into public imagination. However, the public hearings with representatives of the City of Cape Town have had mixed results. Initially the City questioned the legitimacy of the findings and

[33] See also: Ndifuna Ukwazi (2014). Our toilets are dirty: Report of the social audit into the janitorial service for communal flush toilets in Khayelitsha, Cape Town. Accessible at: http://nu.org.za/wpcontent/uploads/2014/09/Social-Audit-report-final.pdf

rejected the methodology as not objective and the sample size as not representative but later acknowledged the need to improve the training regime for janitors as well as the provision of uniforms and equipment.

Generating data about a public service and using these data for social auditing had positive effects to galvanise settlement dwellers and make their voices heard. By educating and giving citizens access to public service delivery documents they could be actively involved in public affairs. This enabled communities to organise in order to hold public leaders to account for their commitments. It also brought together citizens and governments to evaluate the extent to which the commitments contained in legislation and policy are being honoured in practice. However, while the audit project succeeded in mobilising and raising awareness amongst affected communities, enabling them to verify the service delivery, and drawing significant media attention, the dialogue with the city had limited outcomes. Some demands could not be realized and the hearing was perceived as confrontational rather than collaborative.

Debt Resistance UK – Scrutinising the Costs of Government Debt by Opening Public Loan Data

Figure 12: Photographer Kaz

Background

In March 2015 the British Audit Commission was shut down as part of austerity cuts. It represented a central body providing independent external auditors who audited loan borrowing and loan pricing across local councils.[34] After its shutdown audit responsibilities were handed over to local communities who now often rely on private auditing firms, so-called 'treasury management advisers', for financial consultation. This transfer of financial supervision to local councils was intended to give local authorities incentives to reduce costs for loans and financial audits.[35]

[34] For further details on the current local finance audit structure, see: https://www.gov.uk/government/collections/local-audit-framework-replacing-the-audit-commission as well as a report written by Transparency UK (pp. 34-41) for background information: http://sro.sussex.ac.uk/52109/1/Corruption_in_UK_Local_Government-_The_Mounting_Risks.pdf

[35] Interview with Ludovica Rogers and Joel Benjamin. For further details see also a report written by Transparency UK (pp. 34-41): http://sro.sussex.ac.uk/52109/1/Corruption_in_UK_Local_Government-_The_Mounting_Risks.pdf and https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/198057/Local_Audit_and_Accountability_Bill_-_plain_English_guide.pdf as well as the British local government news website http://www.localgov.co.uk/Betts-calls-for-inquiry-into-outrageous-LOBO-loans/38993.

However, many local councils are taking out so-called 'Lender Option Borrower Option' (short: LOBO) loans from private banks paying interest rates that are sometimes largely exceeding the interest rates of loans handed out by the government's Public Works Loans Board (PWLB).[36] Drawing on Freedom of Information (FOI) requests made by Debt Resistance UK, a documentary broadcasted on the British Channel 4 programme argued that one fifth of all council loans they regarded, that is 15 billion GBP, were LOBO loans. Debt Resistance UK and the documentary suggest that LOBO loan charges might be unfair and pose additional costs for local government which are hard to assess due to their complexity.[37] Debt Resistance UK, an informal group of researchers and activists, used public loan data in order to evaluate their costs for the public. The case shows that making data contained in loan contracts machine-readable played an essential role in enabling civil society scrutiny of financial decisions of governments. The case is especially interesting, since this information is not usually considered as a candidate to be published as open data as it would often be considered to be commercially confidential. The case shows that the legal status may hinder effective re-use of this information with potentially detrimental effects for public budgets.

Approach

Debt Resistance UK collects data of loan contracts between local governments and private banks by reading and analysing contract documents gathered through FOI requests. Based on initial analyses of council borrowing and investment tables, Debt Resistance UK sent about 300 FOI requests to more than 220 Councils inquiring about LOBO loans.[38] Since the data were requested via mySociety's website WhatDoTheyKnow, the councils' responses are now visible for the public. Requests addressed specific questions such as the number and types of LOBO loans per local council, the development of interest rates over time for each LOBO loan, the banks lending a loan, financial institutions advising to take out a loan and the broker processing a loan.[39] This information allowed the group to identify which councils are affected to what extend by LOBO loans, as well as the parties involved in advising and profiting from loans. In addition Debt

[36] The PWLB is statutory body operating within the United Kingdom Debt Management Office. It is dedicated "to lend money from the National Loans Fund to local authorities, and to collect the repayments". See also: http://www.dmo.gov.uk/index.aspx?page=PWLB/Introduction

[37] A LOBO loan's long-term duration of up to 70 years and its variable interest rates make it hard for local councils to estimate its overall costs without sophisticated pricing tools. Source: Interview with Ludovica Rogers and Joel Benjamin. See also: http://www.insidehousing.co.uk/lobos-explained/6502500.article, as well as a statement by ex-Barclays Capital employee Rob Carver: http://www.ianfraser.org/how-city-banks-and-brokers-stitched-up-local-authorities-with-lobo-loans/

[38] For council borrowing and investment tables see: https://www.gov.uk/government/statistics/local-authority-borrowing-and-investments-2014-to-2015 See also: http://data.parliament.uk/writtenevidence/committeeevidence.svc/evidencedocument/communities-and-local-government-committee/local-councils-and-lender-option-borrower-option-loans/written/26507.html

[39] See also: http://data.parliament.uk/writtenevidence/committeeevidence.svc/evidencedocument/communities-and-local-government-committee/local-councils-and-lender-option-borrower-option-loans/written/26507.html

Resistance UK requested whether the costs of LOBO loans had been benchmarked against government loans.[40]

If local governments refused to reveal loan contracts, Debt Resistance UK appealed against their decisions involving the British Information Commissioner. The group argued that access to LOBO loan contracts is a matter of public interest since their variable interest rates and exit clauses may pose important costs for public budgets. In all cases, the Information Commissioner ruled for the disclosure of the contracts, setting a precedent for open access to public loan contracts and against their treatment as commercially confidential.[41]

Most contracts were handed over in PDF format and had to be made machine-readable by transferring them into a publicly accessible database.[42] Contract data have been used for multiple analysis. Some of them are related to the loan costs themselves, such as cost development over time (in comparison to government loans), costs of early termination of a LOBO loan or differences in interest rates across councils. To do so the group collaborated with financial journalist Nick Dunbar, who analysed the data with specialised banking software using financial market information.[43] Nick Dunbar's analysis suggests that on average government loans are more expensive than LOBO loans, but that the total costs to exit a LOBO versus a government loan are twice as high.

Debt Resistance UK found that about 250 local councils have taken out LOBO loans from private banks advancing about 15 billion GBP. Some councils owed more than 1.5 billion GBP, in particular the councils of Newham and Cornwall.[44] The group also found that LOBO loan interest rates, terms and conditions vary from contract to contract prompting them to call for more centralised loan audits and investigations into unfair pricing discrimination.[45]

Other analyses looked at the composition and profits of private banks, treasury advisers and brokers, as well as how these parties relate to each other - an approach known from influence mapping. The Royal Bank of Scotland was discovered to have been handing out particularly

[40] Another information channel for loan contracts is the audit commission act: when local governments publish their accounts residents living in the area of government may object or question on local gov accounts. External auditor is obliged to write an answer or report.
[41] Interview with Ludovica Rogers and Joel Benjamin
[42] For an example of the data about LOBO loans gathered by Debt Resistance UK, see here: www.lada.debtresistance.uk/local-authorities/newham/.
[43] A short account explaining the complexity of such pricing models can be found here http://www.ianfraser.org/how-city-banks-and-brokers-stitched-up-local-authorities-with-lobo-loans/
[44] See also: http://www.channel4.com/programmes/dispatches/articles/all/how-councils-blow-your-millions
[45] LOBO loans may start with an interest rate of 0,1 per cent that may later be raised to more than seven per cent. See also: http://data.parliament.uk/writtenevidence/committeeevidence.svc/evidencedocument/communities-and-local-government-committee/local-councils-and-lender-option-borrower-option-loans/written/26507.html

complex and expensive loans whose legality was questioned.[46] Debt Resistance UK argued that service costs for advisers additionally increased costs for local councils. They also found that the majority of LOBO loans advised by Butlers and Sector, were mainly brokered by one firm. This finding raised questions about the independence of treasury management advisers, suggesting that they could have received commissions by brokers for advising loan contracts between local councils and private banks.

The Impact

Gathering public loan data was an important enabler for civil society actors to understand and calculate the costs and risks for local governments when taking out specific loans. It furthermore allowed to gather indications of a potential conflict of interest between private treasury management advisers and local councils. This conflict of interest, linked to commissions paid by brokers to treasury advisers, prompted MP Clive Betts, chairman of the Local Government Committee, to call for an inquiry of the case and a hearing within parliament. Subsequently, the Houses of Parliament held a session to collect oral evidence on the matter.[47] Debt Resistance UK

[46] Regarding loan contracts Debt Resistance UK was able to identify what is called „inverse floater" loans carrying more than twice the interest councils would otherwise be charged, including punitive break clauses, which cost more than the sum of the loan if the council were to exit them and are backed by derivatives - a practice deemed illegal in the *Hammersmith and Fulham vs Goldman Sachs case of 1989*.

[47] For further evidence reported during the parliamentary hearing see: http://data.parliament.uk/writtenevidence/committeeevidence.svc/evidencedocument/communities-and-local-government-committee/local-councils-and-lender-option-borrower-option-loans/oral/18808.pdf

recommended a full investigation in order to determine which LOBO loan contracts are illegal and/or illegitimate. A local councillor, Fiona Furgison, provided evidence on the restricted access to loan contracts she was facing within her council.[48] The hearing and the gathered evidence can be seen as precedents for a larger public debate around a public data infrastructure for public loans.

Subsequently, the National Audit Office, an institution auditing government bodies in the UK and the Department of Communities and Local Government (an agency responsible for local councils), expressed interest in entering into dialogue with members of Debt Resistance UK.

The case of LOBO loans demonstrates how the open use of public loan data enables civil society to understand and flag the detrimental effects of established fiscal oversight mechanisms and loans on public budgets. However, despite initial debates, institutional and legal responses are still missing that could address current audit procedures for local council finances, the potential illegality of LOBO loans or the design of transparency policies ensuring that both, elected councillors and broader publics are about the contracts and structures of public loans.

[48] See also: http://data.parliament.uk/writtenevidence/committeeevidence.svc/evidencedocument/communities-and-local-government-committee/local-councils-and-lender-option-borrower-option-loans/written/26507.html

Moj Vozduh – How an Air Quality App Helped Mobilising Civic Action Around Air Pollution in Macedonian Cities

Figure 13: Photographer Nicolas Raymond

Background

Macedonia's cities have the highest levels of air pollution in Europe, on some days hitting ten times the levels deemed acceptable by the World Health Organization and largely exceeding European standards.[49] Cities like Skopje, Bitola, Tetovo or Kavardaci are centers of heavy industries emitting large amounts of pollutants including particulate matter 10 and 2.5 (PM10 and PM 2.5).[50] PM10 and PM2.5 are air-borne dust particles, small enough to enter the respiratory tract. Because of their linkages to diseases such as cancer, heart diseases, asthma, or chronic bronchitis, PM10 and PM2.5 concentrations are a key indicator for air quality.[51]

Macedonia's air pollution is a highly contested political topic, debated on many fronts. On a European level improvements of air quality are a prerequisite for Macedonia's membership in the

[49] See also: http://www.who.int/mediacentre/news/releases/2011/air_pollution_20110926/en/, http://web.worldbank.org/archive/website01354/WEB/0__CO-52.HTM and http://web.worldbank.org/archive/website01354/WEB/0__CO-43.HTM

[50] The World Health Organisation defines PM 10 as air-borne dust; PM10 and PM2.5 is dust less than 10 and 2.5 microns in diameter. The smaller their diameter is the easier may pollutants be absorbed through respiratory channels. Source:

[51] See also: http://web.worldbank.org/archive/website01354/WEB/0__CO-52.HTM

EU. Oppositional political parties highlight the national government's lack of capacity to tackle the issue.[52] National and local governments debate measures to deal with main polluters including companies in the energy, metallurgy, oil and construction sectors, but also car exhausts and the heating of private households which still often rely on wood and oil. Technologies and practices such as air particle filters for heavy industries and mandates to sprinkle streets with a calcium-magnesium-acetate mix designed to capture air pollutants are highly contested among environmental activists and oppositional politicians.[53]

Responding to recommendations of the European Union, the Macedonian Ministry of Environment and Physical Planning built eleven air quality measurement stations in 2011 across the country, to measure air pollutants like carbon monoxide, ozone or particulate matter on an hourly basis.[54] This information is publicly accessible on the Ministry's website. The website contains data on air pollution, allowed limit values and political goals describing which target values are expected at which point in time as well as information about potential health risks. While this data has been publicly accessible for a while, it was apparently only when the data was transformed into an app that a larger spontaneous civic movement mobilized around the issue.

Approach

Several Macedonian environmental activist groups are dedicated to air pollution, such as Vozduh Sega (English: 'Air, Now'). The group uses official air pollution data measured by the Macedonian Ministry of Environment and Physical Planning in order to advocate for environmental reforms.[55] These data are combined with limit values recommended by the WHO in order to emphasize the discrepancy between the actual and legally allowed concentrations of air pollutants as well as statistics about possible health issues due to air pollutants. Based on these data Vozduh Sega formulated political demands complemented by best practices of other cities who succeeded in decreasing their air pollutant levels.

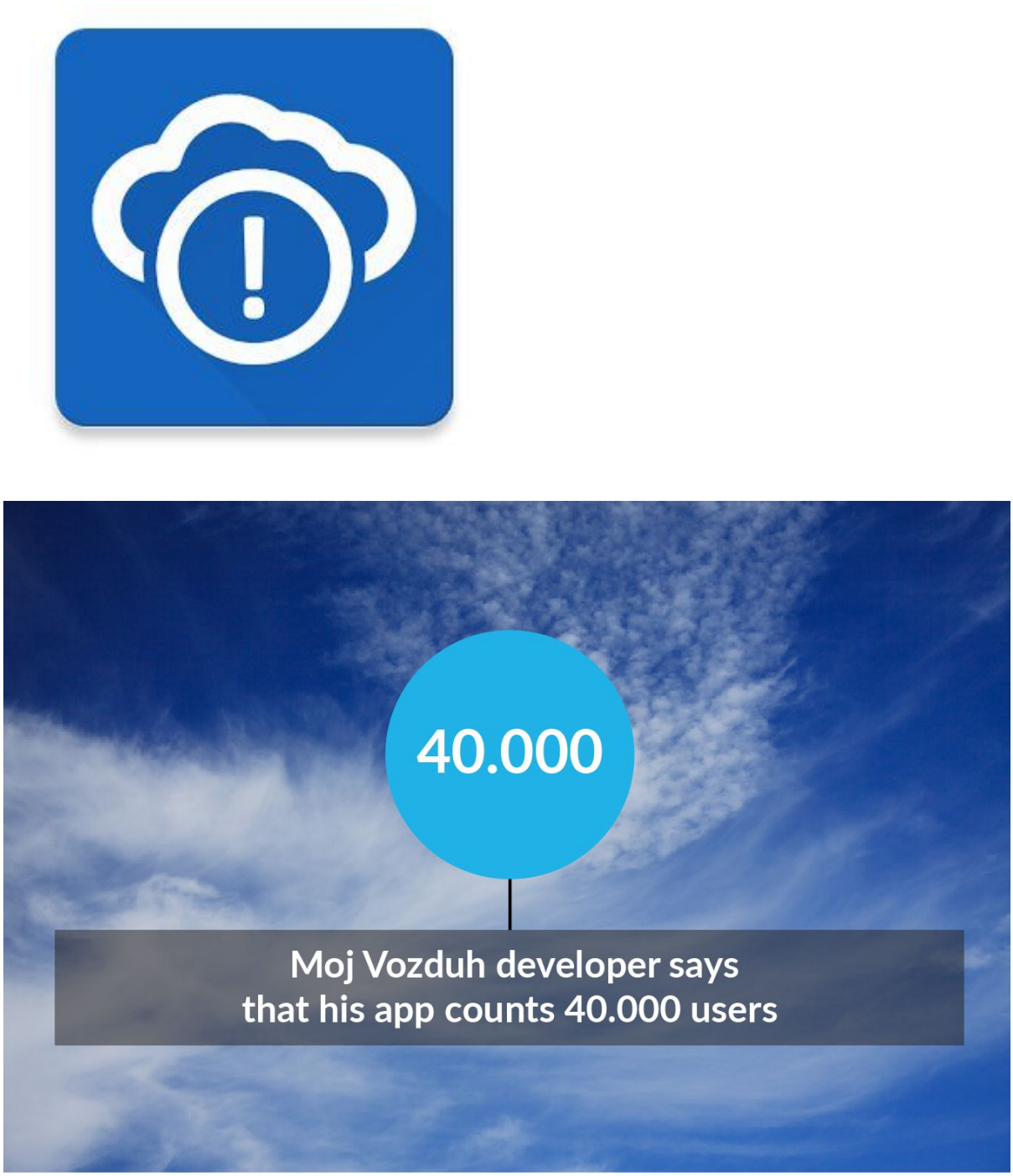
[52] See also: http://www.balkaninsight.com/en/article/macedonians-mull-more-protests-amid-deadly-smog-02-02-2016
[53] http://www.balkaninsight.com/en/article/macedonia-politicians-exchange-barbs-over-deadly-smog-11-25-2015 and http://en.inbox7.mk/?p=2261
[54] See also: http://airquality.moepp.gov.mk/?page_id=2096&station=Gazi%20Baba&lang=en
[55] Interview with a member of Vozduh Sega.

Figure 14: The interface of Moj Vozduh, showing a bar chart indicating current air pollution in a bar chart, and over time.

This data provided Vozduh Sega with important insights and advocacy material. However Vozduh Sega contends that the most powerful tool for their advocacy work was the application Moj Vozduh (English: 'My Air'). The app transforms official air pollution statistics into easily understandable visualizations, including levels of different air pollutants, their effects on health, contributors to air pollution and other influential factors such as wind direction and strength or other weather conditions.[56]

[56] The features of Moj Vozduh can be found under: http://mojvozduh.eu/

The Impact



Putting official statistics into a user-friendlier interface played an important role in pushing Macedonia's air pollution into the limelight. More people could engage with the topic, track air pollution on their phone and understand whether and to what extent they are immediately exposed to specific pollutants. Gorjan Jovanovski, developer of Moj Vozduh says that his app counts 40.000 users (date: February 2016). This is by itself an important asset for a country which only started to measure its air quality in 2011 and which still struggles with significant air pollution

to date. Using publicly accessible data enabled Jovanovski to scale this information and make it more accessible on mobile devices. Even though the data could not be downloaded in bulk and were not explicitly openly licensed, the 'open practices' of retrieving, visualizing and mashing up information in an interface conveyed significant benefits for the larger public who could now more easily access and understand the exposure to particular pollutants.

Moj Vozduh was launched in a particularly cold winter in 2014, when people had to burn large amounts of oil and wood to heat their houses. At its peak, air pollution was 20 times higher than European limits. Equipped with the app Moj Vozduh, citizen activism became more diversified after the harsh winter of 2014, and in more urban grassroots activism groups were formed using the app to understand air pollution and to advocate for political responses. Media reporting became more extensive, and citizen protest culminated in large demonstrations in the capital city Skopje.

Million-Dollar-Maps: Using Crime Data to Discover the Hidden Costs of Criminal Justice Policies in US Cities

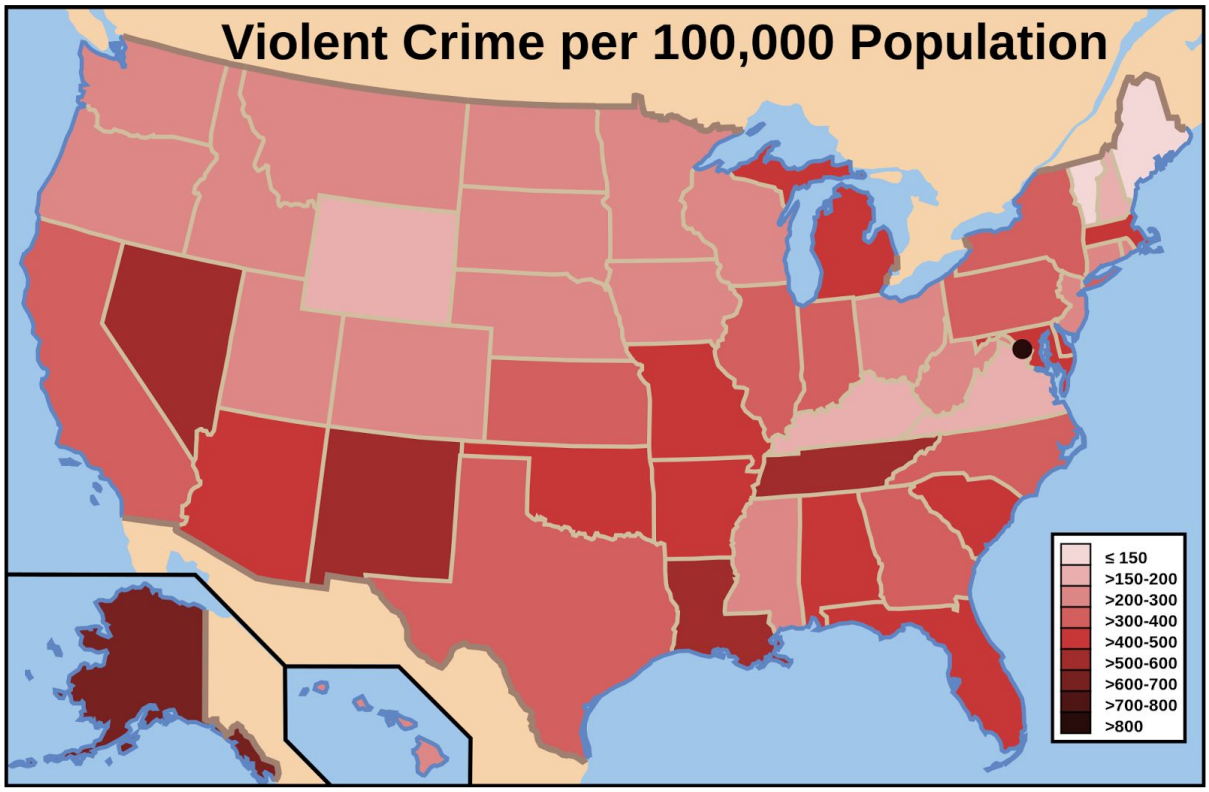


Figure 15:
https://upload.wikimedia.org/wikipedia/commons/thumb/a/a2/Map_of_US_Violent_Crime.svg/2000px-Map_of_US_Violent_Crime.svg.png

Background

Eddie Ellis was an inmate in New York State prison when he conducted experiments with a 'prisoner think tank' and discovered that 75 percent of New York State's entire prison population came from just seven neighbourhoods in New York City. His findings caught the attention of scholars and advocates of criminal justice reform who replicated Ellis' observation and showed that a disproportionate concentration of inmates in New York State comes from poor and isolated city blocks in New York City. Afterwards several projects showed similar findings for other major cities in the US. Criminal justice scholars argue that these numbers stem from criminal justice policies that shifted focus from poverty reduction policies to the 'systematic criminalization of most drug offenses'[57], significantly increasing incarceration rates in particular neighbourhoods.

[57] See also: Kurgan, Laura (2013): Close up at a distance. mapping, technology, and politics.

Laura Kurgan, Associate Professor of Architecture at Columbia University, studied the relationships between prison populations, poor communities and criminal justice policies. She was able to discover 'million-dollar blocks', i.e. blocks where incarceration costs run into millions of dollars, without effectively tackling poverty and socio-economic problems inmates are facing after re-entering society. To do so, she mapped the location of an inmate's home as well as data how much money is spent to imprison them. As Kurgan says, 'crime became the surrogate for poverty, and incarceration the primary response'[58]. This has important ramifications for the public since 'states are spending in excess of a million dollars per year to incarcerate the residents of single city blocks. When these people are released and re-enter their communities, roughly 40 percent do not stay more than three years before they are incarcerated again.'[59]

Approach

In order to visualize the concentration of inmates and to calculate the costs of incarceration for cities, Kurgan and her research team drew inspiration from crime maps visualizing the time and place of a crime. These maps are commonly used for community policing in order to detect crime 'hot-spots' and to focus law enforcement more effectively on the most affected neighbourhoods.

Laura Kurgan acquired incarceration data from criminal justice records collected by New York's Department of State Justice. This data included the type of offense and the length of the sentence, as well as the offender's residential address and the prison where an offender is incarcerated.

This enabled Kurgan and her research group to map the home addresses of inmates as they are admitted to prison, which are also the addresses to which they will most likely return upon release. By correlating this information with the amount of time spent in prison, the research team could highlight the costs of incarceration. These costs were derived from the dollar amounts per sentence length.

[58] See also: Kurgan, Laura (2013): Close up at a distance. mapping, technology, and politics.
[59] See also: Kurgan, Laura (2013): Close up at a distance. mapping, technology, and politics.

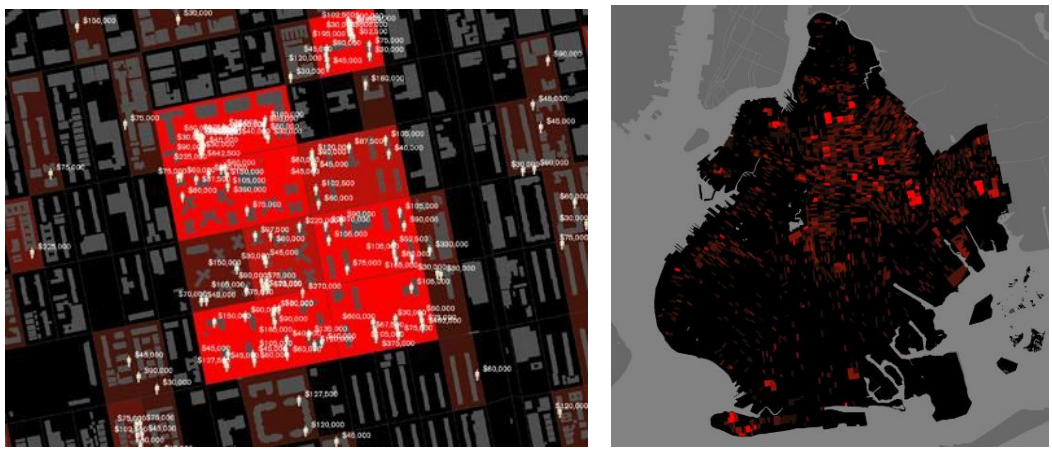


Figure 16: Map of million-dollar-blocks, showing the costs of incarceration per block (left) and the concentration of incarcerations in specific neighbourhoods

Laura Kurgan says that 'when [crime] maps are made [...], they often stop at the very first element: what crimes were committed and where.' She wanted to shift focus away from the geographic marking of crime events. As Kurgan says 'crime happens in many different places. But the people who are convicted and imprisoned for urban crimes are often quite densely concentrated geographically.'

Maps of "million dollar blocks" shed light on city neighbourhoods as the main environment in which inmates live, re-enter society and in which crime reduction measurements may be most effective.
However, as with all data related to individual persons, Kurgan emphasizes that those data have to be used responsibly, protecting the privacy of individuals. While a crime can easier be detached from the person committing the crime, using data about a person's origin demands sensitivity to their privacy. Laura Kurgan addressed this by aggregating the home addresses of inmates as city blocks.

Impact

The shift from crime maps to maps of incarceration costs allowed advocates of criminal justice reform to highlight the effects of current criminal justice policies. It informed politicians and crime justice groups to invest crime prevention and re-entry programs in neighbourhoods with disproportionately high numbers of incarcerated inmates. Governments responded to the issue through the 'Justice Reinvestment Act' enacted by the Council of State Governments. Its official website states that:

'Justice reinvestment is a data-driven approach to improve public safety, reduce corrections and related criminal justice spending, and reinvest savings in strategies that can decrease crime and reduce recidivism.'[60]

The Justice Reinvestment Act is an umbrella project to gather data, stakeholder ideas and research input to develop state-specific solutions. Laura Kurgan says that the Justice Reinvestment Act indicates a shift in the US criminal justice system and is an important step to rethink which government institutions and policies most effectively prevent from crime.

Inmates face punishments when they re-enter their community. Some have difficulties to find a flat on the public housing market, others have difficulties to find an employee that would hire them. The 'million-dollar-maps' helped Laura Kurgan to support communities in New Orleans to set up re-entry programs for inmates in the most affected neighbourhoods. The Common Ground project and the Brownsville Partnership are two organisations offering school programs and other help to former inmates in Brownsville, New Orleans.

[60] See also: https://csgjusticecenter.org/jr/about/

DISCUSSION

Data infrastructures can play an important role in enabling civil society groups to mobilise and obtain progress around city issues they care about – including through raising awareness around their concerns, coordinating action, facilitating communication and collaboration with government agencies, and influencing urban governance and policies. Their capacities to achieve beneficial outcomes for urban regions are intertwined with public information systems which shape and support these actions through the creation, aggregation, analysis and publication of data. However, public information systems should be considered as a site of contestation rather than merely as a "raw" resource that can be exploited. Our case studies highlight how official data is often creatively repurposed, aggregated or augmented with other data sources in the context of evolving data infrastructures which are attuned to the specific needs and interests of civil society actors. These data infrastructures can be used to:

- **Identify spaces for intervention**. Having cadastral data at hand helped civic actors to identify vacant publicly-owned land, to highlight possibilities for re-using it and to foster community building in neighbourhoods around its re-use.
- **Open spaces for accountability**. Using government's own accounting measurements may provide civil society with evaluation criteria for the effectiveness of public sector programs. Civil society actors may develop a 'common ground' or 'common language' for engaging with institutions around the issues that they care about.
- **Enable scrutiny of official processes, institutional mechanisms and their effects** . By opening public loan data, civil society was able to identify how decentralised fiscal audit mechanisms may have negative effects on public debt.
- **Change the way an issue is framed or perceived**. By using aggregated, anonymized data about home addresses of inmates, scholars could shift focus from crime location to the origin of an offender – which helped to address social re-entry programs more effectively.
- **Mobilize community engagement and civic activism**. Including facilitating the assembly and organisation of publics around issues.

Our cases demonstrate a wide range of different kinds of "data work" by civil society actors, including to:

- Combine existing open government data with other publicly available data sources in order to **verify the accuracy of government data,**

- **Complement government data with on-site investigations** in cases where government data is absent but can be gathered independently by citizens,
- Creatively repurpose existing government data to **highlight aspects of an issue government data is not necessarily intended to convey,**
- Use data about public service delivery to **derive evaluation criteria for social audits,**
- **Combine information** provided through government data **with supporting knowledge** such as legal advice, technical and topical expertise in order **to enhance capacities to engage with governments or hold them to account,**
- Use evidence derived from government data to **collaborate with government bodies whose work is aligned with civil society issue agendas.**

While some practices in this list aim to enhance the understanding of an issue by combining multiple data sources, the last three practices aim to develop means of engaging with a government that go beyond the mere use of data. Here official data may play a role in articulating space in which to engaging with public institutions.

As our case studies show, these capacities and subsequent actions may leverage progress towards a range of goals – and sometimes can directly lead to desired outputs such as the creation of community-owned green spaces or the completion of public infrastructure projects. When combined with expertise to navigate legal and political mechanisms of government, these data infrastructures may enable civil society to actively engage with the processes that shape urban life.

Rather than making the case for broad correlations between the widespread availability of data and specific policy outcomes, our case studies are intended to spark imagination and conversation about the role that public data infrastructures may play in civic life – not just as neutral instruments for creating knowledge, but also as devices to organise publics and evidence around urban issues; creating shared spaces for public participation and deliberation around official processes and institutions; and securing progress around major social, economic and environmental challenges that cities face.

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