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Community-Based Data Justice: *A Model for Data Collection in Informal Urban Settlements*

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Abstract

Non-governmental organizations (NGOs) have become important curators of data from informal urban settlements. Given the absence of these communities in public datasets, they work to take informal settlements from a state of invisibility and injustice to one of visibility and justice, in and through data. The working premise of these NGOs is that by producing data about informal settlements, data can act as a "currency" through which individuals can access different forms of justice. However, the literature that studies datafication in marginalized urban communities shows this is not always the case. Data scholars have pointed out that datafication implies a series of risks, as well as new forms of exclusion and inequality for vulnerable populations and minorities. This paper studies, through the analysis of interviews of residents of informal settlements in Lima, Peru, whether intensive data collection in informal settlements is considered a process to access justice by vulnerable communities.

The study concludes that in the short term, datafication does not give access to justice to vulnerable communities but in fact, deepens or reproduces instances of oppression by reinforcing the perception of their lack of knowledge, lack of capabilities or lack of authority to use data to lead their own development. However, participating in the process of datafication sparked an interest among community leaders about the different ways in which data could be used to further their capabilities, mobilize collective action and address their development needs. Community leaders are interested and willing to use data in constructive ways to collaborate with diverse actors and transform their conditions. However, this interest, power and potential needs to be activated through capability development and the cooperation of data partners willing to invest their resources to provide this training. The paper closes with a list of recommendations, suggested by community leaders from informal settlements, on how to build a community-based data collection model that redresses harms and individual forms of injustice from previous experiences.

A. Introduction

> "As a society we have learned to perpetuate inequality by building walls, gates and divisions that go beyond the physical and reinforce the idea that the city is only for a few people" (TECHO–Perú, 2018)

In Peru, and most parts of Latin America and the wider global South, the state does not collect basic data about the living conditions of informal settlements. Their absence results in a two-tiered system of citizenship. Those who live in informal settlements and their needs remain invisible in public data and as a result are not considered as part of the urban reality of the city (Canales and Maulen, 2011). This new form of invisibility reinforces a historical inequality that Peruvian anthropologist José Matos Mar has described as the existence of two Perus: the "official Peru" made up of formal institutions and the "marginalized Peru" made up of urban masses that operate in clandestinity (see also Plöger, 2012).

In response to this situation, non-governmental organizations (NGOs) have become important curators of data from informal urban settlements in Peru. In particular, the NGO TECHO–Perú, the Peruvian branch of TECHO – an organization with over 15 years of experience working on social development and affordable housing projects in contexts of urban poverty – is producing datasets about life in local informal settlements through a cadastral survey or *Relevamiento*[1] in Spanish. Through this data-intensive work, TECHO–Perú is attempting to integrate the "marginalized Peru" into a "datafied official Peru" and improve the representation of the former's needs in public policies (TECHO–Perú, 2018). In other words, the aim of their work is to take informal settlements from a state of invisibility and injustice to one of visibility and justice in and through data.

This study takes a closer look at this assumption: that intensive data collection in informal settlements can be a process to access justice for vulnerable communities. The working premise of the *Relevamiento* is that the "the violation of rights in informal settlements is furthered by the absence of data" (TECHO–Perú, 2018). By producing data about informal settlements, TECHO–Perú implies data can act as a "currency" through which individuals can exercise their rights and access different forms of justice. However, the literature that studies datafication in marginalized urban communities shows this is not always the case. Data scholars have pointed out that datafication implies a series of risks, as well as new forms of exclusion and inequality for vulnerable populations and minorities (Donovan, 2012; Heeks and Renken, 2018). Data gathering is increasingly being theorized as a form of dispossession (Thatcher et al., 2016) that benefits external actors who have the resources to use the information, more than community members who provide their data (Heeks and Shekhar, 2019). This study explores these issues from the perspective of the residents of informal settlements: What does this data-intensive process mean for them? Do they consider that gaining "visibility" through data is a means to access justice? Or do they believe it will deepen their risk of further exclusion or deprivation?

[1] The *Relevamiento* is an adaptation of a traditional cadastral survey. The cadastral survey focuses on collecting information about land property in informal settlements. The *Relevamiento* collected this information, as is explained in Section B, but it also collected socio-cultural information about life in these spaces.

The paper will first provide context to the Relevamiento conducted by TECHO–Perú. It then provides an overview of Iris Marion Young's approach to justice (1990, 2006) and explains how we used her understanding of oppression to think about access to justice in data-related activities in informal settlements. The Methods section describes our process to collect testimonies from community members who live in one particular informal settlement of Lima – San Juan de Miraflores (SJM) – and the methodological tools we used to interpret their participation as well as their refusal to participate in our study. The Findings section describes the common themes that emerged in testimonies regarding data-related activities in informal settlements, analyzed using Young's concepts. And the Discussion section elaborates on how these findings and the experience of SJM can inform a community-based data justice model.

This work aims to contribute to a broader understanding of the concept of "data justice" as theorized in early works by Heeks & Renken (2018) and Taylor (2017). The community-based data justice model can also be a useful tool for data intermediaries like TECHO–Perú that are working overtime with limited resources to bring justice and equity to communities fraught by urban poverty. But above all, this paper hopes to be a platform from which the voices of community members of SJM can inform the design and reduce the harm of future data practices implemented by development practitioners in vulnerable communities.

B. Background

B1. Datafying Informal Settlements in Lima

Over the past few years, attention has been placed on the importance of creating datasets from developing countries and marginalized urban communities as a means to improve their representation in the production of knowledge and information (Graham et al., 2012). The open data movement in particular, as part of its mission to promote access to knowledge, advocates for bottom-up production of urban datasets in rapidly transforming urban societies (Liu et al., 2015). According to data scholars, the production of data about marginalized communities can contribute to more diverse knowledge production, as it opens up new research opportunities in urban studies and planning (Crooks et al., 2015), as well as contributing to the inclusion of these communities in urban planning and management (Chakraborty et al., 2015). Others have argued, from a more critical standpoint, that the datafication of informal settlements can be tied to efforts of policy makers to reduce complexity in governance. Kevin Donovan (2012) draws from James Scott's *Seeing like a State* (1998) to reflect on how the turn to datafication is part of a larger effort of state-led "simplification" and "standardization" that enables powerful entities to maintain political control over diverse communities[2]. In all cases, data is conceived as a means to activate political will and mobilize policy makers to include informal settlements in public policy.

This rationale has been picked up in Latin America. Tamara Canales and Andrea Maulen (2011) who studied "invisibilization" of informal settlements in Chile argue the absence of data about informal settlements in "official figures" makes it impossible for these spaces to be "quantified, intervened and considered" in public policy and urban planning. Similar to other initiatives around the world that open up data of informal settlements such as Map Kibera or Map Mathare from Kenya, TECHO–Perú's work is a response to "the urgency to make *visible* the conditions of poverty and vulnerability in which informal settlers live" in Latin America (TECHO–Perú, 2018).

In the specific case of Lima, TECHO–Perú (2018) suggests that the invisibility of informal settlements in public policy disqualifies the sector as a potential area of public investment, leaving its communities in a situation of precarious access to services and territorial segregation. Furthermore, they argue that collecting this data can also stimulate citizen action. As in the case of Map Kibera, the absence of an open, up-to-date dataset about informal settlements, "leaves their [residents] disempowered and unable to use information to solve problems", excluding them from debates that influence policy and from the possibility of using this information to drive their own development (Hagen, 2011).

With these objectives in mind, TECHO designed the *Relevamiento* project*:* a large-scale regional effort to generate information to locate, quantify and develop a socio-territorial characterization (who lives there, types of organizations, needs, etc.) of informal

[2] Both Scott and Donovan warn that this over-simplification is against the interest of the public. It threatens to reduce the public's political autonomy and their ability to participate in decision making. In the words of Donovan: "What changes through state simplification is that information becomes accessible on a larger scale, one where community ties are less influential." (Donovan, 2012).

settlements in Latin America. The data collection methodology was designed by the Centre for Social Research (CSR) of TECHO in Chile and mainstreamed across local branches of TECHO in Latin America. So far the cadaster or *Relevamiento* has been done in Argentina, Chile, Costa Rica, Nicaragua and Uruguay at the national level, and in Guatemala City, Bogotá, Asunción, Turgua and Lima at the city level. In Peru, the *Relevamiento* was conducted in the district of San Juan de Miraflores (see Figure 1), one of the five areas with the highest concentrations of urban poverty in Lima, according to the Ministry of Development and Social Inclusion[3]. This district has a total population of 432,282 people and is also considered the 8th most populated district in Lima hosting approximately 5% of the total population (TECHO–Perú, 2018).

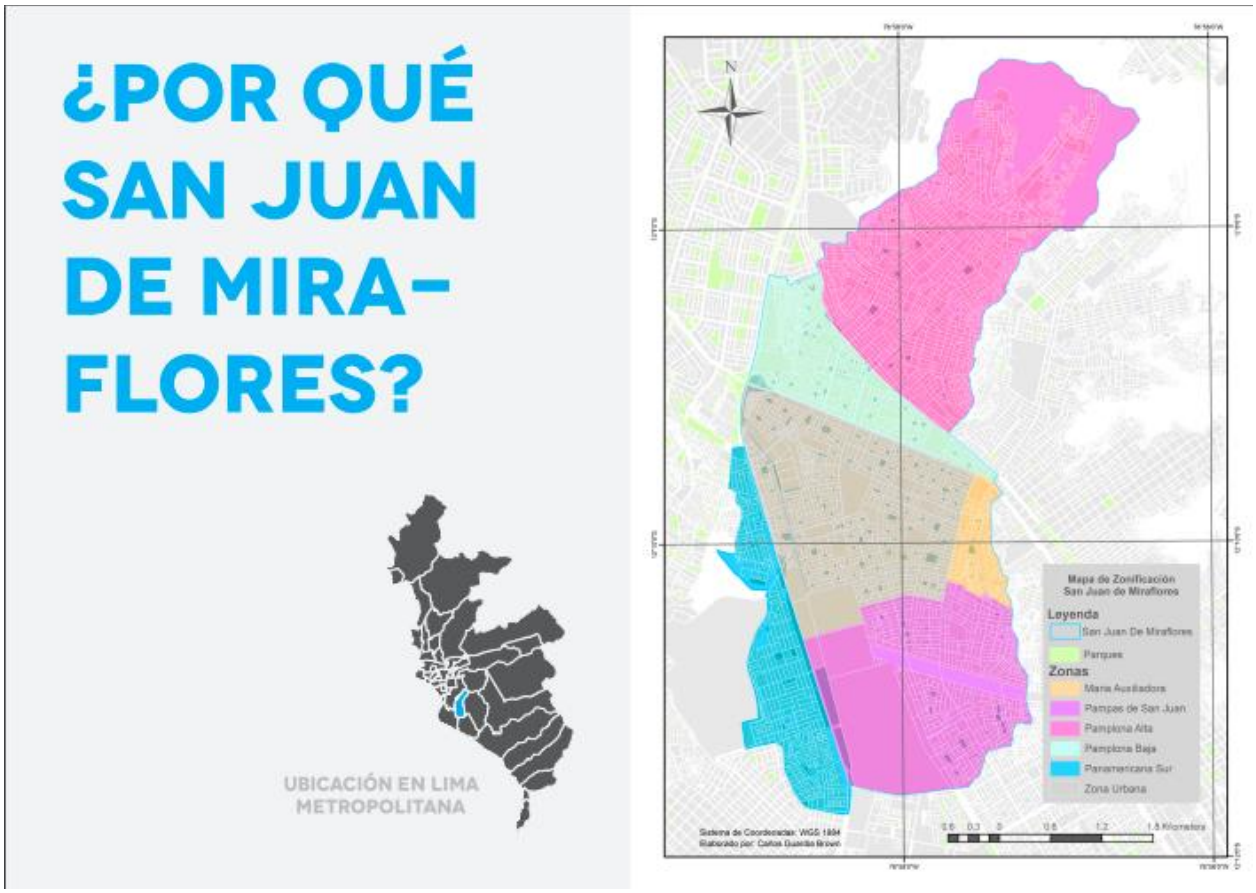

Figure 1: Map of the districts of SJM. Retrieved from the Relevamiento report (TECHO–Perú, 2018)

The main data collection instrument was a survey designed by TECHO's CSR to collect socio-territorial and geo-referenced data of the settlements in a standardized manner. Before deploying the questions, TECHO–Perú adapted the survey to the local context. They held a meeting with diverse actors that included state representatives, academics, community leaders from SJM, civil society organizations and private sector entities. The feedback

[3] In Lima, 3.6 million people – from a total population of 9.3 million – live in urban poverty (Redacción Gestión, 2017). Most of the urban poor live in "urban marginal cities", areas characterized by the total or partial absence of infrastructure and basic services such as water network, electric energy or drainage system (Dede, 2018; Ministerio de Vivienda, 2017). Informal settlements are sub-sets of urban marginal cities where more than half of the population do not have a property title (TECHO–Perú, 2018).

provided in this meeting was incorporated into the survey. The survey was then conducted in SJM by 10 staff members and 300 volunteers (see Figure 2) who were trained to collect data and survey every household in SJM between October 2017 and June 2018[4]. The data collection was conducted using Kobo Toolbox, an open source digital app developed by the Harvard Humanitarian Initiative, designed for non-governmental organizations that conduct research in the midst of humanitarian crises. According to TECHO–Perú (2018), Kobo Toolbox allowed them to work more efficiently, since it automatically generated an online database, aggregated the data and mapped the geo-referenced coordinates of the informal settlements.

The results of the *Relevamiento* were published in 2018 and it made available unprecedented data about SJM. It identified 138 informal settlements within SJM and estimated that at least 46,755 families live in a situation of informality, which represents 10.8% of the total population. It collected information regarding their lack of access to services: finding that 91% of informal settlements do not have access to the public water network, 92% do not have a drainage system, and 97% of settlements do not have property titles. It also collected information about community governance and social relations between SJM residents. It found that 80% of residents appreciate community solidarity and that 95% of settlements have a community board[5] recognized by the local municipality. It concluded that informal settlements are predominantly political spaces where "governance is characterized by self-management of their territories and the struggle for their rights" (TECHO–Perú, 2018).

The data was published in an open data portal and presented to Congress representatives, SJM community leaders and civil society organizations. So far, its publication has inspired a working group in the Peruvian Congress to address the main problems affecting informal settlements and has also been picked up by local media. According to the Executive Director of TECHO–Perú, it has not impacted public policy at a large scale, but they have been successful at initiating a public conversation. It is still unclear whether community members consider this data-intensive process has created new opportunities to access justice for them or not.

[4] TECHO–PERÚ staff mentioned that about five informal settlements within SJM refused to participate in the *Relevamiento.*

[5] Community boards are groups of "neighbors" or individuals who mobilize and lead community governance. They are democratically elected and are chosen to lead social development programs to improve community infrastructure (TECHO–Perú, 2018).

Figure 2: Volunteers heading to conduct surveys in SJM. Retrieved from Relevamiento report (TECHO–Perú, 2018)

B2. Investigating Data Justice using Concepts Developed by Iris Marion Young

To investigate access to justice through data we turn to the work of Iris Marion Young (1990, 2006); specifically her conceptualization of structural injustice and how it can be challenged. Young defines social justice as "the elimination of institutionalized domination and oppression" (1990, p 15); where domination and oppression refer to institutional constraints that prevent individuals from developing their capacities, expressing their needs, thoughts and feelings, and participating in discussions related to decisions that directly or indirectly influence their lives (Young, 1990; Uhde, 2010). This conception of injustice and oppression is structural. Young argues justice is not the result of a specific choice, policy or program (1990, p 5), but that these power dynamics are sustained by the norms, rules and practices present in the social, economic and political structures in which we participate. In our case study, this prods us to look beyond the effects of the *Relevamiento* itself, and to consider if this initiative is contributing to larger social and cultural dynamics that produce injustice.

According to Young, structural domination and oppression constrain the self-determination and self-development of social groups[6] in different ways, affecting the power and capabilities they have to make decisions about their own lives.

[6] Young defines a social group as a collective of persons differentiated from at least one other group by cultural forms, practices, or way of life. Members of a group have a specific affinity with one another because of their similar experience or way of life, which prompts them to associate with one another more than with those not identified with the group, or in a different way (Young, 1990).

> "Structural injustice exists when social processes put large categories of persons under a systematic threat of domination or deprivation of the means to develop and exercise their capacities, at the same time as these processes enable others to dominate or have a wide range of opportunities for developing and exercising their capacities." (Young, 2006, p 114)

To determine if a social group is oppressed, Young describes five forms of oppression, from which we draw three: exploitation, marginalization and powerlessness (see Table 1)[7]. These concepts are grouped into a sub-category of injustices that lead to the work and social contribution of individuals not being recognized in society (Uhde, 2010). These concepts are useful to understand if those who participated in the data collection process led by TECHO–Perú perceive datafication as a process that sustains or challenges former or current experiences of oppression.

Concept	**Definition**	**Pathway to justice**
Exploitation	The social process by which the results of work performed by one social group are appropriated to benefit another	Reorganization of institutions and practices of decision making and alteration of the division of labor
Marginalization	A social group is expelled from useful participation in social life, and experiences uselessness, boredom, and lack of self-respect	Establishing cultural, practical, and institutionalized conditions for exercising capacities in a context of recognition and interaction
Powerlessness	A social group experiences lack of authority, lack of decision making power and exposure to disrespectful treatment	Capability development and creating conditions in which those who hold power recognize the authority, expertise and influence of the social group

Table 1: Summary of analytical framework concepts retrieved from Young (2012)

Young also sheds light on how oppressed social groups can take action to access justice. In the social connection model of responsibility[8] she develops in *Responsibility and Global Justice* (2006), she explains that every individual who participates in economic, social or cultural processes, including those who experience oppression, bears a degree of responsibility for the unjust outcomes they produce (Young, 2006). Even though this may sound counter-intuitive, this definition recognizes that groups who are usually perceived as the victims of injustice have the power to change their conditions through collective action. They not only have a greater interest in structural transformation, but also have unique insights into the sources of structural injustice. In this sense, remedying injustice involves creating the institutional conditions in which oppressed groups can harness their power to change their conditions. While identifying what these conditions should be was out of the scope of this study, we sought to recognize these unique insights by documenting the

[7] The other two concepts are violence and cultural imperialism (Young, 1990).

[8] For more detail, see features of the Social Connection Model of Responsibility in the Annex.

recommendations of community members on how datafication could create new opportunities for capability development and collective action.

Overall, Young's approach to social justice is useful to evaluate how the global turn to datafication is impacting local communities, and in particular, how the social processes that arise from datafication may put vulnerable communities at risk of further domination or deprivation. At the same time, there is an instrumental value to investigating data-related dynamics from the perspective of community members. Through the concepts developed by Young, we could assess if community members consider datafication furthers relations of oppression, or if it activates their agency and affords them opportunities to engage in collective action to transform their conditions through data. A summary of our approach is presented in Table 2.

Research question	**Research concepts developed by Marion Young (1990, 2006)**	**Insight these concepts provide regarding justice and data**
Do community members consider the *Relevamiento* offers a means to access justice?	Conceptualization of injustice and five faces of oppression	Understand how data collection processes can sustain or challenge structural injustice from the community perspective
Do community members consider the *Relevamiento* enabled them to take action to remedy injustice?	Parameters social groups can use for thinking about their own action in relation to structural injustice	Understand if data collection practices enable or constrain vulnerable populations to take action to remedy injustice

Table 2: Applying Young's concepts to assess community perspectives on access to justice through data

C. Methods

To learn about community perspectives, we conducted four in-depth unstructured interviews with SJM community leaders (or *dirigentes*) that mobilize social development programs within SJM and who are the point of contact for TECHO–Perú. For the interview itself, we used open-ended interview schedules that guided the conversation along the lines of the aforementioned themes. The interviews were then analyzed by the research team to identify common themes that capture the perspectives of SJM community members regarding the collection and use of their data in urban planning processes such as the *Relevamiento*. This approach was inspired by the work of Tawana Petty, Mariella Saba, Tamika Lewis, Seeta Peña Gangadharan and Kim M. Reynolds in *Our Data Bodies Project* (Petty et al., 2018). This report collected testimonies of individuals who are targeted for intensive data collection "as they confront data collection and data-driven systems in the process of meeting their basic human needs" in order to "identify commonalities and differences" between those testimonies while honoring the diverse histories and contexts of interviewees (2018, p 2). Drawing from their methodology, we analyzed the perceptions that inform the decisions SJM community members are making regarding data-related activities and sought to emphasize how these emerge in a particular context of structural injustice.

We also consulted ethnographic methods designed to negate extractive forms of knowledge production that privilege our research interests over those of the community we were interviewing. Max Liboiron (2018) and her team at the Civic Laboratory for Environmental Action Research in Newfoundland have been exploring what community peer review might look like and how to iteratively check in with researched communities to ensure consent over time. In this spirit, we created opportunities to obtain input and reiterative consent both from TECHO–Perú and the SJM community. For six months, we held several meetings with TECHO–Perú and collaborated with their staff to design the research process. This involved requesting their input regarding research deliverables, such as the funding proposal and the study write-up, requesting their consent whenever there was a change in research scope and making a commitment to work together at the completion of the study to translate research findings into actionable data collection strategies. The relationship with the SJM community was mediated by TECHO–Perú (e.g., see Figure 3). All of the interviews with community leaders were coordinated by the Research Director of TECHO–Perú, conducted along with a TECHO–Perú volunteer and held in SJM around the availability of community leaders. We took these measures to ensure the research did not harm the relationship of trust that has been built between SJM and TECHO–Perú over the past 15 years.

In spite of these efforts, many community members refused to participate in our study. We initially hoped to conduct at least ten interviews with community leaders. The process of contacting them, setting a time to visit the informal settlements and securing their availability took three months, and only four interviews were secured. Eight community members refused or were unavailable to participate.

Figure 3: Maria Falcone, community leader; Brennda Huarcaya, TECHO–Perú volunteer; and Denisse Albornoz, author. Photo requested by Ms. Falcone, taken and used with her consent; May 2019

Ruha Benjamin (2016) has worked on the concept of "informed refusal" and how expressing refusal creates new, more equitable relationships between researchers and researched communities. Indigenous scholar Audra Simpson (2007) also describes the choice of refusal as an articulation "to ourselves and to outsiders" of "who we are, who you are and these are my rights". We interpret their refusal as an intention to set boundaries with TECHO–Perú and our organization regarding the use of their time and their information. Kim Tall Bear (2013) also prods us to consider these silences "as productive and supportive" of the self-determination of social groups (Benjamin, 2016). Future data justice research that seeks to involve the perspectives of communities who are constantly the target of data collection must be aware of these constraints and allow for refusal and silence to inform and adapt the research timeline in constructive ways.

Finally, to complement the interviews, we also conducted desktop research about informal settlements in Peru and TECHO–Perú´s research methodologies, and undertook two interviews with TECHO–Perú staff who participated in the design or implementation of the *Relevamiento*. With this information, we sought to contextualize the information provided by community members regarding the involvement of TECHO–Perú in SJM and learn more about community partnerships with the organization.

D. Findings

This section summarizes our findings to address our two research questions, that address: a) if community members of SJM consider datafication – or acquiring visibility through data – a process through which they can access justice as operationalized by Young; and b) if community members of SJM consider datafication a process through which they can develop capabilities and activate collective action to remedy injustice.

D1. Datafication as a Process to Access Justice

Through the interviews, we found that community members spoke favorably about the intention to systematize and standardize the problems of SJM with the *Relevamiento*. However, interviewees also provided examples of how the data collection process and its aftermath is sustaining experiences of Young's three forms of oppression – powerlessness, exploitation and marginalization – that already exist within the community of SJM.

Datafication and powerlessness[9]

We found that participating in the *Relevamiento* impacted the community's perceptions regarding their own power in three ways. First, SJM community leaders believe the *Relevamiento* and the production of a data-based report about SJM, could empower them to make more objective and effective diagnosis of their development problems.

> *"The Relevamiento is very important. Our work needs to be based on a diagnosis. Imagine if we start working without knowing anything and we do everything based on our opinion. Suddenly we will leave aside the highest priority for the community. If you do not work with a diagnosis, you do not have a good result. Thanks to TECHO–Perú we have been able to identify our priorities."*

> *"We have worked with data [before]. We [used it to make] a short and medium-term schedule. This is how we built our stepped pathways and obtained street lighting. That schedule was done with TECHO–Perú and with their orientation."*

The turn towards data-driven planning is not only in demand at the policy level, but is now becoming increasingly valued at the community level as well, most likely as a result of exposure to datafication processes. This also implies that other ways of knowing based on intuition, opinions or lived experiences are perceived as less valid or useful to plan and execute community programming than data-intensive approaches. In the long run, the growing pervasiveness of data collection exercises in the community may impact the forms of knowledge the community welcomes, values and desires to describe their context.

Second, the data produced through the *Relevamiento* was thought of as a tool they could use to challenge their own sense of powerlessness in front of more powerful actors. In particular, community members who considered data to be a source of legitimacy and authority, thought the *Relevamiento* could enable them to communicate on more equitable terms with three individuals and institutions. First, the municipal government authorities:

[9] This section summarizes findings that speak to whether datafication furthers powerlessness – be it by furthering a sense of lack of authority, a feeling of incapability, or exposure to disrespectful treatment.

who have most power and political interest to improve the living conditions of SJM. Second, central government authorities such as Congress representatives and policy makers who can steer political will and public narratives surrounding informal settlements. And third, research and civil society organizations who regularly visit informal settlements and request up-to-date data to understand the needs of the community and plan the scope of their work.

> *"When the survey began, municipality authorities said: "we are going to support and listen to everyone". The municipality was very willing to support the Relevamiento and use the data to support the needs that we have in the future. And who better than the municipality, to implement and make the most of the results of the Relevamiento?*"

> *"There are several [civil society] organizations that come in to work and require information. Such as how many women currently live in the community, or what are the occupations of our neighbors. It would be important for me to be able to use the data collected by the Relevamiento to provide them this information."*

However, most community members mentioned having the data in and of itself is not enough to use it effectively to enable collaboration. They emphasized the crucial role played by TECHO–Perú as an intermediary that should not only collect and share this data, but should also provide advice on how to use it strategically to mobilize power and resources. The expectation to continue working with TECHO–Perú is grounded in the trust the SJM community has placed in the organization, however it also threatens to generate dependency on the organization and further the notion that the community is incapable of using data to obtain support from powerful actors without their mediation.

And third, community leaders consider the *Relevamiento* is an opportunity to challenge misleading discourses about informal settlements and what life is like in these spaces. Culturally, those who live in informal settlements are subject to racism, classism and other forms of oppressive discourses that portray the members of settlements as informal, illegal and invisible outsiders, and are used to delegitimize their perspectives and expectations of development (Sakay et al., 2011). Community members believe that these discourses are not only held by the general public, but also by decision makers such as policy makers or public service providers. In their view, becoming visible through data is an opportunity to speak to these actors, tell their stories in their complexity and mostly, to be heard with empathy. However, some community leaders felt the questions asked in the survey of the *Relevamiento* did not give them this opportunity:

> *"There were a lot of questions missing in the questionnaire*[10]*. Sometimes I thought: 'I want you to ask me this' but it was not in the questionnaire. The questions lacked...empathy. They did not ask: Why is the community like this? Why have you not progressed? I would have liked to be asked questions about why we do not have*

[10] TECHO–Perú staff explained that even though they sought to include more qualitative questions in the questionnaire, they were constrained by the standardized survey designed by the Centre for Social Research from TECHO in Chile. The regional branch from Chile had encouraged them to use the same questions to make comparative analyses across the region.

> *property titles until now. I have plenty of stories. Stories about terrorism, crime in the area. There are a lot of topics to be heard about."*

They expressed discomfort about how the data produced by the *Relevamiento* will now shape what people know about SJM without providing the context or a more comprehensive explanation that humanizes informal settlers. As a result, one of their fears is that the final diagnosis produced by the *Relevamiento* misrepresents their reality, and does not get to the deeper structural factors that facilitate or constrain their development. Furthermore, if community members cannot verify what story is being told by the data, they will not be able to identify whether this narrative is harmful to their community and if so, make informed decisions regarding the impact of future data collection activities:

> *"The fear is that the information is not real, that it does not reflect our needs and that only some [people] have been represented [in the data]. That the final results don't reflect what we really want. The intentions behind this work have been really good but we worry that we will look at the information and think: what is this good for? We do not know if this is the case, because we have not seen it. Only after seeing the results, we will know if the job is well done. If it reflects the real needs. Only then we can talk about solutions."*

This problem was also evident in an anecdote told by the Executive Director of TECHO–Perú. When a local newspaper shared the results of the *Relevamiento* (Rosas, 2018), it emphasized the unsafe living conditions of SJM. While TECHO–Perú thought this was a great opportunity to raise awareness about urban poverty in Lima, community leaders were disappointed with the coverage. They felt that the report oversimplified the problem and did not highlight the community-led initiatives to reduce the risks. This discomfort suggests that the data collection and dissemination process, as it is currently designed, is not determined by how community members choose to tell their stories, but is rather ruled by what intermediaries such as TECHO–Perú believe will be most effective approach to obtain institutional attention and support. In this sense the interests, priorities and decisions of the intermediary prevail over those of the community.

Datafication and exploitation[11]

We found that exploitation manifested in two ways. First, there is a general perception that community leaders who participated in the *Relevamiento* have not benefited from having participated. Two years have passed since the *Relevamiento* was conducted and to this date, many remain uncertain about how this data is being used, who is using it and what they have gained due to this process. The interviews show community leaders are still unsure about whether their expectations were taken into consideration:

> *"The neighbors asked TECHO–Perú: In what way will this be useful or beneficial for us? What are we going to obtain from participating? The TECHO–Perú representative explained that the survey would tell us the most urgent problems we have, and we told him that [we already knew] that our most urgent problem was lack of access to*

[11] This section summarizes findings that speak to whether the *Relevamiento* created conditions of exploitation for community leaders in which more powerful groups benefitted from their work.

> *clean water. It has been almost two years since the* Relevamiento *and nothing has improved. Things are still the same. We wanted progress, but [our district] has the least clean and most expensive water in all of Lima. And the* Relevamiento *is not attacking this problem. Maybe it is attacking other problems. We did not want this* Relevamiento *to be just a study, a paper. We want it to translate to 'obras' – to tangible outcomes."*

Even though consent was obtained to conduct the research, it is not clear whether TECHO–Perú was aware of *why* community members chose to participate in this process and provide their data. Were community leaders expecting an outcome in particular? Did they explicitly delegate the decisions regarding data use to the data intermediary, in this case TECHO–Perú? Did they create a system to demand accountability from the intermediary? By asking community members why they want to participate, data intermediaries can learn about the value communities ascribe to their raw data and thoughtfully incorporate these expectations into the design of their criteria for consent, use of data and the process of data collection.

Second, the reluctance to demand results from the *Relevamiento* is tied to the technical, capability and knowledge constraints faced by community members. Currently, they lack a general understanding about *where* to find the data and *how* they can use this data to generate action. These constraints also limit the decisions communities can make regarding their data and how they would like to use it to address their development needs. Interviewees suggested TECHO–Perú should host regular assemblies every year to present the results of the *Relevamiento* and ensure there is continuity in the action plans that have been devised based on the results.

> *"The* Relevamiento *should be presented in front of the recently elected community leaders who are preparing their work plan. The new leaders do not know anything. It would be good to have a meeting every year and tell them: this is what we collected and learned from the* Relevamiento.*"*

Even though the final report of the *Relevamiento* has been published in an open data portal, most community members do not have access to the digital devices, infrastructure or know-how to find it. As a result, many have not been able to use the data or request updates about the state of the study. The lack of access to it creates a situation in which the data can ultimately only be used for the purpose, benefits or interests of those who can access it and creates conditions of exploitation in which community members participate in a data collection process to produce an output they are not able to enjoy or use.

Datafication and marginalization[12]

We found that while the *Relevamiento* is creating a space in which voices and needs of historically marginalized communities can be represented, it is also amplifying social divisions and political struggles that already existed within SJM. The conflicts interviewees mentioned are diverse and complex, spanning from political tensions between community

[12] This section summarizes findings that speak to whether the *Relevamiento* led community members to feel excluded from useful participation in social life.

leaders, accusations of corruption, and ethnic tensions between immigrants from different regions of Peru. Community leaders talked about how the data collection process contributed to these tensions. Even though TECHO–Perú made an effort to include as many community groups in the process as possible, ultimately, coordination meetings were most frequent with the groups that had the most political leverage and who were more effective at building partnerships with civil society organizations. The process ultimately became politicized and was perceived by some as biased:

> *"When the survey came around, I felt it became biased little by little. I felt that it only considered some people and left other people aside. There are communities with whom progress has been made, while with us, the communication slowed down. We feel like we are not being listened to. As a resident, you think to yourself: ¿ya para qué? - What is the point of participating?"*

This sent the message to those who already felt marginalized by the data collection process that only the needs of the most powerful groups of the community would be represented in the *Relevamiento* and that as a result, only their concerns would be integrated into the public agenda. In other words, that only those who actively participated in the *Relevamiento* process would be able to access justice, while the rest would be excluded from the debates and programs designed after this data. This belief has been strengthened by the difficulties some community members are having to work with the municipal government:

> *"The municipality closes many doors for us. If you do not agree with them, they marginalize you. If you do not agree with their thoughts, they marginalize you. Why should I go and negotiate [with them] if I am not going to be listened to?"*

Data is not sufficient to enable collaboration between different actors and ensure the equitable participation of the least powerful groups. Be it between municipal government authorities and SJM residents, or between community leaders, inclusion and collaboration is ultimately more contingent on community relations than on availability of information or data. Recognizing the political conflicts and social divisions of the community and how they will affect the access and use of information, is a precondition to using this data effectively as a political and social tool to redress power imbalances. This also places more responsibility on civil society organizations that collect data in historically neglected populations to develop mechanisms that identify pre-existing community conflicts and mitigate possible risks or harms brought about by the intervention.

Summary

A summary of these findings is presented in Table 3.

Form of Injustice	Instances in which Injustice can be Challenged Through Datafication	Instances in which Injustice can be Sustained Through Datafication
Powerlessness	• The data collection process has led to an appreciation of data and data-based planning by the community. • Data is perceived as a valuable asset that ought to be used, managed and applied by the community to transform their living conditions. • Communicating the problems of the community using data is perceived as an opportunity to demonstrate the urgency of the problems faced by informal settlers and highlight the most pressing needs. • Some community members believe the use of data grants legitimacy, authority and objectivity to community knowledge. • Data allows community members to communicate and cooperate on more equitable terms with powerful actors who consider data-based knowledge a more accurate and trustworthy source of knowledge.	• The data collection and dissemination process is not determined by the priorities of community members but is rather ruled by what intermediaries such as TECHO–Perú, believe will be most effective approach to obtain institutional attention and support. • The turn to datafication is making data more valuable. Data is considered more legitimate and useful than other ways of knowing such as intuition, opinions or lived experiences that are also present in the community. • The role of an intermediary that advises communities on how to use the data effectively could generate dependency and further the notion that the community is incapable of using this data without their mediation. • Community members fear a data-based narrative about the realities of the informal settlement that lacks context portrays them in harmful, undesirable or dehumanizing ways.
Exploitation	• Community members are demanding accountability from the data intermediary; TECHO–Perú. They wish to know how their data has been used and who is benefitting from it. • Criteria for obtaining consent in data collection processes can incorporate the decisions made by community members regarding their data: such as why they are providing it and what they are expecting in return.	• Communities remain uncertain about how the data has been used, who is using it and what they have gained due to this process. • Data is published in open data portals community members cannot access due to technical, capability and knowledge constraints. • These constraints also limit the decisions communities can make regarding their data and how they would like to use it to address their development needs.
Marginalization	• Datafication creates a space in which voices and needs of historically marginalized communities can be represented. • Data can be used to capture attention of powerful actors such as elected government officials, international development organizations and policy makers.	• If the data collection process does not include every community, it risks amplifying the voices of the most powerful groups within the community. • Data is not enough to spark the interest of political actors. Political will is more contingent on community relations than on availability of information or data.

Table 3: Summary of findings on powerlessness, exploitation and marginalization

D2. Datafication as a Process to Develop Capabilities and Take Action

A more strategic use of community data could enable community leaders to challenge oppressive relations and take action to transform their conditions. Iris Marion Young argues in the social connection model of responsibility (2006, p 123) that "structural processes can be altered only if many actors in diverse social positions work together to intervene in these processes to produce different outcomes". SJM community leaders identified three ways in which they can participate on more equitable terms in data-based initiatives and decisions. These ideas contemplate data capability development and are oriented towards improving conditions for decision making regarding the use of data in community development.

Datafication has generated interest in the community towards developing data capabilities

The data-intensive process facilitated by TECHO–Perú has sparked a strong interest in the community to develop data capabilities. The frustration of not being able to access the data has led community leaders to reflect upon the value data has for their community and how they could use it in strategic ways to improve their livelihoods and collaborate with diverse actors. Even though the community of SJM already collects its own data through community-based initiatives, community leaders seem interested in learning to conduct large-scale, systematic processes such as the *Relevamiento.* Among the examples they provided, they wish to be able to access the data generated by the *Relevamiento,* cross-reference it with community data, and use it to inform ongoing community development programs and to improve management and planning of the community resources.

Community leaders want to transition from being data providers to data owners

After the *Relevamiento,* community leaders think of data as a source of power and as a valuable asset. However, they currently lack the technical resources, knowledge and infrastructure to engage with it in a meaningful way and to set the terms for its use. A community leader used a powerful metaphor to explain how data could contribute to self-determination by comparing it to a "multi-purpose knife" or a "first-aid backpack", in that their utility depends on the readiness and sophistication of the user.

> *"The results of the* Relevamiento *should be like a first-aid backpack or a multi-purpose knife. These knives have scissors, a bottle opener, a screwdriver, even a little hammer. Everything that could help me in an emergency. That is what the* Relevamiento *should do. It is a tool for us and also for the authorities. But you have to know how to use it. You need to know where to find it.".*

> *"If you give us the results on paper, [...] we will not understand what that report means. If someone comes and explains it to us: 'now you have this benefit, or you can achieve this, and this. Or we have achieved this and this with the survey.' If it benefits us, we are going to do something with it."*

To address this gap, community leaders suggest the development of training materials and learning modules that build data literacy, digital literacy and digital rights with an anti-oppressive lens. Their idea is to bridge the gap between data and the community through the use of creative tools, such as animated cartoons, dynamic videos or short movies, "that you can watch with the whole family", and that seek to situate and humanize data as part of "the reality" of the SJM community.

Community-based data infrastructure is key for community data management
Finally, interviewees also expressed an interest in the creation of community-based data infrastructures where communities who provided their data can access it, manage it and set terms over how it is used. In practical terms, they suggested the creation of a digital repository or platform designed specifically for community leaders, where they can access and update their own data.

> *"All the community leaders of SJM should be able to use and manage that data. [I would like to] have a transparency portal with our data. We need a platform designed with the specific needs of SJM in mind. The data is currently available in a link, but they have not designed it with a [community] approach. A community leader should be able to access the data and feed the platform with new information. For example, if we know that there are more children being born or that there are new members in the community, we should be able to add it. I'm currently trying to use Excel. We need this information to be up-to-date to plan accordingly."*

This suggests that SJM residents aspire to create conditions where they can see themselves as the experts and "owners" of their data, and create a system in which they have the power to decide what data to use and for what purpose. This is not to say that communities will use the data in an intrinsically positive or neutral way, but eliminating constraints on self-determination and self-development can possibly afford communities more agency to make decisions regarding data and also place more responsibility on them for how their decisions affect the overall system.

Box 1: List of recommendations to build a community-based data collection model

1. Collect information about expectations and aspirations of community members around data
2. Collect multiple forms of data that reflect how communities wish to be portrayed publicly
3. Co-design creative ways in which community members can share their own stories and perspectives beyond the use of quantitative data
4. Explain the value of different forms of data to community members and how each form of data can be used to achieve different purposes
5. Ask for consent both when collecting data, and again when using it. Ask for consent not just to collect data, but also about types of data use
6. Create strategies to cross-reference and integrate community data and data collected at a larger scale by external organizations
7. Build community capacities to use data for program and resource management
8. Develop digital and non-digital mechanisms to share data with the community aimed at reaching diverse publics
9. Design advocacy roadmaps that outline how data will be used to achieve community-defined objectives
10. Design a community-based data infrastructure where communities who provided their data can access it, manage it and set terms over how it is used

E. Discussion and Conclusions

Datafication is not only a technical process, but an activity that is deeply influenced by the power dynamics and the social, cultural and political tensions that operate within a given context. While in this study we mostly focused on identifying instances of oppression and the reproduction of inequality in data-intensive practices, Young's work prodded us to consider how residents of historically marginalized communities hold responsibility and agency to transform their conditions. Broadly speaking, datafication as it is being implemented now does not create justice for vulnerable communities. In fact, its process deepens or reproduces instances of oppression by reinforcing community perceptions regarding their lack of knowledge, lack of capabilities or lack of authority to use data to lead their own development.

However, participating in a process of datafication along with a trusted partner such as TECHO–Perú, sparked an interest in community leaders about the different ways in which they could use data to further their capabilities, mobilize collective action and address their development needs. Community leaders perceive themselves as capable and willing to use data in constructive ways to transform their conditions. This interest and power needs to be activated through capability development. The themes that emerged in the case study also led to the following four reflections:

First, the case illustrates how the cultural meanings given to data in historically marginalized communities are as important as the processes and practices we put in place to use it. In the case of Peru and SJM, we learned that datafication had a much stronger political and cultural significance than anticipated. For many, data was an objective form of expression that conferred authority to community leaders and was able to systematize the chaotic, complex and misunderstood reality of informal settlements. It also represented the opportunity to speak a lingua franca that bridged the gap between powerful decision makers from the "official Peru" and communities from the "marginalized Peru". However, to other community leaders, data embodied institutional power. It represented the imposition of a new set of rules, unmet expectations and the burden to learn new skills to stay relevant in the system. All in all, these perceptions highlight how datafication can simultaneously represent hope and oppression for vulnerable communities, and how these perspectives are not homogenous. The approach of each individual and each community group to data will be situated in their lived experiences and the power relations they are a part of. However, this case illustrates how these expectations, concerns, motivations, among others, are seldom considered in the design or the aftermath of the data collection process, leading to new forms of cultural marginalization, exploitation and powerlessness in which the perceptions of data producers and their contributions are ultimately marginalized or deemed irrelevant for the final output of the project.

Second, datafication also proved to be a process through which different actors acquire power, while others feel powerless or incapable of participating. Institutional actors or individuals who feel comfortable with the use of data will resort to datafication as a tool to boost their legitimacy and solve their problems, as is the case of local authorities who demand the use of data in evidence-based policy making or civil society organizations who

require data to legitimize the work they do with vulnerable communities. However, we learned that individuals who lack the capabilities necessary to handle data, or the opportunities to develop these capabilities, feel they cannot use the data they provided and once owned in order to make informed decisions to address their development needs. In other words, not developing data capabilities creates conditions of exploitation in which individuals are providing their data to meet the purposes and benefits of external actors, while not being equipped to proactively reap benefits for their own community. A process of datafication that is not coupled with data capability building, limits the choices individuals from marginalized communities can make regarding their own data.

Third, the case of SJM suggests that NGOs and civil society organizations that act as data intermediaries can play a fundamental role in developing these capabilities and in enabling what Michael Gurstein calls "effective data use" (2011). We learned that the path towards becoming an effective intermediary involves understanding how to navigate community—researcher—practitioner relations in an equitable way. If data intermediaries have the social and cultural capital to build relationships of trust with community members, they can also create the conditions to develop relevant data capabilities in the community and boost community-based datafication. We consider this should be the ultimate goal of organizations that undertake data-intensive practices in vulnerable communities: to create the conditions in which datafied systems are built and sustained by the community under norms, rules and practices set by the community. This is a particularly timely approach. As the trend towards datafication grows, every citizen will need these skills to uphold their rights and participate in society. Residents from informal settlements, along with other vulnerable communities will most likely be neglected by this process and will not have access to the opportunities to develop these skills in the same measure as other groups in society. Data skills and data justice principles could position them to assert their agency not only in datafication but in their ability to exercise their citizenship in the city.

And finally, the path towards a community-based data justice model involves imagining socio-technical practices and infrastructures that enable community data stewardship. The case of SJM illustrated how the *Relevamiento* was not designed to achieve structural change in and of itself, but to create tools SJM residents could use to exist and interact on more equitable terms within system. In this sense, the idea of a community-oriented data infrastructure is promising. Community members in SJM did not reject the process of datafication, but imagined a datafied system in which they would be able to access the data, and manage it continuously improve it. This introduces a different way to think about data that is built on the basis of community – as opposed to individual – ownership and stewardship. Many questions remain about the benefits or risks of this model: what data rights do they hold as a community? How can they establish boundaries for external, more powerful actors, that wish to access and use their data? Would this model reproduce the hierarchies of the current model by establishing gatekeepers and limited users of information? However, we believe it is a step forward to reduce the power of those who are currently leading datafication initiatives, and enable communities to define new rules for what datafication in development should do, in what way and for whom.

E1. Recommendations

Practical recommendations were outlined above in Box 1. From an academic standpoint, future studies should attempt to use Young's framework to understand data-related injustice. Her concepts were very useful to identify specific ways in which datafication could mitigate or further an individual sense of injustice. However, more in-depth research is required to understand how larger, institutional forms of injustice are challenged or sustained by datafication. It is also key to continue investigating how relations of domination-oppression can translate into and affect other areas of life with wider implications for livelihood and survival over time. Some questions include: in what ways do powerlessness, exploitation and marginalization constrain access to social, economic or political participation? How do perceptions of these affect the decisions oppressed communities make in their personal, family and community life? How does injustice experienced in datafication intersect with other forms of powerlessness, exploitation and marginalization experienced on the basis of gender, race, socio-economic status, etc.?

To continue developing a community-based data justice model, future studies should explore community data management. On this occasion we found that community management is organized around collective action; yet this ideal is constrained by the political and ethnic conflicts that exist between the diverse social groups that exist in spaces like informal settlements. Many questions remain about what socio-technical systems need to be in place to enable effective community data governance: how will their cultural and social divisions translate into mechanisms for community data management? Who will have the power to manage community data? What checks and balances will need to be in place to ensure representation and accountability? As these questions are tackled, studies should continue to center the voices of those who live in marginalized communities and portray the diversity, complexity and power imbalances they navigate.

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Annex: Social Connection Model by Iris Marion Young

1. Social Connection Model of Responsibility developed by Iris Marion Young. Concepts and definitions retrieved from Section IV of *Responsibility and Global Justice* (Young, 2006). Table created by the authors.

Feature	Definition
Not isolating	In a context of structural injustice, finding a few people guilty of perpetrating specific wrongful actions does not absolve from bearing responsibility others whose actions contribute to the outcomes. A social connection model of responsibility recognizes how the actions of every actor who participates in the structure has an impact over the just or unjust outcomes of the structure.
Judging background conditions	A model of responsibility understands the mediated connection that agents have to structural injustices. It often brings into question the background conditions – historical legacies, institutional rules, accepted cultural norms – that shape decision making of actors who belong to the structure and perpetuate injustice.
More forward-looking than backward-looking	Assigning and taking responsibility for injustice is more forward-looking than backward-looking. This recognizes there are an ongoing set of processes that will likely continue producing harms unless there are interventions. The point is not to blame, punish, or seek redress from those who created a specific act of injustice, but rather to enjoin those who participate by their actions in the process of collective action to change it.
Shared responsibility	Shared responsibility recognizes each individual is personally responsible for the risks of harmful outcomes produced by a group of persons in a partial way. The specific part that each person plays in producing the outcome cannot be isolated and identified, thus the responsibility is essentially shared.
Discharged only through collective action	Forward-looking responsibility can be discharged only if many actors in diverse social positions work together to intervene in these processes to produce different outcomes.

2. Parameters of reasoning social actors can use to think about their own action in relation to structural injustice. Concepts retrieved from p137 of *Responsibility and Global Justice* (Young, 2006). Table created by the authors.

Parameter	Definition	Young's reflections regarding action and justice
Power	The degree of potential or actual power or influence over the processes that produce the outcomes.	Agents do not always have sufficient energy and resources to respond to all structural injustices to which they are connected. They should focus on those where they have a greater capacity to influence structural processes.
Interest	Degree of interests in the maintenance or transformation of structures that produce injustice.	Victims of structural injustice often have a greater interest in structural transformation. But those with the greatest interest in perpetuating the structures are those with the greatest power to influence their transformation.
Privilege	Degree of privilege acquired by virtue of the structures. Privilege often coincides with power.	Persons who benefit relatively from structural injustices have special moral responsibilities to contribute to organized efforts to correct them, not because they are to blame, but because they are able to adapt to changed circumstances without suffering serious deprivation.
Collective ability	When interest, power, and existing organization enables people to act collectively to influence processes more easily regarding one issue of justice than another.	The structural processes can be altered only if many actors in diverse social positions have the capabilities to work together and intervene in these processes to produce different outcomes.