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New housing supply, population growth, and access to social infrastructure

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Using high quality, independent evidence and through active, managed engagement, AHURI works to inform the policies and practices of governments and the housing and urban development industries and stimulate debate in the broader Australian community.

AHURI undertakes evidence-based policy development on a range of priority policy topics that are of interest to our audience groups, including housing and labour markets, urban growth and renewal, planning and infrastructure development, housing supply and affordability, homelessness, economic productivity, and social cohesion and wellbeing.

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Executive summary

Key points

- This research develops a quantitative geographic methodology to assess and inform the forward planning of social and community infrastructure in rapidly growing areas of Australian cities. It focusses on greenfield areas of Sydney, Brisbane, and Perth greater metropolitan regions (GMR) to demonstrate data sources and methods that are able to be replicated in other contexts.

- Social and community infrastructure is critical to the effective functioning of rapidly growing urban regions, but lag times between population growth and new infrastructure delivery are pervasive in new greenfield development areas.

- Timely fine-grained spatial data is critical to informing and measuring performance in spatial planning and infrastructure delivery processes, but existing datasets are limited.

- This project tests and demonstrates the utility of new datasets—particularly high-capacity data such as Geoscape, median speed on individual road links, and Open Street Map — which are updated with greater frequency than traditional data sources, such as the census. The new datasets are available for very fine-scale geospatial analysis.

- A general quantitative analytical framework for measuring social infrastructure provision is developed for the three greenfield areas. It is able to be adapted to other rapid-growth settings in metropolitan Australia.

Key findings

Access to social infrastructure such as schools, health services, leisure and recreation facilities is critical to community wellbeing in newly developing areas—especially if we hope to realise Australia's urban policy aspiration of '30-minute cities'. However, coordinating the delivery of new social infrastructure and services is complicated by:

- the fragmentation of delivery agencies
- the lack of coordinated and timely data sharing.

New data sources and tools offer an opportunity to address this problem by providing more timely insights to inform the planning and provision of social infrastructure in rapidly growing areas.

In this context, this project achieves two aims:

- It develops and tests an enhanced method for projecting population growth by using fine-grained spatio-temporal scale buildings and dwellings growth as a leading indicator and explanatory variable for future population projections. The analysis demonstrates that including urban development as an explanatory variable in population projection methods can result in more accurate and reliable projections.
- It develops 'spatial accessibility profiles' that provide a measure of existing and potential proximity to social infrastructure and services, which—when combined with fine-grained and time-sensitive population data—can be used by diverse organisations to prioritise funding and delivery decisions. In this project, the utility of this measure is demonstrated by creating 'spatial accessibility profiles' for greenfield case study areas, based upon access to education and health services.

Overall, the project finds that novel data sources, which are widely available, can enrich spatial and infrastructure planning in high-growth areas of Australia. These data sources include:

- Geoscape buildings growth data—used to add urban development information to population data
- OpenStreetMap (OSM) – open-source map data
- median speed data for every road link across Australia used to measure travel time by car (2019 data by Compass IoT)
- General Transit Feed Specification (GTFS) data—used to measure travel times on transit in the cities of Sydney, Brisbane, and Perth.

Data methods and measures demonstrated in this study were tested with planners and industry experts familiar with the three capital cities of Sydney, Brisbane, and Perth. These experts saw value in publicly available 'real-time' data to inform and measure social infrastructure accessibility in new growth areas of metropolitan Australia, and more widely in regional Australia. Big-data approaches and modelling are increasingly being used to inform the spatial planning exercises.

However, there are difficulties in data and information sharing across agencies, and in translating data insights into funding and delivery priorities. There are also difficulties around accessing valuable data maintained by individual government agencies, despite increasing commitment to open data platforms. Further efforts to develop innovative measures for understanding and informing social infrastructure requirements and provision in Australia should address these implementation challenges.

Policy development options

The findings of the study have four implications for policy development and practice.

1. There is an opportunity to improve planning and coordination of new development areas in metropolitan and regional Australia through the use of new analytical tools and methods, such as those demonstrated in this project. In particular, novel 'big data' sources should be incorporated to inform evidence-based planning, after ensuring that they are accurate and reliable.
2. Open data platforms, including data on existing and planned social and physical infrastructure, should be shared across government agencies, researchers, and members of the public. This would ensure that common datasets are used to inform planning and decision-making processes. This has begun to occur —but progress to date is slow.
3. Fine spatio-temporal scale building and construction data should be used as a leading indicator for small area population projection models, in the short term.
4. 'Spatial accessibility profiles' provide a powerful basis for community engagement around priority development and infrastructure decisions. They can be extended to many thematic applications—from schools and health facilities, as demonstrated in this project, to parks, recreation, or retail services. As well as informing planning and funding decisions, the accessibility profiles provide a powerful measure of urban performance and spatial equity.
5. The accessibility profiles can be used to inform and measure progress towards sustainable transportation and a reduction in car dependency. Accessibility profiles can be measured for different modes, such as walking, cycling, car-driving and transit, as well as for chosen infrastructure dimensions. Planning process can prioritise accessibility through transit and active modes of transport.

The study

This research reports findings from an AHURI standalone data project: *New housing supply, population growth, and access to social infrastructure*. It focusses on the potential to better inform the planning, scheduling, delivery, maintenance, and coordination of social infrastructure in the rapidly growing greenfield areas of major Australian cities through the use of big data sources and techniques.

Several novel data sources were used in this project, and new methods were adapted and developed. New data sources included:

- Geoscape dataset—a longitudinal dataset comprising the footprints and attributes of over 15 million buildings across Australia.
- median speed data for every road link across Australia (2019 data)
- Open Street Maps (OSM)—open-source map data
- General Transit Feed Specification (GTFS)— developed by Google, that defines common format for public transportation schedules and associated geographic information.

While the Geoscape data is used to track the growth of buildings at the finest possible spatial scale, the other datasets are used to accurately compute travel times on various modes (walking, transit, cars) — which form a critical component of the accessibility computations.

This project aimed to develop a monitoring and coordination tool that enables computation, mapping, and visualisation of fine spatial scale accessibility for various social infrastructure dimensions. In this report, the tool is used to demonstrate accessibility to schools and hospitals, including their hierarchical distributions—for example, primary and secondary schools, primary healthcare centres, and large hospitals.

The project uses three cities for case studies: Sydney, Brisbane, and Perth. Accessibility is mapped for entire metropolitan regions, with special focus on three greenfield development areas in each city.

Finally, a ground-truthing exercise was performed. The authors conducted a panel discussion and workshop with several local and state government officers, along with private industry consultants and practitioners, to reveal how the tool could be beneficial in different policy and planning contexts.

As well as developing a tool to inform policy and planning practice, the project extends previous research on urban accessibility by computing it for the first time at the mesh-block level. (A mesh block is the finest geographical area defined by the Australian Bureau of Statistics (ABS) at which census information is collected).

Most accessibility mapping studies focus primarily on the number of jobs and workers accessible to and from different parts of the city. In other words, they make work–home relationships and employment catchment analysis the focus of their accessibility studies and urban performance. This study breaks new ground, as it extends the idea of accessibility to social infrastructure as a critical facility to support daily life.

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