



Pathway modelling to optimise long-term policy impact in New Zealand

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Introduction

Wicked problems are described as “inherently intractable late-industrial problems associated with modern social planning” (Farrell, 2011). They include many of the problems faced by New Zealand society today, including how to reduce homelessness and inequity, and ways to mitigate the impact of damp social housing. To tackle wicked problems, transdisciplinary approaches that provide evidence-informed cross-sector policy are needed.

Transdisciplinary approaches are holistic and collaborative in nature and integrate knowledge and methodologies from different disciplines to solve problems that cross different fields. For example, the adverse effects of damp social housing manifest across health, education, and employment. Initiatives to address these effects separately in any of these sectors, or exclusively in the housing sector, will not be as effective as an integrated, cross-sector policy approach.

Wellbeing is also a cross-cutting concept and enables the benefits of cross-sector policy approaches to be properly understood. According to the [Treasury Living Standards Framework](#) the four capitals (natural, human, physical, social and financial) are the assets that generate wellbeing.

Pathways, trajectories, transitions and turning points all provide descriptions of how individuals or cohorts of individuals move through the various agencies and sectors of societies. **Social pathways** are descriptions of how cohorts of society move through, e.g. education, work, and residences. **Social trajectories** are descriptions for particular individuals in society, so they may not align exactly with particular social pathways, but they are the result of how social pathways affect individuals. Both pathways and trajectories are composed of **transitions**, i.e. changes in states or roles for cohorts (within pathways) or individuals (within trajectories), e.g. moving from education to employment. **Turning points** are transitions that involve substantial change in an individual’s life, e.g., returning to education in midlife. Policy initiatives aim to transform and/or incentivise social pathways and, by doing so, provide opportunities for turning points, e.g. grants for starting your own business, or transitions at turning points, such as training programmes for unemployed people, that improve an individual’s wellbeing.

Indicators of Future Wellbeing



Source: New Zealand Treasury

Key Recommendations

This briefing suggests the following approach for policy with impact:

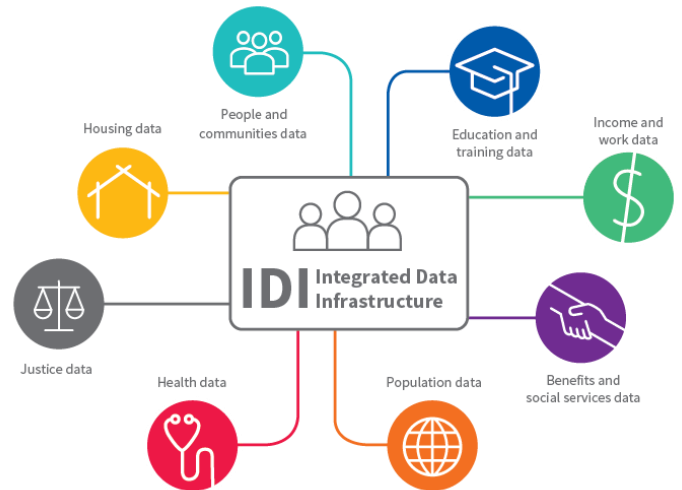
- Co-design should be an integral part of policy modelling
- Use narratives and linked data to identify social trajectories
- Examine how current policy identifies social pathways
- Model the interaction between trajectories and pathways, with a focus on (potential) turning points
- Overlay wellbeing measures to enable comprehensive policy evaluation
- Evaluate current and (potential) future policy to find high impact combinations

Longitudinal cohort studies such as Growing up in New Zealand (GuiNZ) can identify trajectories for the cohort under study, but this approach can potentially be resource intensive at large scale (although exceptionally valuable for validating large scale approaches). In addition to the sample of trajectories provided by GuiNZ, the narratives of the GuiNZ cohort and, indeed, narratives provided by domain experts and front-line workers, provide valuable information about pathways, trajectories and (in particular) transitions.

Linking Data to Identify Pathways and Trajectories

Once narratives about pathways/trajectories and samples of trajectories have been collected, they can inform data sources for developing evidence-based pathway and trajectory models. These data sources are particularly useful if they can be linked so that cross-sector information is available for individuals.

One example of a linked data source is the Integrated Data Infrastructure (IDI), that is curated by Statistics New Zealand. The IDI has linked data for individuals from many sources including housing, health, employment and education. Other organisations with linked data on individuals may include ministries, district health boards, hapū, iwi and local councils.



Process discovery techniques can be used to map and analyse existing and hypothetical pathways, by transforming time-stamped data for individuals, such as the data available in the IDI, into trajectories for those individuals (similar to the trajectory data being produced for the GuiNZ cohort).

This innovative approach involves co-discovery and co-design though out the process, combining quantitative and qualitative methods to provide a mix of granular and big data. It offers a scalable, low-risk and cost-effective virtual policy model that enables policymakers to evaluate policy interventions in advance

Building Pathway and Trajectory Models

Given a set of individual trajectories (e.g. from GuiNZ or extracted and then discovered from the IDI), existing transitions between states/roles can be investigated and analysed to create predictive models of probable transitions for individuals with given characteristics, e.g. demographics, current state of health/employment, etc. These transition models can then be “stitched” together to create predictive trajectory models for individuals. Finally, these trajectory models can be integrated with either currently defined social pathways (determined by current policy initiatives), and/or provisional pathways (e.g. defined by potential policy initiatives) to provide a pathway model for society (or at least the cohort of interest) that reveals how various policy initiatives affect individual trajectories and, hence, individual outcomes. Moreover, these outcomes can be integrated with wellbeing measures, e.g. the Living Standards Framework, to evaluate the effect of existing or potential policy initiatives on wellbeing.

Conclusion

Evaluating policy initiatives is a wicked problem and inherently difficult. We can address this by considering how policy decisions inform social pathways across multiple sectors, and how trajectories through these social pathways affect individual wellbeing outcomes. Trajectory data and narratives of lived experience that complement large, linked datasets, provide the opportunity to construct models that can accurately predict wellbeing outcomes at scale. Policymakers can use these models to assess the efficacy of policy initiatives, quantifying their contribution to wellbeing. This approach combines ideas and methods from the policy and social sciences, co-design, data science and mathematical modelling to address the wicked problem of policy design.

To find out more about this research, please visit: <https://orua.auckland.ac.nz/project/policy-planning/>
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