



Dynamic clustering and transport appraisal

Transport projects can transform an area in many ways besides just improving or increasing transport links. This includes changing an area's density and type of businesses, residences and users – 'dynamic clustering'. As a relatively novel area, research and guidance on appraising projects for dynamic clustering is needed.

In this study, researchers developed a framework to assess if, how, and how much transport interventions affect dynamic clustering. They also researched how to assess the economic impact of dynamic clustering. They asked:

- What is dynamic clustering's value to society?
- Does it add to the other impacts of transport intervention?

How was the research done?

The researchers reviewed literature from peer-reviewed academic journals, reports and guidance documents intended for transport appraisal practitioners, as well as work by practitioners on appraising transport schemes.

Then they developed a flexible approach to appraising the economic impacts of dynamic clustering from transport intervention.

Finally, the researchers used two case studies to demonstrate the appraisal framework:

- Waterview Tunnel – a road transport project in Auckland, New Zealand. The tunnel significantly altered journey times and accessibility in and around Auckland. These changes affect land use and alter the economic benefits of the project.
- Northern Line Extension – a rail project in London’s Underground. This project involves coordination of land-use and transport, so facilitating dynamic clustering is a key objective.

The results on appraising dynamic clustering

There were five points to the researchers’ main findings:

1. Appraising dynamic clustering is important, complex and challenging.
2. Practitioners should be guided by the literature, which is extensive and evolving. They should understand the reasons why businesses and individuals might relocate due to changes in connectivity, and the reasons why agglomeration benefits are likely and over what timeframes.
3. There is no ‘one size fits all’ approach to assessing dynamic clustering impacts. Much depends on the specific context. Practitioners should use a well-developed economic narrative that sets out what economic impacts are expected from the project and why. They can use the following tools developed by the researchers:
 - a. logic maps, which set out the transport project’s expected impacts given the various contexts and market failures relevant to the project
 - b. appraisal summary tables, which summarise the expected impacts of the project
4. It is very important that robust, dynamic analysis is done beyond static analysis to ensure that sound decisions are made on specific projects. Users should recognise and clearly state the strengths and weaknesses of the analysis. This will help others to understand and trust the method chosen.
5. There is a great deal more work that could and should be done in the area, including:
 - a. applying the researchers’ framework on a ‘live’ project
 - b. developing the use of spatial computable general equilibrium models
 - c. refinements to existing approaches using land use transport interaction modelling
 - d. further developing and evaluating the induced demand approach to benefits estimation alongside a robust wider economic impact framework approach
 - e. gaining a deeper understanding of the labour market
 - f. studying elasticities of land supply
 - g. researching locational choice models
 - h. further analysis of consumption amenity benefits.

- c. the methodology funnel, which helps assess which types of analytical approach are most appropriate for the project
- d. a checklist of reasons why dynamic clustering might be truly additional rather than just due to displacement
- e. a high-level summary of the likely magnitudes of different impacts
- f. some model selection criteria, including:
 - i. using rigorous and context-specific narratives and evidence
 - ii. ensuring that analysis is soundly based on economics
 - iii. validating the results by checking forecast accuracy
 - iv. using uncertainty quantification to avoid the risk of inaccuracy
 - v. using a ‘trust-test’ when explaining the approach to a non-expert, which should include why the approach chosen is best in the specific context, the results found, and why they are likely.



RR 680 – *Dynamic clustering and transport appraisal*, Waka Kotahi NZ Transport Agency research report. Available at www.nzta.govt.nz/resources/research/reports/680