On Achieving (Urban) Social Equity

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Overall Goal: Present ideas for actual services/products that can be deployed; pitches to cities.

I. Problem Statement

A hallmark of the 21st century is the migration of humans to cities. While half the population lives in urban regions, it is estimated that by 2050, two-thirds of the population will live in cities (2018 Revision of World Urbanization Prospects). However, cities are complex, continually evolving entities, and their design must take into account the interaction between environmental, social, and economic forces. In particular, cities must cater to the diverse needs of their populace in order to enable humankind to flourish. In this white paper, we outline existing approaches used to assess social equity and propose new tools and methods for measuring social equity within cities.

II. Proposed Service/Product

We outline three steps that are necessary to augment existing tools and procedures that aim to reduce social inequity.

A first category of product is an ***assessment*** tool consisting of a compendium of social-equity related indices that if collected can benefit a city's future planning and design. This category is comprised of existing information and provides a powerful starting point for researchers interested in improving urban social equity.

A second category of product is a set of ***discovery*** tools and methods to compute new measures of social equity. Ideally, these sets of indices will translate into a more holistic indicator of social equity and will address the limitations of existing measures.

The third category of product is an investigation into the best mechanisms for the integration of these indicators into existing frameworks for decision-making–whether by policymakers, private sector actors, or community members. Potential stakeholders include scientists, governing bodies, land owners and developers, urban planners, organizational leaders, and any residents concerned with social justice at the local, citywide, or national-level. Government agencies would have trusted and transparent information from which to base urban policy-related decisions. Concerned citizens would have access to digestible metrics detailing the strengths and weaknesses of their community. Finally, social and physical scientists would be able to use these metrics to propose long-term strategies for reducing urban inequity.

III. Expertise and resources needed

Providing these levels of services will require a range of expertise from individuals across a variety of sectors. Data owners will need to cooperate and provide access to each other in ways that have historically been difficult to accomplish. Industry, government entities, academic institutions, non-profit, and NGO agencies would need to strengthen or establish new channels of cooperation. Likewise, urban planners, policymakers, as well

as other decision-makers should coordinate efforts and will need to identify overlapping goals in order to optimize progress towards social equity. Experts in urban informatics and analytics as well as user-design will be essential to collecting, standardizing, analyzing and sharing data in meaningful, accessible and actionable ways. Civic technologists, community engagement organizations, and other advocacy-oriented, community front-line workers will need to be given the opportunity to provide input on the development of new tools. These actors will also be integral in the delivery of services to community residents.

IV. Assessment Product

Key to the success of this sort of data-driven approach will be to identify relevant indices. Traditional measures of social equity such as the UN Human Development Index (HDI, 2018) have primarily relied upon economic and consumption-based indicators including gross domestic product, percent of residents under the poverty line, median individual and household income, income inequality, wealth, housing availability and costs, labor force participation, unemployment, educational attainment, as well as adult literacy rates. Other indices have also utilized estimates of residents' average life expectancy to approximate the health and well-being of citizens (e.g., HDI, 2018, World Health Organization, 2016). More contemporary measures of social equity such as the Social Progress Imperative and the World Happiness report have attempted to advance our understanding of social inequity by including non-material indices such as:

- Direct measures of population health (e.g., obesity, diabetes, hypertension rates, infant birth weight, access to health insurance, etc.)
- Environmental quality (e.g., pollution, heat, contaminated drinking water, groundwater pollutants, PM2.5 concentration, Co2 emissions etc.)
- Crime, homicide, incarceration, and recidivism rates
- Access to healthy and affordable food
- Homeownership, overcrowded housing (e.g., number of residents per household), and homelessness
- Access to quality education and health services
- Degree of civil freedom as well as exposure to social exclusion and discrimination
- Access to public transportation and the efficiency of transport routes
- Access to essential services (e.g., hospitals)
- Mobility/walkability, traffic density, vehicle access
- Demographic diversity and residential segregation
- Digital inclusivity
- Broadband internet access
- Civic engagement and participation (i.e., voter registration, polling numbers)
- Budgetary allocation within cities (e.g., public spending on social benefits, childcare, early education, etc.)

"Populist" indicators such as Great Schools, Gini Coefficients, and Walk Scores also provide an important indicator of social equity.

Measuring the amount of time spent attempting to access critical resources may also advance our understanding of social equity. A "Time Spent" indicator of social inequity might utilize Google/BING mobility reports to generate an objective measure of disparities in distance traveled to amenities and critical places. It would also benefit from

capturing the amount of time spent researching (possibly through the use of search query data), applying, and waiting for benefits. Data on wait times for benefits and administrative services at the state, county, and city-level may be beneficial in this regard. 311 data might also shed light on the lag time between when a call is made to when the problem is fixed by city officials. A similar use of 911 data to measure safety could also be considered. Lastly, search engine data could possibly reveal social-equity related insights not captured by other commonly used indicators. For example, the extent to which residents search for mental-health related topics or services may serve as an indicator of the subjective well-being of a city's residents.

Other Equity Data Sources

a. Census
b. CDC Social Vulnerability Index (https://svi.cdc.gov)
c. UIL Transit Desert Index (https://www.transitdeserts.org/)
d. USDA Food Desert Index (https://www.ers.usda.gov/data-products/food-access-research-atlas/go-to-the-atlas/)
e. Social Wealth Economic Indicator (https://centerforpartnership.org/programs/caring-economy/social-wealth-index/)
f. Opportunity Index (https://opportunityindex.org)
g. EPA Smart Location Database (https://www.epa.gov/smartgrowth/smart-location-database-technical-documentation-and-user-guide)
h. National Equity Atlas (https://nationalequityatlas.org)
i. Environmental Performance Index (https://epi.yale.edu)

V. Discovery Product

In addition to identifying available data, there is a need to corroborate, expand or fill-in missing social equity metrics and data for large and small cities. The discovery product has four parts as described below.

Part 1— Identifying existing metrics of social equity.
This includes defining and exploring existing metrics and discovering how these measures differ between geographic spaces as well as culturally within cities.

Part 2— Exploring where data *is* an *is not* available.
The next step includes expanding and corroborating the information identified in each metric for cities, communities, and neighborhoods.

It will be important in this exercise to consider what other measures can help address missing or biased data. For example, small, rural, or remote cities are likely to have less and/or different social equity data. A pertinent question is how missing data should be collected and how biased data might be remedied. This section explores possible mechanisms for addressing these gaps.

To obtain an indicator of job skills at the neighborhood-level, one could collect data through LinkedIn or other online career building and job-search platforms. This could also be corroborated with data on start-up company density and business ownership at the neighborhood or city-level.

Navigation data may provide insight into how many residential streets are included in common routes as well as sidewalk/bike lane completion rates. Moreover, crowdsourcing sites such as Openstreet Map (https://www.openstreetmap.org/#map=4/38.01/-95.84) might reveal the most/least desirable neighborhood navigation routes. Similarly, discrepancies in perceptions of community safety could be measured by comparing the density of 311 and 911 calls across geographic spaces.

Most major cities also share information about access to parks, recreation, trees, and green spaces by neighborhood in open GIS format (e.g. https://data.austintexas.gov/), which might also prove useful.

Qualitative measures of happiness and neighborhood connectivity might be captured by looking at how many people post and reply at Nextdoor.com. The substance of these posts might also be used to gauge residents' feelings about their neighborhood. The degree of connectivity residents share with nonprofits, providers, and religious institutions may also be leveraged using big data from social media sites.

Lastly, one possibility might be crowdsourcing for other data points or utilizing 'search query' data at the city, community, or neighborhood-level. A cross-industry dataset could be established by linking sources from Microsoft, Google, Amazon, as well as other large corporations. Beyond these large corporations, community-led datasets (e.g., iseechange.org or local tree census datasets) may provide interesting and unique data.

Part 3— Spatial distribution.
Starting at the city level and then drilling down to a more granular level (e.g., zip code, census tract, neighborhood, block group and block level) will reveal gaps in spatial/geographic level data. Most census data provides information at the tract level, while local community surveys might offer insights at the block level.

Part 4— Aggregating new and existing measures.
When developing a new, more holistic measure of social inequity some considerations include:

- Whether each indicator should be weighed equally to get a final score?
- Whether weighting should be differentially applied? And if so, how?

This process will necessitate going deeper into evaluating the efficacy and quality of each indicator, paying special attention to identifying/correcting for bias. This could be accomplished using search query data as well as validating data and insights with community members.

VI. Integration Methods

Once comprehensive data sets are established and analyzed for findings, it will be critical to determine how best to share, integrate, and build support for new indicators in order to maximize interest, utilization, and impact.

Some considerations include the infrastructure required to ingest data. There could be two data streams, one produced by the government or other organizations and another crowdsourced by individuals. The infrastructure utilized to analyze data should be cloud-based in order to facilitate greater cross-collaboration.

Infrastructure will need to be developed in order to present data in formats (e.g., website, mobile app, etc.) that will be useful to all stakeholders. Functionality of website/apps should include the ability to examine social equity metrics at any given location (location-based service). It should provide an overall score of social equity as well as sub scores across categories. It should also rank each city relative to its peers. The data/website structure should consider a hierarchy from low-level (e.g. data by census tract, suggestions from individuals, etc.) to higher level (e.g. aggregate view, results with zoom in ability, etc.). It is important to note that how these levels are defined has impact on how data are collected and analysed (e.g., https://www.universalhub.com/2019/impossibility-mapping-boston-neighborhood-lines).

Infrastructure may also be designed to provide feedback and guidelines/case studies for policy makers to remedy social inequity. It should also encourage community involvement by allowing users to upload information, request new types of data, ask questions, provide feedback, as well as upvote/downvote.

Finally, it is essential to start the process with a user-centered approach and identify up front who in cities would consume resulting services and how they would benefit. For example, how could these services help city planners, mayors or policy makers, real estate developers, companies, or community leaders? How would citizens consume these services and benefit? How could residents contribute to it on an individual level?

Before beginning, it should be known which city entities or agencies would be required to launch such a service. Would a joint service between a city's information department, industry, community advocacy organizations, and academia be the right mix of stakeholders? Who is missing? One consideration is to take a research approach by starting collaborations with a few tech-hub cities (e.g. Austin, Boston, San Francisco, Denver, Seattle). These cities might offer some "low hanging fruit" in that they already have more readily available/accessible data sources as well as higher density of technology companies and local governments which presents fewer barriers to implementation.