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BETTER DEMOGRAPHIC DATA FOR IMPROVED PLANNING AND PROBLEM SOLVING SOUTH AFRICAN CITIES

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Abstract

The proposed Lightning Talk presents an open data platform, SCODA, developed for the South African Cities Network by Open Data Durban to facilitate an evidence based approach to city planning. It is being used to predict demographic trends at the ward level (the smallest South African administrative unit) of South African cities, and overcome limitations in current demographic data. This tool provides an innovative step in addressing gaps in population data by improving accuracy of current migration and population growth analysis to assist in more accurate spatial planning and land use planning. The demographic trends analysis provides an example of the potential of the SCODA portal that will be used to store city related data, and allow for government and community stakeholders to store and analyse a range of information that can be used to improve quality of life in urban areas.

Key Words:

Big Data

City Government

Demographic Modeling

Inequality

Open Data Platform

Racial Segregation

1. **INTRODUCTION**

The use of technology and data is not a new practice in urban municipal planning. Cities have commonly employed the use of databases, spatial modeling tools and data-collection to inform planning decisions related to land and the needs of society. Increasingly though the use of information technology has become ubiquitous, and big data becoming the bedrock for new urban knowledge where efficiently utilized (Thompson et al. 2016). In countries facing high levels of urbanization and poverty a lack of reliable data can have serious implications for providing and facilitating the needs of the people (United Nations. 2009). South Africa, as a country with rapidly growing cities, faces this data challenge. There is a growing need for alternative, robust, coordinated technology and data systems to cultivate better evidence based decision-making. Such information should not just be for government, but for private sector and public use as well.

Over the past five years a number of open source data platforms have been added to established data practice in South Africa such as the South African Cities Open Data Almanac (SCODA)(http://sa-cities-almanac-prototype.herokuapp.com) and Muni-money (https://municipalmoney.gov.za/). These data platforms differ from other municipal data websites such as the Municipal Barometer (http://www.municipalbarometer.co.za) in that the information from Muni-money and SCODA is not under copyright, is free to access, can be analysed, commented and built upon by users in real time. This improves access to, and exchange of, critical government data, improves the transparency of local government - the nearest administrative body to the people and so improves democracy.

However, the innovation of open source platforms does not lie only in the data platform itself, but in what information is made available, whether the information is useful, how that information is used, and how the information is displayed. In the context of a Country such as South Africa this means that the information must contribute to addressing institutional inefficiencies, poverty and inequality.

This brief to the Lightning Talk focuses on the example of a tool developed for the SCODA platform to provide demographic projections for South African Cities at the ward level (the smallest administrative unit) that was made possible by generous funding made available by the Japan International Cooperation Agency (JICA). Being able to understand future population growth better can assist in the improved allocation of land for development in spatial plans, in

informing the location of public and private sector investment and help residents understand the implications of population growth on their neighbourhoods.

2. **SOUTH AFRICAN CITIES OPEN DATA ALMANAC (SCODA)**

SCODA (Data Almanac) was launched in 2016. It is an interactive data tool loaded on an open source derived website to make urban information, sourced from a range of data sets, available to local government and the public. Information is available in terms of specific urban themes, graphic representations of the themes and the underlying data sets for use by a third party.

The Data Almanac was initially launched as the data component of the State of the Cities Report 2016 (SACN. 2016) by the South African Cities Network, a non-governmental organization that advocates for urban development matters on behalf of its members, eight of the Country's largest city governments. The Cities Network partnered with Open Data Durban (ODD), a Durban based civic technology lab and non-profit organization specializing in open-source civic innovation to build the web application and design the data portal framework behind SCODA.

The intent, under a five-year strategy was for SCODA to develop the tool so that it could contribute to positive social change and inform decision making primarily by local government but also for the private sector and community groupings. To achieve this vision SCODA needs to be interactive, easier to use and have improved internal modeling and data bandwidth (Open Data Durban. 2017). Moreover, the improvements will allow for more comprehensive analysis of urban data sets. These improvements will be useless if the platform goes unused. As such ongoing training is to be provided to potential user groups, such as local government officials.

SCODA has been recently upgraded and a test application in the form of an enhanced ward level demographic model developed that seeks to enhance local city governments' ability to plan for future development requirements at the local level.

3. **CITY LEVEL LIMITATIONS IN DEMOGRAPHIC PROJECTIONS IN SOUTH AFRICA**

Official demographic statistics in South Africa are captured by Statistics South Africa (STATSSA) through the census held every ten years. The census is supplemented by a Community Household Survey held every five years based on a population sample. While census

data is captured at an enumerator level, that can represent as much as a few blocks depending on population density, population projections provided by STATSSA are provided for the provincial (state) and national level. As such, official data,is not provided at the frequency or at the level of analysis that cities require to confidently aid planning and respond to ward changes in population. Traditional projection methods treat wards and metros as if they are closed systems despite being open systems open to the vagaries of immigration and emigration and are open to changes in household composition. In South Africa, a birth or death in the household can easily prompt relocation to another dwelling and the new dwelling be in another ward or in another city. The demographic model developed for SCODA treats ward population change as an open system allowing the model to be applied to localized areas(ibid).

4. SCODA'S DEMOGRAPHIC PROJECTION PROPOSITION

The demographic projection used in the project method requires the projection of the population of enumerator areas and their subsequent aggregation at the ward level. These projections have then been calibrated to ensure that the total population in a metro matches the more reliable information on projections of metro population growth. The method has resulted in a robust method of projecting population for the medium term (ibid).

On completion of the projections, innovative data that reflect levels of human activity in localized areas have been compared to the above "normative projections". The data sources used in this regard included:

- 6 Billion Tweets over a three-year period
- Mozilla location services
- OpenCell ID data, and
- Night Lights telemetry over a ten-year period
- Voting District Returns

The comparison between the data sources highlights strengths and weaknesses of the methods used providing an opportunity to improve the model, and in the process, indicates the value of innovative data sets used (ibid). The different data sources were used in different combination to determine which source provided a better interpretation of how demographic change has occurred in at the ward level.

5. APPLICATION OF THE DEMOGRAPHIC MODELING TOOL IN RELATION TO LAND AND POVERTY IN SOUTH AFRICA

In South Africa, land and poverty are inextricably linked to settlement patterns entrenched under Apartheid Policy of the National Party (1948-1994) and the segregation of populations based on race (SACN. 2016). In urban areas, this manifests in people designated as black located in densely populated townships on the periphery of predominately low density areas designated for white occupation.

Since Apartheid was abandoned as a policy imperative in 1994, there have been key interventions and trends that have added layers of complexity to settlement patterns in South African cities while the legacy of the racially segregated city remains. The first has been the significant growth of South African cities through natural growth and in-migration. A second has been the provision of 3.5 million housing opportunities for the poor (Department of Human Settlements. 2016) that is characterized by the provision of freehold, detached housing units on individual plots at approximately 50 dwelling units per hectare. These have generally been located on the urban periphery where land is cheapest but far away from employment opportunities, entrenching existing spatial patterns (SOCR. 2016). A third trend, which has also contributed to the expansion of cities, has been construction of middle-income housing in the form of high-security walled townhouse complexes at approximately 60 dwelling units per hectare located on cheap land on the urban periphery along major arterial roads facilitated by high levels of private vehicle ownership (Landman K, Badenhorst W. 2014). This has led, in certain circumstances, to the poor and the middle-income earners living next to each other separated by an electric fence. In parallel to these processes, economic activity has decentralized from original central business districts predominantly into the areas originally designated for the white population and the decentralized town-house locations. The primary vehicle for such decentralization has been the shopping centre. The associated trend has been a change of activity in central business districts characterized by the removal of office headquarters while operational offices and branch retail operations are maintained, growth in government related office activity and the growth of informal business activity and a trend to poorer populations, often immigrants moving into the inner-city (SACN 2016). A final important trend has been the growth of informal settlements on

accessible land both serviced and unserviced. Connecting these trends physically is a network of roads facilitated by private and public vehicle transport.

An understanding of the general development land use trends at a local ward level combined with more accurate demographic modeling allows government, the private sector and communities themselves to understand the nature of change that may occur in an area.

Arguably the greatest beneficiary will be local government.

At a local government level, more accurate demographic projections will inform ward level planning interventions relating to land use changes in Spatial Development Frameworks, the legislated spatial planning instrument in South Africa. Areas for densification can be identified, areas for public service provision (e.g. community halls, hospitals, clinics, schools and emergency services) or the expansion or reduction of existing services can be highlighted and the implications of major land use trends can be tested against population trends.

In addition, demographic projections at the ward level combined with ward level income information can assist local government in determining what future tariff revenues will be for water, sanitation and electricity in an area. Similarly, combining the demographic projection information with the value of individual properties can assist local government in determining what future rates will be.

For those local governments that are responsible for dispersing social grants to the poor the population projections that would be available on SCODA provides a check and a balance to more detailed research determining change in poor populations in a ward. It will also assist in identifying those areas eligible for free basic water and energy, and how these areas may change over time.

More accurate demographic projections combined with an understanding of land use change and household incomes at a ward level provides the private sector, especially the retail sector, with a better understanding of the purchasing power across the city. This would be especially useful to those businesses operating in low-income areas, that might not have the funding to do comprehensive marketing research but require an understanding of their customers.

For communities, easy to understand data that speaks to their local urban experience can be very useful in understanding and evaluating proposals and promises made by elected officials and government employees which in turn strengthens local democracy.

6. PREREQUISITES FOR SUCCESS OF THE DEMOGRAPHIC TOOL AND SCODA

For SCODA and its demographic tool to be successful and have a meaningful impact on land use and reach a larger audience that includes the poor, the following pre-requisites need to be met:

a. The open data platform needs to be easily accessible, easy to use and needs to address real problems
b. Marketing the data to the right parties within primary user groups is critical
c. Data needs to be trustworthy. It needs to be accurate.
d. It needs to be used by government, the private sector, communities and contribute to researchers' needs
e. The data needs to be free to use
f. It should be interactive. Users should be able to add to and comment on the data.
g. The platform needs to be updated and maintained on a continual basis

7. CONCLUSION

Greater accuracy in demographic modeling which the SCODA provides gives local city government and other key sectors the ability to better understand population dynamics and by extension contribute to the transformation of space, and assists in addressing poverty in the South African context. With the ability to understand and analyze live migration data and build that into analysis, the tool provides the technological and data-driven environment for realizing a more inclusive urban environment.

While the use of an open data platform to improve the dissemination of urban data is relative recent in South Africa, the real innovation of such an information tool lies in the information that it can impart. In this case the real innovation lies in the demographic modeling tool. The Tool overcomes limitations in the current demographic projection models used in South Africa by projecting populations for the smallest administrative unit, and using alternative data sources to verify the accuracy of the projections.

The projections can be combined to enable a better understanding of the key urban trends occurring in a ward relating to income, urban land use change to inform spatial plans, local government tax planning, determine future service requirements, indigent support, community politics, business decision making. The demographic projections provided by SCODA provide a free alternative to expensive consultancy driven projections, a check and balance in an increasingly over-crowded data space.

However, the success of an open data platform such as SCODA and the data that it contains is premised on how the information is maintain, marketed to and used by the target audience. If the administration of the platform is not undertaken adequately, it will not succeed.

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