

EFFECTIVE APPROACHES TO INCREASING ACTIVE TRANSPORT IN NZ

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ABSTRACT

For over 20 years, governments in New Zealand have had the policy objective of increasing walking and cycling mode share. A review of the data shows that levels of active transport have remained stagnant, and in some cases, have actually decreased. This presentation uses data prepared as part of an Austroads project that examines the effectiveness of interventions to boost active transport mode share.

A prioritisation framework is offered, allowing governments to select the interventions that are most impactful in boosting active transport mode share. The findings of this study show that ambitious initiatives are required in order to boost levels of walking and cycling. Two decades of policy support for increasing active transport mode share may have stopped or slowed falls in walking and cycling levels but has not yet succeeded in achieving widespread and large increases. This presentation also highlights how, in addition to impact, an intervention's cost and complexity is also necessary to make informed decisions.

The presentation concludes with the insight that in order to grow active transport mode share, a mix of interventions will be required, including those that reduce or remove current incentives that encourage car use alongside interventions designed to encourage walking and cycling.

INTRODUCTION

This paper offers an overview of the actions that governments in New Zealand (NZ) can take to increase active transport mode share. This is important given that many governments in NZ have had long standing ambitions to grow levels of walking and cycling, and yet, in most instances, these ambitions remain largely unrealised.

The purpose of the paper is to:

- Support transport agencies and local governments to increase the mode share of active transport.
- Provide guidance that is actionable today.
- Provide recommendations for better incorporation of key initiatives and actions within government issued guidance related to active transport.
- Reduce pressure on agencies to undertake guidance development in parallel to meet emerging pressures.

Consideration of both incentives and disincentives emerged as critically important when seeking to grow active transport mode share. The review of the literature and the subject matter expert interviews conducted for this paper found that without the application of both incentives and disincentives, active transport mode share is unlikely to increase.

The actions have been selected based on a prioritisation framework developed for the Australasian context, via an Austroads funded project (Austroads, 2024), completed by the authors of the current paper. The framework has been used to shortlist the broader set of actions. The overarching objective of the prioritisation is to highlight the interventions most effective in growing active transport mode share. The actions are accompanied by guidance regarding their suitability for different parts of Australasia (e.g., inner city, suburban and regional). This paper is designed to provide practitioners with guidance on the suitability and impact of different interventions to increase active transport mode share in NZ.

ACTIVE TRANSPORT IN THE NZ CONTEXT – BACKGROUND

Compared to many other OECD countries, NZ (and Australia) have low levels of active transport mode share. This section highlights levels of active transport using available NZ data, as well as selected other countries/cities. Australia and New Zealand have among the lowest number of trips completed by bike, with only 1.4% and 2% of the national population commuting by bike to work, respectively (Buehler & Pucher 2021).

The mode share for journeys to work across New Zealand regional councils in 2018 is shown in Figure 1. Walking and cycling trips to work are highest in Nelson Region (Nelson, with 15.5%), followed by Wellington Region (Wellington, with 14.1%) and Otago Region (Dunedin, with 13.2%). The two most populous council regions of Auckland and Canterbury (Christchurch) have lower active transport mode shares, of 5.8% and 9.1% respectively. When looking at cycling trips however, Christchurch comes second only to Nelson in terms of cycling commute mode share. As is the case with large Australian cities, it is likely that Auckland has areas with higher public transport mode share. Across New Zealand as a whole, census data shows that 8.1% of all trips to work were by walking or cycling in 2018.

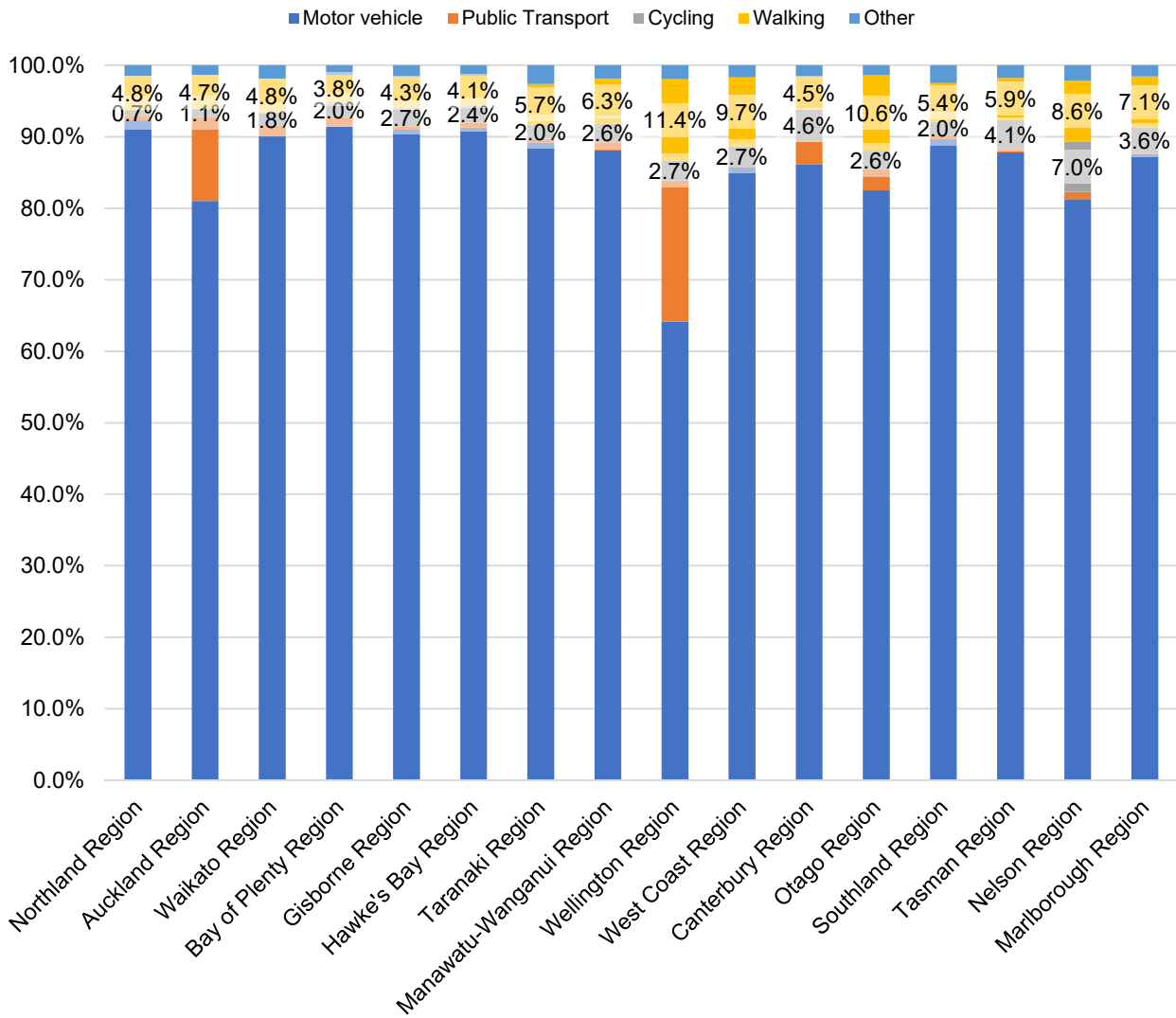


Figure 1 Mode share for journeys to work for NZ regional councils

Source: Stats NZ Tatauranga Aotearoa (2018)

Many public agencies in NZ have had a policy commitment over the last two decades to increase the proportion of trips done by active modes. Reviewing journey to work mode share in NZ since 2006 (see Figure 2), car driving has risen, from 76% to 82% (2006 to 2023) of trips, while walking has reduced from 7.1% to 5.2%. Cycling has stagnated, at around 4%. This hides some local increases in cycling. For example, following investment in cycling infrastructure, trips to work by bike have risen significantly in the 2023 Census in Christchurch, Nelson and Wellington. On a more national level however, while the measures taken to grow walking and cycling participation may have been useful, they have been insufficient to achieve the aspirations, from government and the community, for a more sustainable transport system.

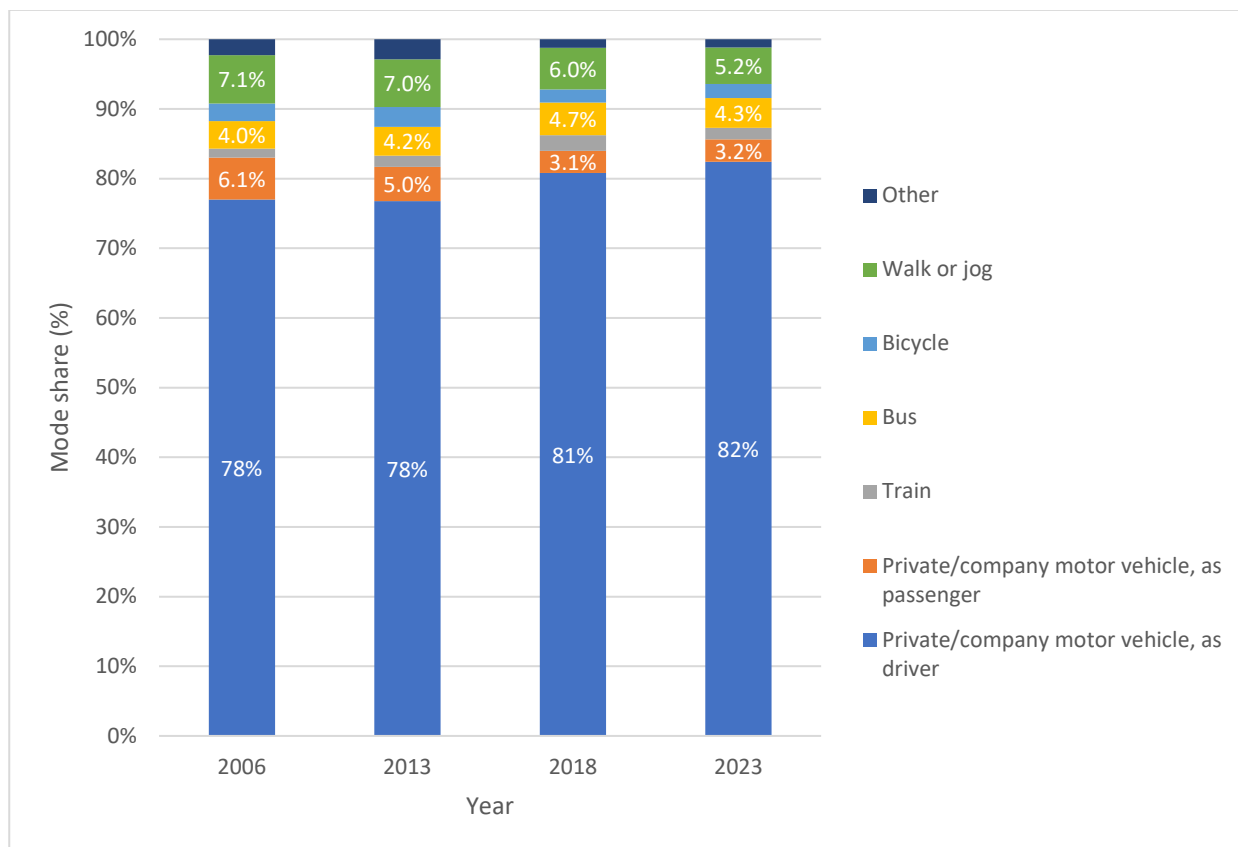


Figure 2 Mode share changes, NZ

Source: Stats NZ Tatauranga Aotearoa (2013, 2018, 2023)

The New Zealand Census also contains information about journeys to education, which have a much higher active transport mode share across New Zealand than journeys to work, with 25.5% of journeys to education being walked or cycled. The top three council regions are again, Nelson (39.9%), Otago (39.5%) and Wellington (30.5%). Auckland and Canterbury were again lower, at 23.4% and 28.5% respectively.

BARRIERS TO ACTIVE TRANSPORT

Active transport mode share in NZ is low compared to many other developed countries. There have been no sustained increases in walking and cycling levels in Australasia over the past two decades, despite an increasing number of policies over this period calling for a growth in active transport. This section offers a summary of some of the key barriers to walking and cycling. Concerns around safety are the most commonly stated barrier for cycling. Primarily, this relates to concerns interacting with motor vehicles. While there are some overlaps with cycling, barriers to walking are different. Security concerns and distance are key barriers to walking.

A synthesis of the major barriers to active transport has been captured in Figure 3. This group of barriers was developed following a review of the peer reviewed literature (see Austrroads, 2024). In many cases, the magnitude of the barrier will differ for walking and cycling. For instance, distance will generally be a more powerful barrier for walking than cycling (up to a point), and mixing with motor vehicles will typically be a more front-of-mind concern for people considering cycling than walking. A summary of key barriers and facilitators to cycling, encompassing a range of different studies on the subject can be found in Boufous et al., (2021).

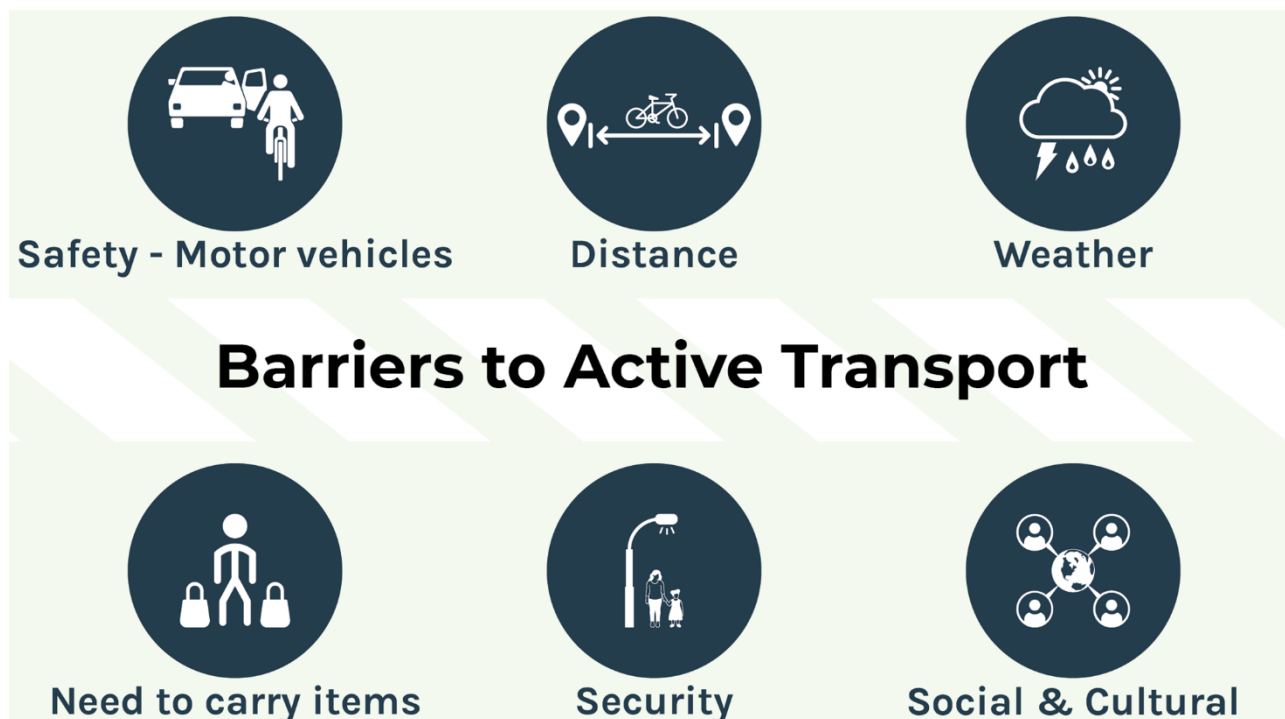


Figure 3 Major barriers to active transport

Weather is identified in Figure 3 and while it is known that weather does impact active transport levels (Böcker et al., 2019), its effect is not straightforward. Some cities with cold, wet winters, such as Copenhagen and Amsterdam actually have some of the highest levels of cycling (Buehler & Pucher, 2021), suggesting that other factors have a more powerful impact on participation. During periods of ice, snow, and rain, cycling remains a common mode of transport in the Netherlands (e.g. see Figure 4). The quality of the infrastructure network makes cycling in these conditions less of a barrier than in cities without an extensive network of protected bicycle infrastructure. Thus, while poor weather will reduce active travel, the provision of high-quality infrastructure (and also good quality weather protection attire) will boost the degree to which people are willing to cycle.



Figure 4 Cycling is common in the Netherlands, even when weather conditions are poor

One factor not included in Figure 3 that can be important in NZ is topography. Hills reduce people's interest in active transport. As the growth in the use of e-bikes continues, it is likely the barriers of distance and hills will begin to diminish. Researchers have established that those riding e-bikes are willing to ride further and are less deterred by topography than those riding regular bicycles (Popovich et al., 2014).

Social and cultural factors are listed in Figure 3 and require a brief explanation. Social-cultural factors are often subtle, indirect and unrecognised (Garrard et al., 2006). The status of cycling is an example of an important social influence on whether people view active transport as an option when deciding their mode of transport (Frater & Kingham, 2020). In countries in which there is no social stigma or negative status attached to active transport (e.g., Denmark or the Netherlands), people are less likely to experience social and cultural barriers to walking or cycling (Frater & Kingham, 2020). Conversely, where active travel is a minor contributor to mode share, social and cultural factors are likely to diminish people's willingness to see these modes of transport as attractive. In these cases, drivers can perceive cyclists to form a minority 'outgroup', and they are viewed negatively (Basford et al., 2002). Australian research has revealed similar findings, with cyclists being dehumanised by other road users (Delbosc et al., 2019).

METHODOLOGY

This paper presents the results of a prioritisation framework, developed to identify the actions most effective in boosting active transport mode share. An intervention pyramid (see Figure 5) is used to classify the major intervention types. The prioritisation framework helps decision-makers allocate resources and attention to the most impactful and strategically important actions. Additionally, this paper provides guidance as to the suitability of the prioritised actions for different parts of Australasia; recognising that what might be suitable in inner city Auckland may not be suitable for Invercargill or Oamaru.

The timeline shown on the right-hand side of Figure 5 indicates an approximate timeframe for each of the different layers of intervention. Land use planning to boost density and diversify land uses will take decades to achieve, as will the development of a mature bicycle network.



Figure 5 Intervention pyramid and implementation time

Intervention categories

The interventions have been systematically categorised using the intervention pyramid shown in Figure 6. This categorisation allows for a comprehensive and standardised comparison within each pyramid tier, for all actions reviewed as part of this project.

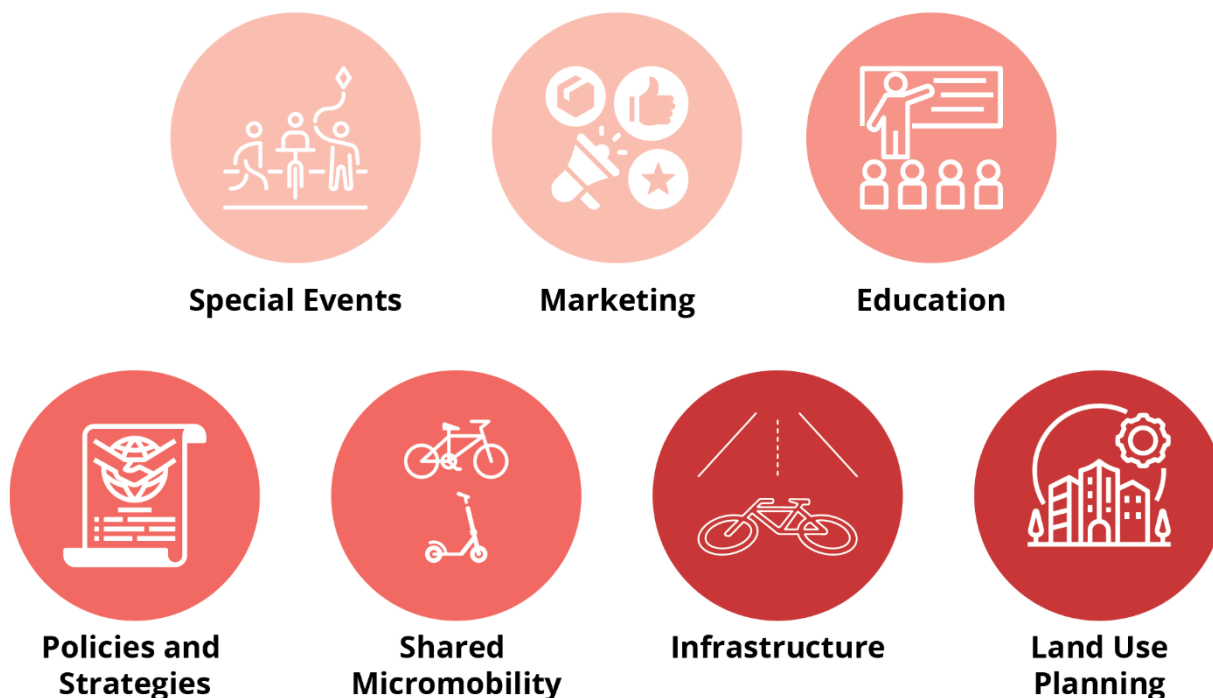


Figure 6 Intervention categories

Variables included in the prioritisation framework

Impact, *Complexity* and *Cost* are the three key variables used in the prioritisation framework. A total of 168 documents (peer reviewed and grey literature) were used to create a database of intervention types. Researchers have used a variety of different outcome metrics to express the impact of different interventions. As a consequence, this paper has harmonised the diversity of factors researchers and government reports have used when describing the impact of different interventions. For comparative analysis, the paper collates studies that share similar metrics within each layer of the pyramid shown in Figure 6. For example, all the studies reporting their effects on the *mode share* within a layer of pyramid are compared together and categorised into "Low," "Medium," and "High" categories. This similar approach is also employed for other assessments of impact with other metrics, such as *time spent* in active travel. The factors considered in the prioritisation framework are shown conceptually in Figure 7 and described immediately below.

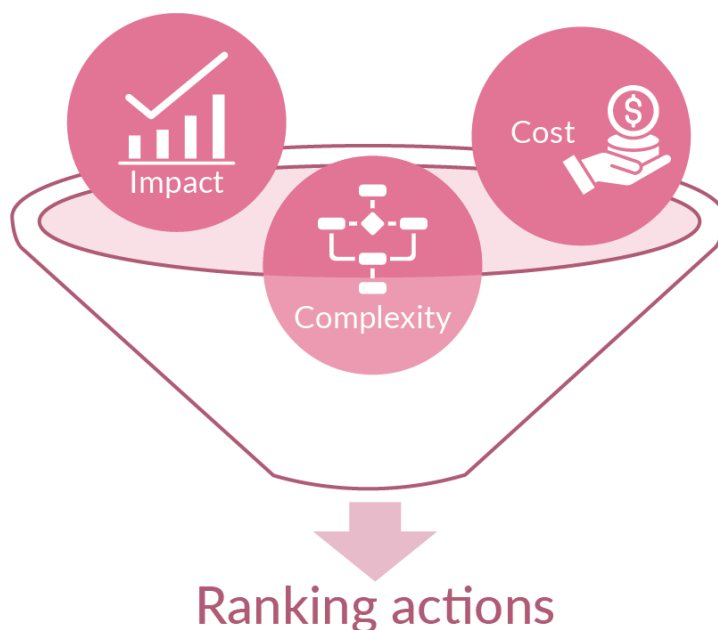


Figure 7 Variables included in the prioritisation framework

Impact

Impact is a key variable within the prioritisation framework and is divided into two elements:

- impact on increasing active transport mode share and
- impact on enhancing safety.

Understanding the extent to which specific actions influence *travel behaviour* and *safety* is essential to growing active transport mode share.

Complexity

The complexity of an intervention has been included in the prioritisation framework and has two elements; *technical difficulty* and *political considerations*. The evaluation of complexity was made based on the intervention category and professional judgement (as the literature very rarely offers objective metrics regarding an intervention's complexity to implement).

Cost

The prioritisation framework considers cost as a multi-dimensional factor made up by up-front costs, ongoing costs, as well as possible revenue generation. Cost, for the purposes of this prioritisation assessment, is *cost to government*. Interventions that may be costly but borne primarily by the private sector are not rated as costly (although they may have larger political considerations), compared to projects that are financed by government alone. Finally, the *duration of impact* is also integrated into the cost rating.

Approach to ranking and scoring actions

Each action was given a score comprising impact, cost, and complexity. The score weighs an action’s impact against its cost and complexity. This prioritises actions that have medium impact, and medium cost and complexity over actions that have medium impact, but high cost and complexity.

For each action, its impact, cost, and complexity was assessed as high, medium, or low. These assessments were converted to numeric values, as shown in Table 1. The overall score was calculated as:

$$\sqrt{(2i \times (p + c))}$$

In the equation above, *i* is impact, *p* is cost, and *c* is complexity.

The impacts of an intervention are compared against the cost and complexity of the intervention. For this reason, impact is weighted double, so that it is equal to the cost and complexity. This ensures that each intervention’s prioritisation score balances impact on one hand, with cost and complexity on the other.

A *mean square* calculation is used to provide a composite score of impact against cost and complexity. The advantage of a mean square over simply adding the scores together is that it weighs projects that have more even scores across all criteria higher. As an example, a project with medium impact and medium cost and medium complexity would score an 8 if all values were added (and impact worth double), and score 4 under the mean square equation above. However, a project with low impact and low cost and low complexity would also score 8 if all scores were added (and impact worth double), but score 3.5 using the mean square equation.

Table 1 Prioritisation ranking

	Impact	Cost	Complexity
High	3	1	1
Medium	2	2	2
Low	1	3	3

RESULTS

This chapter presents the results of the prioritisation process. Table 2 provides the intervention prioritisation results (ranging from 2 – 6), with those in bold achieving above the inclusion threshold of four. Table 2 also identifies if the intervention is considered *discouraging* of car use or *encouraging* of active transport, or both. Interventions that work to both discourage car use and increase active travel are often the most impactful in boosting active transport mode share. The scores in Table 2 are calculated as set out in the section immediately above.

Table 2 Intervention prioritisation - results

Intervention	Pyramid category	Discouragement / encouragement	Score
Transit/Pedestrian Orientated Development	Land use planning	Encouragement	4.9
Car parking supply in the planning system	Land use planning	Discouragement	4.0
Bike modal filter	Infrastructure	Encouragement and discouragement	5.5
Bike lane - shared lanes	Infrastructure	Encouragement	4.9
Bike lane – painted lanes	Infrastructure	Encouragement	4.0
Bike lane – separated lanes	Infrastructure	Encouragement	3.5*
Bike lane – separated lanes (pop-up)	Infrastructure	Encouragement	4.9
Bike lane - quietways	Infrastructure	Encouragement	4.0
Shared paths	Infrastructure	Encouragement	3.5*
Walking - footpath	Infrastructure	Encouragement	4.9
Walking – crossings	Infrastructure	Encouragement	4.5
Walking - placemaking	Infrastructure	Encouragement	4.5
Pedestrianisation/ car free	Infrastructure	Encouragement and discouragement	2.8
Super blocks	Infrastructure	Encouragement and discouragement	3.4
Bike racks on buses	Infrastructure	Encouragement	3.4*
Bike parking at stations / shower	Infrastructure	Encouragement	4.9
In building bike parking and end of trip facility	Infrastructure	Encouragement	4.9
Bike share	Shared micromobility	Encouragement	5.5
E-scooter share	Shared micromobility	Encouragement	3.2*
Motor vehicle speed reduction	Policies and strategies	Encouragement	2.8
Public transport integration with walking and cycling	Policies and strategies	Encouragement	4.0
Road-user pricing	Policies and strategies	Discouragement	4.9
Car parking cost - on street parking cost	Policies and strategies	Discouragement	2.8
Car parking cost – off street taxes and levies	Policies and strategies	Discouragement	3.2
E-bike incentive	Policies and strategies	Encouragement	4.0
Cycling incentive – e-bike trial	Policies and strategies	Encouragement	3.5
Parking cash out scheme	Policies and strategies	Encouragement	3.5
Free public transport passes	Policies and strategies	Encouragement	2.8
Car share	Policies and strategies	Encouragement	3.2
Travel behaviour change programs	Education	Encouragement	5.5
School-based interventions – walking programs	Education	Encouragement	3.5*

Intervention	Pyramid category	Discouragement / encouragement	Score
School-based interventions – cycling programs	Education	Encouragement	3.5*
Ride 2 work day/ walk to work day/ walk in to work out	Special events and marketing	Encouragement	4.9
Ciclovias	Special events and marketing	Encouragement	4.2
PARK(ing) Day	Special events and marketing	Encouragement	3.2
Digital platforms and gamification	Special events and marketing	Encouragement	3.5

Results - Infrastructure

Given the importance infrastructure plays in influencing rates of walking and cycling (particularly cycling), it is worth specifically identifying the results of the prioritisation process for infrastructure specifically. Using the results shown in Table 2, the infrastructure initiatives have been plotted based on their *impact, cost and complexity*, as shown in Figure 8. Interventions in the top left-hand corner of Figure 8 were found to be high impact and low cost. While separated bike lanes were found to be impactful but high cost, its cost can be reduced using *pop up* infrastructure.

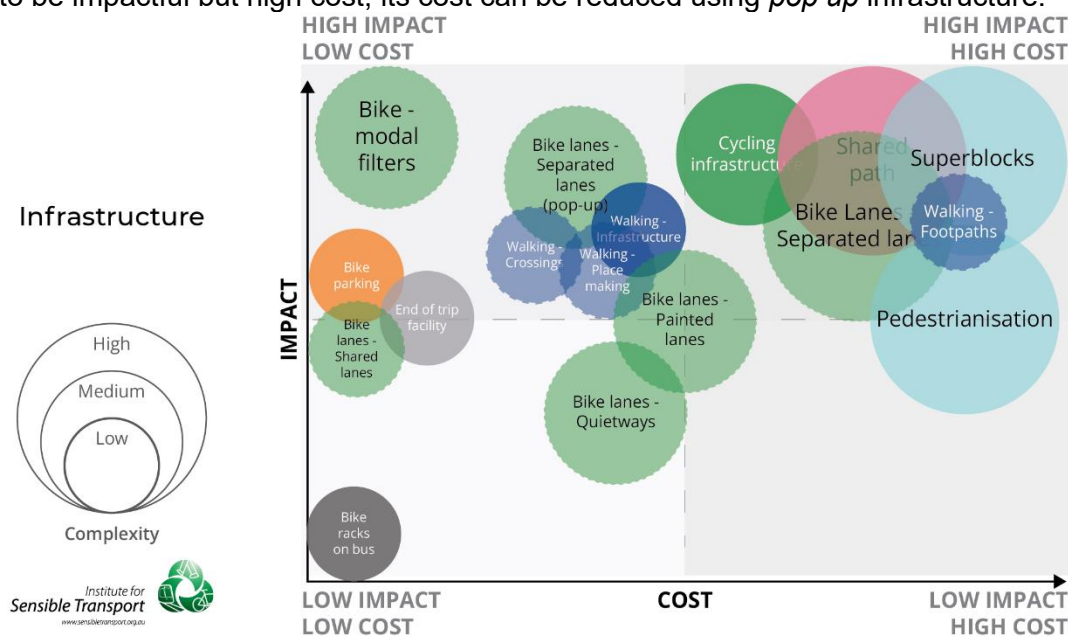


Figure 8 Infrastructure interventions ranking

CONCLUSIONS AND RECOMMENDATIONS

The purpose of this paper has been to support transport agencies and local governments seeking to increase active transport mode share. This report has provided an overview and prioritisation of interventions capable of boosting the proportion of trips by walking and cycling.

A key finding from this research is that increasing active transport mode share is difficult and that the initiatives that are currently being used are important but insufficient for achieving a more sustainable, resilient transport system. In order to broaden the appeal of walking and cycling in NZ, and give more people the option to choose these modes of transport, a greater focus on both

carrots and sticks is necessary. Without measures that make car use less convenient, it is unlikely that substantial shifts towards active transport are possible.

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AUTHOR CONTRIBUTION STATEMENT

This outlines the contribution made to the paper by each co-author.

Dr Elliot Fishman was project director and responsible for writing, reviewing literature, and engaging with Austroads and other stakeholders. Dr Liam Davies developed the metrics and evaluation framework. Takuya Katsu prepared the graphics used throughout the paper. Dr Mahsa Naseri reviewed papers and assisted Liam in the development of the evaluation framework.