‘I’ll just take the car’
Improving bicycle transportation to encourage its use on short trips
February 2011

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NZ Transport Agency research report 426

ISBN 978-0-478-37126-0 (print)
ISBN 978-0-478-37125-3 (electronic)
ISSN 1173-3756 (print)
ISSN 1173-3764 (electronic)

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Smith, P,[1] M Wilson[2] and T Armstrong[2] (2011) 'I'll just take the car' Improving bicycle transportation to encourage its use on short trips. *NZ Transport Agency research report no.426.* 132pp.

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Keywords: affective, bicycle, cycling, design, New Zealand, policy, practical, short trip, systems thinking, travel, urban, utility

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Acknowledgements

The authors also wish to acknowledge the significant contributions to the project made by Fleurine Barre Debilly and Loren Nolan.

The authors wish to acknowledge the valuable assistance received by:

- ARTA
- Brisbane City Council
- Bicycle Victoria
- Gregg Franz at Cykla, Australia
- Air New Zealand
- Countless bicycle industry importers and retailers in New Zealand and Australia who contributed to the market and solution reviews.

The assistance given by those who participated in the survey and workshops is acknowledged, as is the assistance given by the project reviewers, Simon Kennett, John Randal and Sam Maitland.

Abbreviations and acronyms

ARTA	Auckland Regional Transport Authority
BIANZ	Bicycle Industry Association of New Zealand
EPS	extended problem solving
LPS	limited problem solving
GPS	*Government policy statement on land transport funding 2009/10–2018/19*
GWRC	Greater Wellington Regional Council
LTSA	Land Transport Safety Authority
MoT	Ministry of Transport
NLTP	National Land Transport Programme 2009–2012
NZTA	New Zealand Transport Agency
NZTS	New Zealand Transport Strategy
RLTS	Regional land transport strategy (In this report RLTS refers specifically to the Auckland Regional Council's *Regional land transport strategy 2010–2030*.)
SoI	Ministry of Transport *Statement of Intent 2010–2013*
SPARC	New Zealand Sport and Recreation Council
WCC	Wellington City Council

Contents

Executive summary **7**
Abstract **9**
1 Introduction **11**
1.1 Product design methodology 12
1.2 Research questions 13
2 Literature and market review **14**
2.1 Short trips 14
2.1.1 Is our focus on short trips (up to 5km) valid?/Is the car the dominant transport mode for short trips? 14
2.1.2 Why do we make short trips? 15
2.2 Cycling in New Zealand 18
2.2.1 Do we cycle? 18
2.2.2 The next 1% of cyclists 19
2.3 Encouraging the market 20
2.3.1 New Zealand national cycling policy 20
2.3.2 Overseas comparison 24
2.3.3 New Zealand local cycling strategies 28
2.3.4 Summary of New Zealand cycling policy 31
2.4 Understanding the market 33
2.4.1 Why do we choose to drive? Why don't we choose to cycle? 34
2.5 How do we target the 'next 1%' of cyclists? 40
3 Solution review **44**
3.1 Cycling solutions 44
3.1.1 Why do cyclists need products and services? 44
3.2 Products in New Zealand 45
3.2.1 Can cyclists easily source suitable products in New Zealand? 45
3.2.2 Accessories 56
3.2.3 Accessibility 58
3.2.4 Services in New Zealand 62
4 Practical cycling survey **64**
4.1 Survey methodology 64
4.2 Survey results 64
4.2.1 Demographic 64
4.2.2 Location 66
4.2.3 Overseas experience 67
4.2.4 Cycling experience 68
4.2.5 Observation of cycling 70
4.2.6 Media consumption 72
4.2.7 Cyclist imagery 74
4.2.8 Cyclist imagery – summary and analysis 84
4.2.9 Bicycle imagery 86
4.2.10 Bicycle imagery – summary and analysis 96

5 Practical cycling workshops 100
5.1 Workshop process 100
5.2 Workshop outcomes 103
5.2.1 Summary of bicycle impressions 103
5.2.2 Summary of ride impressions 108
5.2.3 Summary of perception data 109
6 Design model 114
6.1 Introduction 114
6.2 Practical cycling system model 116
6.2.1 Planting the cycling seed 116
6.2.2 Making it easy to choose to ride a bicycle 118
6.2.3 Creating a pleasurable cycling experience 119
7 Conclusion 121
7.1.1 System assessment 121
7.1.2 System goals 123
7.1.3 Initiative design 123
7.1.4 Practicalities of implementing the model 125
7.1.5 Examples applied to the model 126
8 Recommendations 128
9 References 129

Executive summary

Cycling for transport in New Zealand is a minority activity, with fewer than 2.5 % of trips made by bicycle. The car is the most popular choice of travel mode by far and two thirds of all driving trips in New Zealand are less than six kilometres long. However, recreational cycling is booming, and has been growing in popularity for a number of years. Between 2002 and 2009, government, local authorities and communities demonstrated a clear desire to encourage more practical cycling in New Zealand as part of a sustainable transport network, but there was limited understanding of who would be the next practical cyclists and how to encourage them. New Zealand saw a change in government in 2009, and the release of a revised land transport policy which stated a reduced desire to encourage travel mode change to walking and cycling. The policy considered funding for walking and cycling infrastructure over a three year period which for 2009/10 – 2011/12 totalled $51m, an average of $17m each year. This was comparable to spending in 2008/09 and higher than spending in years prior to 2008. There is little information regarding the amount of travel demand management funding available to cycling and walking projects and the reduced desire to encourage travel mode change does not suggest that funding increases will be forthcoming. If local authorities and community groups are to continue to benefit from more practical cycling within this revised funding environment it is even more essential that they understand who to target and how they might be encouraged to cycle.

This project, which started in July 2008 and ended in June 2010, used a novel approach compared with previous attempts to increase levels of practical cycling. The affective design methodology, with a core focus on desirability, experience and appreciation of products, was applied to the design goal of increasing practical cycling in New Zealand. Affective design maintains focus on the user. The project also assumed that practical cycling is a multi-layered system, where individual parts of the system demonstrate a complex level of interaction and must be considered holistically.

In the 1950s and 1960s cycling was a dominant travel mode in New Zealand and overseas. However, increased use of the car saw that dominance fall dramatically. The key difference between countries that now have high levels of practical cycling and New Zealand is the swift response of those countries to implement policy favouring cycling and walking. In this respect, New Zealand is decades behind. However, a comparison with cities that have seen significant recent gains in practical cycling levels, such as London, suggests that New Zealand could see a similar change within a decade or less. A review of overseas best practice shows that a thoroughly designed and integrated local policy is effective at developing underlying positive attitudes to cycling. This includes policies that directly encourage cycling, but also those that indirectly affect cycling (such as inclusive urban planning policies that encourage shorter trips and transport policies that discourage driving). New Zealand policy is more fragmented and incomplete. Encouragement of practical cycling generally takes a simplistic, discrete approach rather than considering the effects of initiative on the whole system.

A review of relevant literature uncovered significant psycho-social aspects of choosing a travel mode. The decision to cycle (or not) involves a complex balance of functional requirements (overcoming barriers to cycling and fitting the activity into current lifestyle) and attitude. Attitudes are shaped by indirect experience of the activity (such as media coverage, peer opinion and observation). The theory of diffusion of innovations and the contemplation of change model assist in describing the potential for spread of cycling and offer insights into who might be the next practical cyclists and how they can be targeted.

A review of practical cycling-related products, services and facilities (the ‘tools’) in New Zealand clearly showed that the market is heavily biased towards recreational cycling. This limits the choice and

accessibility of practical cycling tools. This is particularly relevant to potential cyclists, who have little or no cycling experience and are not attracted to the enthusiast-dominated recreational market.

A 2009 survey of 234 New Zealand residents, mainly located in Dunedin and Wellington, and consisting of current cyclists and non-cyclists, revealed that cycling was visible to most people, regardless of whether or not they cycled themselves. However, practical cycling was less easily observed and was perceived as a risky and strange activity associated with lower status. Practical cycling is not an aspirational activity and this results in non-cyclists creating many barriers to cycling (both real and perceived).

The survey presented the respondents with images of cyclists and bicycles. There were some clear differences in perception of the familiar recreational cyclists and bicycles for current cyclists and non-cyclists. In all cases, non-cyclists perceived these bicycles (and using them) to be more strenuous, risky and firmly in the realm of young, fit males. However, the images of bicycles and cyclists that were not considered to represent cycling in New Zealand (practical bicycles and cyclists) created agreement between current cyclists and non-cyclists, and in many cases the non-cyclists held a higher opinion of the cyclists and bicycles pictured. Given the lack of cycling experience, the perceptions of non-cyclists were clearly developed from an indirect experience of cycling.

A series of practical cycling workshops, held in Dunedin in February 2010, were used to investigate the effects of direct experience of riding and cycling products on the perception of practical cycling. The workshops had 15 participants, solicited from the survey, and whose collective profile was similar to the profile of the complete survey population. Each participant offered their perceptions on a number of bicycles and practical cycling as it related to them, through informal interview, before and after a short practical bicycle ride. The results clearly showed that direct experience of practical cycling changed perceptions of the activity. It also positively affected the aspiration to cycle and assisted in removing perceived barriers. Participants with little experience of cycling, or the practical cycling tools presented to them, were able to quickly and easily make reasonable decisions as to which equipment and services would be beneficial to improve the practical cycling experience.

In conclusion, a 'practical cycling system design model' was proposed to address the holistic design approach needed to understand and encourage practical cycling, and to ensure that practical cycling was positioned as an aspirational activity. This is summarised below:

Planting the cycling seed

1 Practical cycling is a normal activity
Government, councils, employers, community groups and the mass media portray cycling as a socially acceptable, normal activity.

2 Practical cycling is positively visible
Seeing cyclists and cycling tools in the environment creates a good impression of the activity.

Making it easy to choose to ride a bicycle

3 A wide range of relevant practical cycling tools are available and are easily accessible
There is a choice of tools that meet basic needs for transportation and generates excitement about practical cycling. The tools, and information about them, can be found easily and offer flexibility to be fitted into life.

Creating a pleasurable experience

4 The first experience of practical cycling is perfect
The expectations of practical cycling are met or exceeded by direct experience, and any negative perceptions are removed.

5 The continuing experience of practical cycling is positive
The feasibility of regular practical cycling is addressed by providing an ongoing positive experience.

A route to implement the model was proposed, which used local coordinators to manage the model for a defined environment. In addition, there were three key recommendations arising from the research:

- **Position cycling as an aspirational activity**. Address the perception of practical cycling as risky, strange and of a lower status than driving by re-assessing the emphasis put on the promotion of cycling by stakeholders, moving away from the focus on safety and infrastructure, and developing a real understanding of the potential cyclist market needs.
- **Establish a best practice approach for the design of initiatives to encourage practical cycling**. Initiatives and actions in New Zealand to encourage practical cycling tend to be poorly designed and/or implemented. It is common practice in the design of successful products and services to apply an iterative development cycle to achieve a high-quality design relevant to the target market and to continuously improve through measurement of successes and failures.
- **Implement the practical cycling system model as a pilot study**. Pilot the model in a small and carefully controlled environment, and gather further information about the dynamics of such a practical cycling system. This offers an opportunity for further research into providing data to confirm the model.

Abstract

Cycling for transport in New Zealand is a minority activity, yet the recreational cycling market is growing. The car is the most popular choice of travel mode by far. There is a clear desire to encourage more practical cycling in New Zealand, but limited understanding of who will be the next practical cyclists and how to encourage them. This research, from July 2008 to June 2010, applied the affective design methodology to the goal of increasing practical cycling in New Zealand. A literature review revealed that overseas best practice is for integrated local cycling policies. Theories of diffusion of innovations and contemplation of change were highlighted and used to inform the project. A review of the New Zealand cycling market showed limited choice of and access to practical cycling tools. A survey of 234 New Zealand cyclists and non-cyclists demonstrated differences between the groups in perception of bicycles and cyclists, with more agreement for unfamiliar practical cyclists and bicycles. Practical workshops explored the effect of direct cycling experience on perceptions. A ‘practical cycling system design model’ was proposed, along with recommendations for its implementation.

1 Introduction

Throughout the report, a differentiation is made between practical cycling (also referred to as transport, urban or utility cycling) and recreational cycling. Practical cycling is defined as riding a bicycle as transportation to achieve another purpose (such as commuting to work or to the shops), whereas recreational cycling is defined as riding a bicycle with no other practical purpose.

Cycling is recognised, within New Zealand, as a desirable and necessary part of a sustainable urban transport system (MoT 2005). A 1997/8 Land Transport Safety Authority (LTSA) survey showed that two thirds of all driving trips in New Zealand were less than 6km long, and one third were less than 2km long (LTSA 2000), which suggested that the car remained a popular choice for undertaking short journeys.

In 2006, over a third of New Zealanders questioned agreed that they could replace up to two car trips a week by walking or cycling (Sullivan and O'Fallon 2006). However, the uptake of cycling as transport within our urban centres has fallen far short of expectations. In 2006, only 2.4% of journeys to work were made by bicycle (Land Transport NZ 2007) and in 2005 to 2009 only 1% of all trips were made by bicycle (MoT 2009a), despite the majority terminating at home or a place of work.

Research and anecdotal evidence suggest a number of reasons for the low uptake of cycling as a mode of transport; infrastructure and road user conflict issues are important concerns for both cyclists and non-cyclists (LTSA 2004). In June 2007, Land Transport NZ reported that between 1989 and 2006 the number of cycling trips reduced by 51%. There are a number of societal changes which may have influenced the level of cycling in New Zealand during this period (such as increased ease of car ownership, education policy and changes in lifestyle and working patterns). However, the concerns of cyclists and non-cyclists suggest the cumulative effect was that the environment for cycling was perceived as being less safe and less convenient (Land Transport NZ 2007). Non-cyclists offered further factors such as inconvenient local geography and weather, inadequate bicycle security, and poor load carrying capacity as further reasons for turning to the automobile for short journeys.

Many initiatives aimed at increasing cycling in urban areas focus on promoting bicycles to non-cyclists. However, in a country such as New Zealand with a strong dependence on the automobile, any such initiatives must overcome the poor perceptions of cycling safety and convenience. A catch-22 situation arises where cyclist numbers will not grow until cyclist numbers grow enough to achieve a critical level of visibility. Countries and cities that have developed a strong cycling culture have reached this tipping point (for example London, Portland Oregon, and many Dutch and German towns and cities) through a combination of cycling infrastructure design, effective promotion of cycling, and the availability of products tailored to the local market.

One such project promoting cycling in New Zealand is *Bike Now* (O'Fallon 2010). This provides data regarding factors influencing people's decisions to cycle or not cycle to a workplace, and encourages workplaces to offer improved facilities to motivate cycling to work. However, approaches such as this do not focus on understanding the transport needs of users for short journeys. There is a gap in knowledge that requires a methodology aimed at understanding user and stakeholder needs, and evaluating the suitability of existing and new solutions to encourage cycling among user groups that lend themselves to cycling.

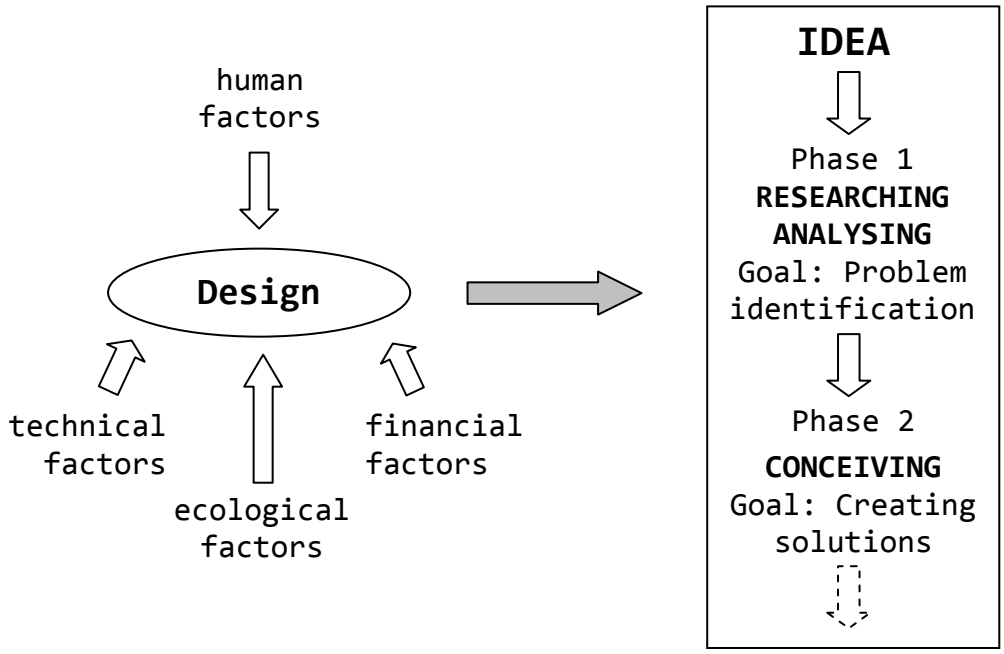
1.1 Product design methodology

> *The role of design is to respond to peoples' changing needs with the requisite sensitivity, intelligence and imagination to enable the integration of those needs into the cultural, economic and ecological environment. By fulfilling this role, design can improve the quality of life.* (Heufler 2004)

Product and service design is a creative discipline that uses a rigorous methodology to gather stakeholder and end user needs, and create products and services to meet those needs.

The process considers four types of *determining factors* (figure 1.1) that may influence the design. These can be rational to irrational, and evaluation criteria may range from objective to subjective. The aim of the design process is to manage all factors present and generate a design of a product, service or facility to satisfy those factors.

Figure 1.1 Determining factors in the design process



This research project applied the design methodology to the **idea** of increasing the use of bicycle transport for short (< 5km) journeys.

The primary focus was the needs of the users and stakeholders, and each of the four factors shown above were considered as they relate to users and stakeholders in the identified target market. The idea is fluid to start with, but becomes firmer as the design process advances and determining factors are better understood. Eventual solutions to the identified problem may be applications of current solutions or new solutions developed during the process. The discipline of *affective design* considers the experience of using a product and is particularly appropriate when considering products and services that are part of a larger and more complex system, such as practical cycling. The affective design approach considers that product appeal changes over time as the level of immersion with the product progresses. It involves three central concepts (Massey University 2008):

1 *Desirability* is the aspiration of owning and using the product. This is related to personal identity, cultural and social values and self-representation. Ideally, your product is the one that people are

talking about, that they crave for, and that they eventually end up buying. In order to be successful, your product must be more desirable than the competition.

2 *Experience* arises from perceiving and interacting with the product. This is where the greatest opportunity, and risk, of the product success lies. If the product meets or exceeds the expectations of the user, they will spread the word. If not, they will spread the word as well, but to many more. For your customers to choose your product next time as well, you want to make sure that they have the best possible experience with the product during the life cycle of use and ownership.

3 *Appreciation* includes the long-term appeal of the product, which arises partly as a result of desirability and experience. Appreciation has to do with all factors of perceiving and interacting with the product, and how the customer assesses and interprets the product on the basis of the design.

Applying the three concepts to the goal of encouraging more practical cycling is a novel approach. Our 'product' is practical cycling and the competition is all other transport modes, in particular driving. The focus of the first concept, desirability, is on understanding the identity, cultural and social values of the potential practical cyclists and ensuring that practical cycling is aspirational for them. The aim of the second area is to meet or exceed the expectations the user has for the product, and the third area introduces long-term appeal. The overall approach differs from previous cycling campaigns, which tend to concentrate on removing barriers to cycling and providing simple reasons to ride (such as financial, convenience or environmental). The affective design approach ensures that practical cycling is seen as a complex system of interacting and conflicting desires, and any solutions consider the long-term impact on the desirability, experience and appreciation of cycling.

1.2 Research questions

1 What factors influence transport mode decisions for short (< 5km) trips?

2 What are the needs of New Zealand transport users relating to transport mode choices for short (< 5km) journeys?

3 How can we improve the design of products, services and facilities to encourage bicycle use for short trips?

2 Literature and market review

2.1 Short trips

2.1.1 Is our focus on short trips (up to 5km) valid?/Is the car the dominant transport mode for short trips?

An analysis of the 2003–2006 New Zealand Household Travel Survey (Abley et al 2008) showed that the average length of a cycling trip chain was 2.8km and a vehicle driver trip chain was 9.1km. The New Zealand Travel Survey 1997/98 (LTSA 2000) showed that the average length of a cycling trip chain for adults over 15 years old was 3km.

It is important to define a 'trip', as it is a potential source of confusion and error when interpreting travel data. Sullivan and O'Fallon (2004) differentiated between trip *chains* and trip *segments*. A trip segment is an unbroken journey between a given start and end point (ie an unbroken trip from home to work is a single trip segment). A trip chain is the connection of two or more segments into a single journey (ie a trip from home to drop the kids at school, then continuing on to work would be a chain of two segments). There is potential confusion in describing a trip segment as a single trip. It might look as though each trip is short and could be targeted as replaceable by walking or cycling. However, the reality is that the trip chain is longer and more complex. The trip data presented in the New Zealand Travel Survey 1997/98 (LTSA 2000) was really trip segment data. Sullivan and O'Fallon (2004) re-analysed the data to account for trip segments and chains. They showed that 92% of cycling trip chains consisted of one or two segments. They also found that 80% of cycling trips were less than 5km in length. However, the analysis found only 13% of driver trip chains were under 2km long and 42% were under 6km long (compared with original figures of one third of 'trips' being less than 2km and two thirds less than 6km). The difference is accounted for by the definitions of 'trip' and trip chain, including segments. The authors concluded there were fewer vehicle driver short trips available for targeting travel behaviour change. However, there were 36% of trip chains less than 5km long and 42% of trip chains less than 6km long. As the same study found 80% of cycling trips were less than 5km long, it is reasonable to conclude from this that up to 36% of current vehicle driver trips could be made by bicycle.

The Sullivan and O'Fallon (2004) analysis highlights a complexity of travel mode change. Many motor vehicle trips are multi-segment chains, while the majority of cycle trips consist of only one or two segments. This suggests part of the perceived convenience of a car is that many short single-purpose trips can be combined, while cycle trips are focused on one purpose and destination (ie there may be a perception that a car journey visiting the dairy, taking the kids at school, and continuing on to a place of work would become two or three separate trips by bike). The research did not consider the potential to increase the number of segments in each cycling trip, possibly through provision of end-of-trip facilities such as secure cycle parking, to enable the convenience of cycling to be encouraged. It also neglected the potential to break complex motor vehicle trip chains into smaller chains or segments using alternative transport modes (eg bus to work while the kids cycle to school). These observations would mean the reported potential for cycling underestimated the potential for mode change to cycling, as it only considered the current configuration of trip chains and segments.

The Auckland Regional Transport Authority (ARTA) (2007) reported in their *Sustainable transport plan 2006–16* that the car was used for 54% of morning peak trips less than 2km long and 76% of trips less than 5km. The data also showed that cycling and walking were significant modes of transport for trips up to 5km long, but negligible for trips longer than 5km.

The New Zealand data suggests that short trips, less than 5km long, are a reasonable focus for travel mode change from driving to cycling in New Zealand. The majority of existing cycle trips are of this length, but driving a vehicle is still the dominant form of transport for journeys under 5km. International research presents similar definitions of short trips.

Many Australian cities have reported urban car use statistics for journeys less than 3km and 5km. A 2007 Cycling Promotion Fund fact sheet stated that in Melbourne 37% of all car trips were less than 3km long, and 53% less than 5km long The Australian National Cycling Strategy 2005–10 (Austroads 2005) stated that in Brisbane 37% of trips were less than 3km long and in Sydney in 2002, 42% of car trips were less than 5km. The strategy suggested that a trip of 5km or less was easily completed on a bicycle.

In the metropolitan areas of the United States, 41% of all trips in 2001 were shorter than two miles (3.2km) and Americans used their cars for 89% of all trips between one and two miles (1.6km and 3.2km) long (Pucher and Dijkstra 2003).

The National Policies to Promote Cycling report (European Conference of Ministers of Transport 2004) stated that 30% of motorised trips in 15 EU countries were shorter than 2km, and 50% of motorised trips were shorter than 5km. In all countries the motor vehicle accounted for over 50% of modal share, including in The Netherlands and Denmark where the modal share for cycling was unusually high at 27% and 18% respectively. The Walcying project in Europe (Hyden et al 1999) found that the average cycling trip length in 10 European countries was 2km. The study based its work on a maximum cycling trip length of 3km–5km. The same study also showed that the average length of walking trips was less than 1km, and a reasonable limit for walking trip length was 1km–2km. The study suggested that cycling could be used to replace car journeys of between 1km and 5km, whereas trips less than 1km were more likely to be replaced by walking.

Overseas research confirms that the focus on trips less than 5km is valid, and also suggests that trips under 1km are more reasonably transferred to walking.

In Denmark, The Netherlands and Germany, between 2000 and 2005, the modal share of cycling for all trips between 2.5km and 4.4km ranged from 11% (Germany) to 37% (The Netherlands). For longer trips, between 4.5km and 6.4km, the share ranged from 7% (Germany) to 24% (The Netherlands). This compared favourably to the overall share of cycling for all trips, which was 10% in Germany and 24% in The Netherlands (Pucher and Buehler 2008).

Germany, Denmark and The Netherlands, often held up as shining lights for bicycle use, show that cycling can command a significant modal share for trips between 2.5km and 6.4km.

2.1.2 Why do we make short trips?

In order to plan for product, service and facility solutions to promote short cycling trips, it is essential to understand the purpose of trips and where they start and end.

A comprehensive study of travel behaviour in New Zealand was offered by Abley et al (2008) who analysed the Ministry of Transport's New Zealand Household Travel Surveys (NZHTS) 2003–2006. The authors applied the trip leg and chain analysis suggested by Sullivan and O'Fallon (2004). The study classified trips based on purpose at destination and, hence, implied a classification by destination. The analysis showed that 35% of all trips ended at home. Other significant trip purposes were travel to work or on employer's business (18%), travel for shopping and personal business (14%), and social visits and recreation (13%). Travel for educational purposes (travel as a student to school, university etc) was 4% of all trips. This figure probably reflected the lower proportion of respondents who were students and was supported by a further 5% of trips made to accompany someone else (many of which would be to accompany children to school).

The high proportion of trips ending at home is not unexpected, as many trips are round trips starting and ending at home. It is surprising that travel for shopping and personal business (defined as any visit to a shop, or to transact personal business, eg bank, library, hairdresser) and social visits (travelling to a private home, pre-school activities and all entertainment activities) were almost as frequent as travel to work or on employers' business. Travel to home, work, education, for shopping, and for social visits included 78% of all trip legs.

Abley et al (2008) also categorised trip leg proportions by purpose and mode of transport. This data showed that driving a vehicle was the dominant form of mode choice for travel to work (77 % of trip legs), travel on employer's business (87 %), shopping (61 %) and personal business (69 %). Travel as a vehicle driver for social visits was only 49 %, but travel as a vehicle passenger for this purpose was 33%. This suggested that social trips involved vehicles with multiple occupants all travelling for the same purpose, which represented a more efficient use of a motor vehicle. Although driving a vehicle only accounted for 15.5 % of educational trips, 39 % of educational trips were made by vehicle passengers. This might suggest that many of the 38 % of vehicle driving trips made 'to accompany someone else' were made to transport children to school.

The data showed that 32% of trips were made for the purpose of travelling to work, on employer's business or for shopping and the dominant mode of travel was by driving a vehicle. While travel for employer's business described only 2% of trip legs, a very high proportion of these were made by driving a motor vehicle. Similarly, share of travel made for the purpose of personal business was less significant than travel for shopping, but vehicle driving was still the dominant travel mode. Many of these trips would also include a return leg home, which could add up to a further 31% of all trips.

The data did not differentiate between short trips and other trips. However, it is reasonable to expect the split of trip purposes to be similar across all trip lengths, with a bias towards driving a motor vehicle for longer trips.

New Zealand Household Travel Survey data for 2007 (MoT 2008a) showed that vehicle driving still dominated travel mode, accounting for 54% of trip legs. Vehicle passenger travel accounted for a further 25%. Vehicle driving was the only travel mode to exhibit a statistically significant increasing trend from 1989/90 to 2003/06. The 2007 data showed that vehicle driving was the dominant transport mode for journeys to work (77%), on employer's business (88%), shopping (58%), and for personal business (67%). Travel for social visits was mostly by vehicle driving (47%) and vehicle passenger (38%) modes. Educational travel showed a vehicle driving proportion of 14%, and vehicle passenger proportion of 27% (down from 39% in 2003–06). This was explained by a corresponding rise in bus/train mode (27%, up from 12.5% in 2003–2006).

A further data analysis presented by Abley et al (2008) examined travel by time of day. The analysis included only travel using motorised transport in major urban areas, and looked at the time of arrival of all trips. This showed peaks in weekday travel at 7am–8am and 2pm–3pm (each peak representing an 11% share of all daily travel) and 4pm–5pm (9% of all daily travel). There was a reasonable spread of arrival times throughout the day, with the proportion of daily travel always above 6% for all hours from 7am–8am to 5pm–6pm.

A more detailed analysis of the data, looking at weekday arrivals based on purpose of travel showed clear trends in times of arrival. Trips that ended 'at work' peaked between 8am–9am (19% of daily travel to work) with a secondary peak at 2pm–3pm (8%). Trips for employer's business peaked at 9am–10am (14% of daily travel on employers business) with a secondary peak at 2pm–3pm. Trips for education peaked at 8am–9am (64% of daily travel for education). Trips ending at home peaked at 3pm–4pm and 5pm–6pm (each 15% of daily travel to home) with a secondary peak at 12pm–1pm (6%). Travel ending at a place of work or education (or the corresponding return trip home) accounted for the majority of peak hour motorised trips made at

7am–8am, 2pm–3pm and 4pm–5pm. Travel in those three hours accounted for 31% of all daily trips made in major urban areas.

Trips to shops, for personal business or social visits were spread more evenly throughout the day. Shopping trips showed an extended peak (remaining above 8% of daily shopping travel) for all hours between 10am and 6pm. The pattern for personal business arrivals was similar, but with two clearer peaks at 10am–11am and 3pm–4pm (each peak was 11% of daily travel for personal business). Trip arrivals for social visits remained above 6% of all daily social visit travel between 9am and 9pm peaking at 10% between 5pm–6pm. Trips for shopping, personal business and social visits accounted for the consistent level of travel throughout the day in major urban areas, despite the morning, lunchtime and afternoon peaks.

Data from travel surveys between 2003 and 2007 detailed travel mode split and trip purpose in New Zealand. Reference to trip length was absent, but the data offered a reasonable picture of New Zealanders' travel. The data can be used to highlight trip purposes that may be suitable targets for a travel mode change from driving to cycling in New Zealand:

- **To work.** A significant proportion of all trips were for this purpose, and the trips showed a high proportion of driver mode. Trip times showed clear peaks in the morning and early evening, and a smaller lunchtime peak.
- **On employer's business.** Only a small proportion of trips were associated with this purpose. However, 9 in every 10 trips were undertaken by driving a motor vehicle. Trips were more evenly spread throughout the working day, but peaked mid-morning and early afternoon.
- **For shopping.** A significant proportion of all trips were for this purpose, and the trips showed a high proportion of driver mode. Trips were spread quite evenly between morning and early evening.
- **For personal business.** Only a small proportion of trips were associated with this purpose. However, the majority of trips were undertaken by driving a motor vehicle. Trips were spread quite evenly between morning and early evening.
- **For education.** A reasonable number of trips were associated with this purpose and there was a higher proportion of vehicle passenger than driver mode (suggesting trips were made to take children to school). The majority of all daily travel was in the early morning.
- **For social visits.** A significant number of trips were associated with this purpose and the motor vehicle was the dominant travel mode. However, there was an even split of driver and passenger travel, suggesting a more efficient use of the vehicle (passenger and driver travelling for the same purpose).

The majority of all trips are made by motor vehicle, and most can be grouped into one of four categories: travel to work or for work business; education; shopping and personal business; and social visits. Of these, the trips to and from work and a place of education are at morning and afternoon peak times and likely to involve a trip chain that starts or ends at home. These trips may be high priority to target for mode change to cycling, as they involve a significant number of trips and travellers and occur at peak travel times. Targeting travel for education may be complicated by the relationship between parent and child. Travel for the remaining purposes is spread throughout the day. Travel for shopping and on work or personal business may be suitable for mode change to cycling. This travel potentially involves a different population demographic and occurs at times when traffic density is lower and cycling could be perceived as safer. It also includes travel with fewer potential time pressures (ie getting to work on time) which may be conducive to the consideration of travel mode change.

The trip length and purpose must be considered for any product or service solutions aimed at encouraging bicycle use. For trips starting and ending at home, the availability of a suitable bicycle would be the responsibility of the traveller (through ownership or long-term leasing perhaps?). However, if we aim to encourage trips that start or end elsewhere, a workplace or community bicycle rental scheme may be more suitable. End-of-trip facilities will be dependent on the end point and reason for the trip. The focus on short trips may preclude the need for shower facilities, but not the requirement for short- and long-term bicycle parking. Further incentives or products, services and facilities that increase the ease and enjoyment of the cycling trip could be independent of the trip reason or end point (for example solutions to overcome terrain or protect from adverse weather) or may be related to the trip purpose (for example shopping trips may require load carrying capability and work trips may have to be made in work-suitable clothing).

2.2 Cycling in New Zealand

2.2.1 Do we cycle?

Cycling is recognised, within New Zealand, as a desirable and necessary part of a sustainable urban transport system (MoT 2005). However, only 1% of all trip legs were made by bicycle in the period between 2005 and 2009 and the proportion of hours travelled by bicycle reduced from 3.3% in 1989/90 to 1.6% in 2005 to 2009 (MoT 2009a). During the same period, travel as a vehicle driver increased its mode share from 45.9% to 53.8% (MoT 2009a). In 2006, an average of 2.4% of journeys to work were made by bicycle (Land Transport NZ 2007), with bicycle use ranging from 0.9% of journeys to work in the Auckland region to 7.2% in the Nelson region.

Cycling in New Zealand has not always been such a minority form of transport. In the early 1950s, the bicycle was the most common form of transport. New Zealand imported thousands of bicycles and manufactured many thousands more (Kennett et al 2004). However, in the 1950s and 1960s, the car grew in popularity and cycle commuting declined. This decline has continued to reach the present low levels of cycling.

New Zealand is not unique in its historical pattern of bicycle use. A similar trend can be seen in many European countries and cities. In Britain, 16% of journeys to work in the 1950s were made by bicycle (the same number as by car). However, by the 1960s this had reduced to 5.2% by bicycle, while car use had risen to 35.8% of journeys to work (Pooley and Turnbull 2000). In Britain in 2005 only 1.3% of trips were made by bicycle (Pucher and Buehler 2008). The Dutch Bicycling Council reported that cycling in The Netherlands, Denmark and Germany also plummeted between 1950 and 1975 (Dutch Bicycling Council 2006). The report summarised a historic study of bicycle use in nine cities in The Netherlands, Denmark, Britain, Germany, Switzerland and Belgium. This showed that cycling commanded a mode share of between 20% (Manchester) and 80% (Amsterdam) in the 1950s. All cities showed a severe drop in bicycle use between 1950 and 1970. The cycling share of transport reduced to 2%–3% in Manchester and 25%–30% in Amsterdam. The sharp decline in bicycle use is attributed to the rapid advance of the motor car and policies that have encouraged car use and the spread of urban areas. Since 1970, bicycle use has stabilised or recovered in all cities. However, there is a marked difference in both the depth of the fall in bicycle use between 1950 and 1970, and the subsequent rise in use to 1990. The report concluded that, for cities with a high bicycle share in 1990 (more than 30%: Amsterdam, Copenhagen etc) there was never the introduction of a public transport system to compete with the bicycle. These cities also accepted the bicycle as a 'normal' form of transport in the 1950s and 1960s, so development of a motor car infrastructure was not at the expense of the cyclist. For cities with the lowest share of cycling (less than 10%: Antwerp, Manchester etc) the introduction of public transport took a share of cyclists, while strong car-oriented policies ensured that large-scale car infrastructure was realised, and cycling became a marginalised mode.

Cycling for transport in New Zealand has declined since 1989/90, but appears to have stabilised since about 2003. Historical cycling trends are similar in New Zealand to those in Europe. However, the continual decline in cycling as a transport mode aligns with countries such as the UK, where policies focused on the motor car have dominated. New Zealand and the UK now have similar levels of bicycle use and car dependence. In countries often held up as beacons of transport cycling (The Netherlands, Denmark etc) a similar pattern of decline occurred in cycling levels as the motor car became popular. However, consistent and continuous policy favouring cycling as a normal mode of transport has ensured bicycle use is high and growing in popularity in these countries. The question may be: Can New Zealand increase bicycle use by simply adopting Danish, Dutch and German best practice? Or does an additional 50 years of motor vehicle domination mean a different approach is required to raise bicycle use?

Bicycle imports to New Zealand have increased annually since 2005, and in 2007 there were more bicycles imported than first-time car registrations with 281,860 bicycles and 197,836 new car registrations (Land Transport NZ media release 20 February 2008).[1] The Cyclist Advocates Network states there were 1.3 million cyclists in New Zealand, with 750,000 above voting age (Cycling Advocates Network 2009).

This contradictory data regarding the number of trips made by bicycle and the number of claimed cyclists and bicycles in New Zealand suggests that bicycles are mainly used for recreation. This is confirmed by data from the North Shore City 'Bike It' survey (North Shore City). The most frequent responses for reasons why a bicycle was used in the 12 months before the survey was for leisure/pleasure (82.2%) and fitness/health (52%). The next highest response was for shopping trips (26%), with 14% cycling to work and 8% for travel to school. Recreational cycling events in New Zealand are very well supported. The annual Lake Taupo Cycle Challenge[2] regularly attracts over 10,000 riders and the Day Night Thriller[3] mountain bike race reportedly sees 3000 participants each year.

New Zealand has a thriving recreational cycling culture, yet a low adoption of cycling as a mode of transport. It is a fair assumption that recreational cyclists enjoy riding a bicycle, have access to a bicycle and accessories, and are reasonably skilled in riding. In the UK, a study of 500 leisure cyclists, utility cyclists and non-cyclists found a conflict between the image of leisure cycling (calm, peaceful and liberating) and utility cycling (dangerous, demanding and needing self-discipline) (Gardner 1998). This suggests that many barriers to undertaking short cycling journeys apply to current recreational cyclists. However, the study also noted that many utility cyclists claimed leisure cycling encouraged them to cycle to work. However care should be exercised in drawing comparisons to the New Zealand situation based on this single overseas study.

2.2.2 The next 1% of cyclists

Auckland Regional Transport Authority (ARTA) plans to increase cycling transport trips by 1% (ARTA 2007) and will target the 'next 1%' of cyclists. It is important to determine who these people are and how they perceive cycling. Are they non-cyclists or recreational cyclists who may be persuaded to cycle for transport reasons? We know they probably commute or shop or make social visits by car. They may or may not own a bicycle and ride it for recreation and fitness reasons. Understanding why they choose to drive, their perception of cycling, and the barriers that prevent them from choosing to cycle is critical.

[1] See also the website of the Bicycle Industry Association of New Zealand *www.bianz.org.nz/*

[2] See *www.cyclechallenge.com* for more information.

[3] See *www.daynightthriller.co.nz/* for more information.

2.3 Encouraging the market

Many initiatives aimed at increasing cycling in urban areas focus on promoting bicycles to non-cyclists. However, in a country such as New Zealand with a strong dependence on the automobile, any such initiatives must overcome the poor perceptions of cycling safety and convenience. A catch-22 situation arises where cyclist numbers will not grow until cyclist numbers grow enough to achieve a critical level of visibility. Countries and cities that have developed a strong cycling culture have reached this tipping point through a combination of cycling infrastructure design, effective promotion of cycling, and the availability of products and services tailored to the local market.

In New Zealand, cycling culture is almost exclusively focused on recreation. This undoubtedly leads to products and services aimed at the recreational cyclist: road racing, mountain and BMX bikes and associated accessories and clothing. The New Zealand cycling market is small by international standards. In 2007, New Zealand imported almost 281,000 bicycles whereas the USA imported 18.1 million bicycles (Bicycle Industry and Retailer News 2008). The New Zealand bicycle import industry also consists of many small and medium enterprises. The Bicycle Industry Association of New Zealand (BIANZ) lists 21 bicycle distributor members, and many smaller importers act independently of BIANZ. This means the market should be agile and able to respond to emerging trends (such as increasing transport cycling), but it also means many importers are unwilling or unable to undertake the risk involved with introducing new product lines for untested market segments. It is reasonable to suggest that the New Zealand bicycle industry is able to respond swiftly to market demand, but cannot effectively compel change.

Evidence from European countries with a higher level of cycling than New Zealand demonstrates that local and national cycling policy is critical to promote cycling and raise practical cyclist numbers. By establishing how the current New Zealand government cycling policy relates to local policies, practical measures to raise awareness of practical cycling can be identified, which may assist in developing a cycling market.

2.3.1 New Zealand national cycling policy

Data shows that only 1% of trips in New Zealand are made by bicycle (see section 2.1). However, this accounts for 22 million hours of cycling each year and 25 million trip legs (MoT 2008a). Even considering a relatively modest goal of increasing the cycling mode share by 1% would add 19 million trips by bicycle each year. Accounting for existing cyclists who simply cycle more often, this represents a significant number of new cyclists. Public sector investment in infrastructure for and promotion of cycling will encourage new cyclists. While many initiatives are implemented at a local level, the national government strategy for land transport, and cycling in particular, has a significant influence and allocates much of the funding.

In 2008, the New Zealand government released the New Zealand Transport Strategy 2008 (NZTS) (MoT 2008a), which updated the previous 2002 document. This takes a long-term view of transportation and has the vision that in 2040 people and freight in New Zealand will have access to an affordable, integrated, safe, responsive and sustainable transport system. The strategy has five objectives, which include: 'protecting and promoting public health', 'improving access and mobility' and 'ensuring environmental sustainability'. The specific targets for transport in 2040 include:

> *Reduce the kilometres travelled by single occupancy vehicles, in major urban areas on weekdays, by ten percent per capita by 2015 compared to 2007.*
>
> *Increase walking, cycling and other active modes to 30 percent of total trips in urban areas by 2040.*

The focus on reducing per capita car trips is encouraging. Cycling can make a significant contribution to this target. The target of 30% of all urban trips by active modes would put the modal split for active travel in New Zealand at a similar level to that of France, Italy and Germany, and 10%–20% below that of Sweden, Denmark and The Netherlands. Although the figures quoted for these countries date from 1995, they show that the New Zealand target is achievable in countries with a similar (or worse) climate and a similar population demographic.

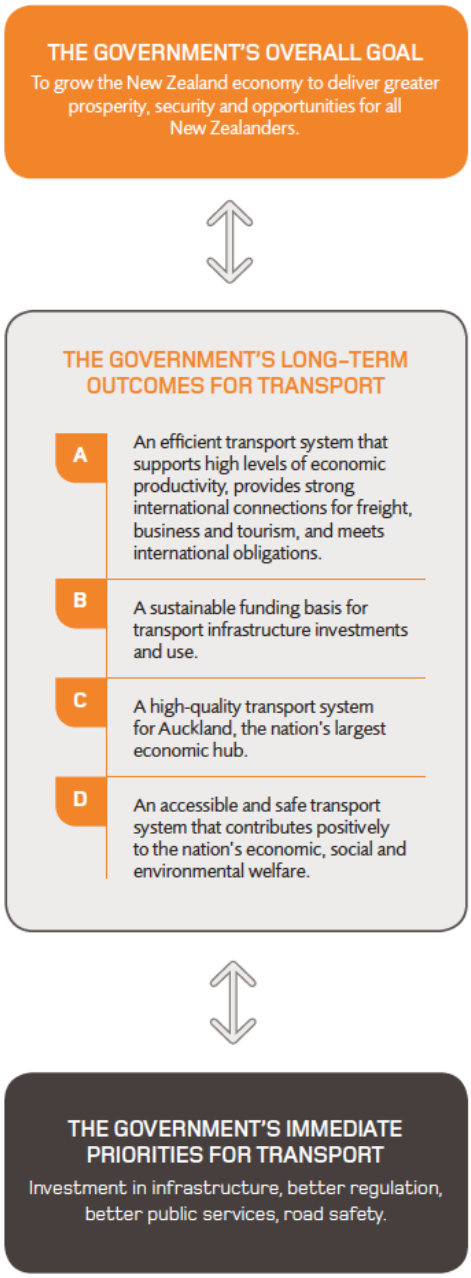
New Zealand had a change of government in 2009, and land transport policy has changed accordingly. The immediate implementation of the NZTS is now defined by the Ministry of Transport *Statement of Intent 2010–2013* (SoI) (MoT 2010). The summarised approach is shown in figure 2.1. The focus of the document is on the safety and economic sustainability of transport, and its contribution to economic productivity. Cycling is included under an operating intention to amend the Public Transport Management Act in 2010/11 to improve the value for money of funding and procurement of public transport, cycling and walking services and infrastructure. The potential impact of this policy shift on cycling in New Zealand is shown in the Minister of Transport's foreword to the *Government policy statement on land transport funding 2009/10–2018/19* (GPS) (MoT 2009b). This document aligns investment in the land transport sector more closely with the government priority of generating economic growth and productivity. The Minister states:

> *the GPS closely reflects the modal choices that are realistically available to New Zealanders. Approximately 70 percent of all freight in New Zealand goes by road, and 84 percent of people go to work by car, truck or motorbike, so we need good roads to move freight and people. The government supports some mode shift over time, especially in our major cities of Wellington, Auckland and Christchurch, but considers that this should not be accelerated to the point where the outcomes are economically inefficient.*

This statement is reflected in the funding allocated in the GPS to non-motorised transportation. The GPS defines walking and cycling funding as available for new and improved infrastructure (including cycle paths and lanes, footpaths, shelters, facilities for crossing roads and bicycle parking facilities. The indicative total funding for walking and cycling for the three years 2009/10 to 2011/12 is $51 million, There are no significant increases in funding indicated beyond this period. Cycling is also included in the 'demand management and community programmes' activity, through initiatives to encourage a change in travel behaviour (to improve the performance of the land transport system) and through national and local promotion of cycling and walking. This activity class, which includes all activities that promote safe and sustainable use of land transport networks and services, is allocated $145 million over the 2009/10–201/12 three year period. It also has no significant increases in funding indicated beyond this period.

The current government transport policy, as defined by the SoI and GPS documents, has a significant focus on the development of roading infrastructure for motorised transport. This is justified by the assertion that 84% of journeys to work are made by car, truck or motorbike and 70% of freight is carried by road. The documents suggest little ambition to encourage mode change through encouragement programmes or infrastructure and service development. The thinking appears to be that Kiwis drive, so investment must support driving and encourage more driving. The goals of this road funding are to build and manage road infrastructure to relieve congestion, increase safety and increase economic productivity. While there is some sense in this approach for the state highway system, where few alternative transport modes suitable for long journeys exist, it makes less sense for the urban environment. Here, road congestion has potentially the largest impact on economic productivity through delays in getting to work. As viable alternative travel modes have been proven to reduce congestion in urban areas in New Zealand and overseas, this policy seems short-sighted and one-dimensional.

Figure 2.1 Summarised approach for transport (MoT 2010)

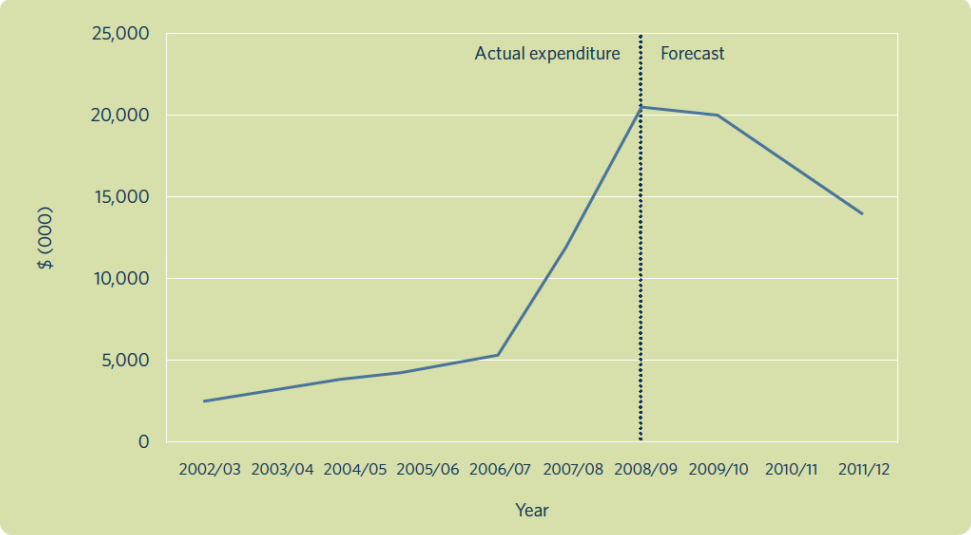


In response to the SoI and GPS documents, the NZTA has developed the National Land Transport Programme 2009–2012 (NLTP) (NZTA 2009). This document outlines how the $8.9b funding will be allocated in this three-year period. The chairman of NZTA highlights the significant increase in funding for this period, the highest level of funding in New Zealand's history, and the significant increases to funding for state highways (19%), local roads (14%) and public transport (21%). However, the level of funding available for cycling infrastructure and encouragement (through demand management initiatives) is less positive. Funding allocated to cycling rose dramatically from approximately $5m in 2006/7 to over $20m in 2008/9. The NLTP shows this reducing to below $15m by 2011/12 (figure 2.2). The document states that $13m of the $51m allocated is to honour previous funding commitments, leaving $38m for new cycling and walking infrastructure projects throughout New Zealand. The approach described in the NLTP is to prioritise funding for model walking and cycling communities. These were announced as New

Plymouth and Hastings (NZTA 2010). Funding of $7.3m has been allocated to these areas in 2010/11 and 2011/12 to make cycling an easy transport choice and to reduce congestion in the urban areas. The remaining funding will be allocated to projects that either improve safety or complete existing networks and assist in reducing urban congestion. The funding for demand management initiatives that refer to cycling is split between nationally delivered activities and local community programmes. The walking and cycling programme is allocated $480,000 for Bike Wise and $180,000 for skills training programmes. This is a share of $23m of funding (which includes other nationally delivered activities such as road safety advertising). Local authorities can access an additional $1.7m funding for cycling, and a further $4.0m for school and workplace travel planning.

The low investment in cycling infrastructure and encouragement over the three-year period to 2012 follows from government strategy contained in the SoI and GPS guidance. It is disappointing that trends for increasing investment in cycling are reversed, and the emphasis on infrastructure projects will be to increase safety and complete existing networks. While these are worthy goals, they suggest that the desire is to improve the environment for existing cyclists, with little encouragement for new cyclists. Along with the significant focus on local roading and the promotion of safety throughout the road network, there is a danger that cycling could become more marginalised and pushed off roads and onto 'safe' cycle paths. However, the inclusion of cycling within local road developments is unknown, and there may be potential for development of intersections and roads that accommodate cyclists. The identification of two 'model walking and cycling communities' in New Plymouth and Hastings is promising. While this may be a response to the disappointingly low funding for these transport modes, it creates two pilot projects that can potentially demonstrate the effectiveness of travel behaviour change on urban congestion, and the wider community. This should be seen as an important opportunity to develop and implement a comprehensive system of cycling and walking initiatives.

Figure 2.2 NLTP funding for walking and cycling infrastructure (NZTA 2009)



The 2008 NZTS states that the approach set out in the 2005 national walking and cycling strategy: *Getting there – on foot, by cycle* will be continued to achieve the active travel target. The strategy has three goals:

- community environments and transport systems that support walking and cycling
- more people choosing to walk and cycle more often
- improved safety for pedestrians and cyclists.

'Getting there' also lists 10 priorities for action, which include providing supportive environments and systems, influencing individual travel choices and improving safety and security. These priorities provide a good idea of the range of actions required to advance walking and cycling, and the NZTS recognises that specific measures to move pedestrians and cyclists higher up the 'road user hierarchy' will need to be explored. Information, education and social marketing will also help to encourage people to use these types of transport.

'Getting there' was the first cycling strategy developed by the New Zealand government, and arose from the 2002 NZTS. These strategies, along with the Land Transport Management Act of 2003 directed district and local councils to develop their own cycling strategies. A further condition of funding also encouraged the development of walking and cycling strategies: 'A walking and cycling project must be identified, either specifically or generically, in a current walking or cycling strategy to qualify for Land Transport NZ subsidy' (New Zealand Government 2003). It is perhaps unsurprising, then, that Land Transport NZ research in 2005 (Macbeth et al 2005) showed that 31% of district and local councils had dedicated cycling strategies and a further 15% had combined cycling and walking strategies. A further 65% of councils who did not have walking or cycling strategies intended to develop one within a year of the survey. The majority of the strategies were developed in 2003 or 2004, and most of these were first versions. Many of the strategies were reviewed and updated by 2008.

In the light of the new government direction for land transport, it remains to be seen how the 'Getting there' strategy will be implemented to 2012. The NLTP includes implementation of 'Getting there' in the nationally delivered activities of the demand management and community programmes activity class and is allocated $171,000 for 2009/10. There is no additional detail regarding how this funding has been spent.

2.3.2 Overseas comparison

Pucher and Buehler (2008) conducted a review of cycling and cycling policies in The Netherlands, Denmark and Germany. It is useful to summarise that review here as it highlights critical policy and historical similarities to and differences from New Zealand. Cycling in The Netherlands, Denmark and Germany suffered a decline from the high levels of the 1950s, similar to that in countries such as the UK, USA and New Zealand. However, this decline was turned around in the mid-1970s. Transport and land-use policies in the former three countries shifted dramatically to favour walking, cycling and public transport. The reform was a response to the increasingly harmful environmental, energy and safety impacts of rising car use. From 1975 to 1995, the bicycling share of trips in the measured sample of German, Dutch and Danish cities rose by roughly one quarter, resulting in 1995 bicycle mode shares of 20%–43 %. This shows evidence of the powerful impact of policy on travel behaviours. It is particularly impressive given the growth in per capita income, car ownership and suburban development in all three countries during the same period.

Cycling policy in The Netherlands, Denmark and Germany operates at three levels: national, state and municipal. While New Zealand structure contains three levels (national, regional and local), most similarities are at the national and local/municipal levels. Many of the responsibilities for cycling strategy at these levels are identical in the three Northern European countries and New Zealand. National policy provides overall goals, design guidelines, research support, coordination and funding. Local councils are responsible for making and implementing the specific plans that reflect the needs of the local context, including training, safety and promotional programmes. Regional councils in New Zealand provide additional policy guidance and coordination, as well as direct planning for regional cycling networks, but are limited to advocacy roles when influencing local initiatives. However, in the Northern European countries the state governments manage their own independent budgets and operate a full range of

ministries. This difference may offer a significant advantage to implementing cycling policy on a regional and local level. There is also a substantial difference in national cycling policy between New Zealand and the Northern European countries. There tends to be a more practical approach in the Northern European countries. Current Danish, German and Dutch national cycling policies propose various best practice strategies, including design of products, services and facilities such as bike parking and integration with public transport. They also directly fund and evaluate a wide range of experimental and innovative projects aimed at increasing cycling or cyclist safety. The Dutch government has directly funded 80% of the cost of city cycling infrastructure and facilities since the mid-1970s. The Danish government has recently spent 2 million euros to install long-term bicycle parking facilities at railway and bus stations.

A further, and potentially significant, difference is in the historical development of cycling policies in Northern Europe and New Zealand. In New Zealand, the first cycling strategy was at government level in 2002. This encouraged a flood of local and regional cycling policies in subsequent years. A few exceptions exist, notably Nelson and Christchurch which, in 1995 and 1996 respectively, developed local policies in advance of the national cycle strategy. It is reasonable to say that local councils, who have ultimate responsibility to encourage cycling and implement enabling products, services and facilities, have only recently considered cycling as a transport mode, and only then at government insistence. In comparison, the Northern European countries have had local cycling policies in place since the 1970s. Local councils have been planning, constructing and funding bicycling facilities for many decades. Central government involvement in cycling has been more recent, evolving gradually since the 1980s. This progression shows a willingness at local level to promote cycling for transport. Thirty years of local policy has enabled an extensive cycle route network to be built and an impressive array of bicycle services to be developed. It has also created a culture that views cycling as a normal, everyday activity. This has only been possible because local councils have considered the bicycle in both transport and urban planning policies, regardless of any sticks or carrots from central government. Central government policy has evolved as a response to the local activity, as cycling has become a significant and popular mode choice.

Pucher and Buehler (2008) summarised seven categories of measures that have been widely adopted in Dutch, Danish and German cities. Their success in making cycling so appealing is attributed to coordinated implementation of all of these measures, so that they reinforce the impact of each other. Pucher and Buehler offer this coordinated approach as the most important lesson from policy in these countries. The seven categories (drawn from Amsterdam and Groningen; Copenhagen and Odense; Berlin and Muenster) are:

1 Extensive systems of separate cycling facilities: well maintained, fully integrated paths, lanes and special bicycle streets.

2 Intersection modifications and priority traffic signals: including advance green lights for cyclists; advanced cyclist waiting positions fed by special bike lanes; exemptions from red signals at certain junctions and traffic signals synchronised to cyclist speeds.

3 Traffic calming: including entire residential areas, by 30km/h speed limit and physical infrastructure; bicycle streets where cyclists have absolute priority over cars; and ‘home zones’ with 7km/h speed limit where cars must yield to all other road users.

4 Bike parking: a large supply of good bike parking throughout the city, with improved lighting and security of facilities often featuring guards and video surveillance and priority parking for women.

5 Coordination with public transport: extensive bike parking at all stations (including deluxe parking at some with video surveillance and repair services); and bike rental programmes operating at most train stations. Note: none of the cities allow bikes to be carried on buses or trains.

6 Traffic education and training: comprehensive cycle training for all school children (including a test by traffic police); and stringent training of motorists to respect cyclists and avoid hitting them.

7 Traffic laws: special legal protection for children and elderly cyclists; motorists assumed by law to be responsible in many crashes involving cyclists; and strict enforcement of road rules for both motorists and cyclists.

Local and national cycling strategies in The Netherlands, Germany and Denmark recognise the role of the local bicycle industry in providing products, services and facilities that promote and encourage cycling. There are many examples of public-private partnerships in European countries, such as JC Decaux providing the public rental bike scheme in Paris. The German national cycling strategy (Federal Ministry of Transport, Building and Housing 2002) also discusses the impact of a cycling increase on the local bicycle manufacturing, retail and service industry and estimates that a 5% rise in cycling would result in 1000 new jobs in the industry.

Many of these categories of best practice can be seen in New Zealand cycling strategy documents. However, none offer anything approaching the depth and commitment to cycling demonstrated in the examples listed above, nor is there the coordinated implementation of the measures seen in northern Europe. There is little mention of the cycling industry, either in its role as provider of products, services and facilities, or as a beneficiary of increased cycling.

The requirement to offer a coordinated approach to policy is demonstrated in London. In 2002 the mayor, Ken Livingstone, implemented a wide ranging and controversial transport policy. The flagship was a congestion charge for private motor vehicles entering a central London zone. Transport for London (TfL) reported that the charge operated for under a third of the hours in a year, but covered two thirds of central London traffic (Transport for London 2007). The aim of the charge was to reduce congestion, make radical improvements to the bus service (through investment of the revenue from the charge), and to improve journey time reliability (Transport for London 2008). Motorised traffic (chargeable) entering the congestion zone reduced by 27% immediately after the charge was introduced, and remained at a comparable level in 2007. During the same period, buses increased by 31% and bicycles by 66% (Transport for London 2008). The mode share of trips within London for cars reduced from 44% in 2000 to 38% in 2007, and bus use in the same period increased from 33% to 40%. Transport for London noted in 2008 that this trend had existed since the early 1990s, but the rate of shift doubled in the period of congestion charging. In 2007, cycling was still a minority transport mode in London, with 2% of all trips made by bicycle. This was an increase from 1.2% of trips in 2000, and was a reversal of the UK national trend in which cycle trips reduced each year from 1996 to 2009 (Department for Transport 2009).

Perhaps the most interesting development in London is the urban and transport policy to redistribute road space within the congestion charging zone. As a result of reduced demand by private motor vehicles, urban areas can be redesigned to incorporate other users more effectively (e^2 documentary, PBS 2009). This has been demonstrated in London through improved bus routes, the pedestrianisation of Trafalgar Square (with a through road removed from one side), the redesign of Kensington High Street to remove visual and physical barriers and create a zone shared between pedestrians, bicycles and motor vehicles, and the redesign of Old Street to create a shared zone (Mayor of London 2009). The present Mayor of London, Boris Johnson, has released London's *Great outdoors* (Mayor of London 2009) and has dedicated 180 million pounds over three years to create more inclusive streets.

These examples of transport policy designed to discourage car use, and urban policy designed to be more inclusive indirectly and positively affect bicycle use. In London, this has complemented direct cycling policies which aim to achieve 5% of all trips made by bicycle by 2026, a 400% increase in cycling from 2001 levels. The vision lists 10 important conditions to be achieved (Transport for London 2010):

1 Cycling recognised as a major transport mode right across the capital, from central London to the outer boroughs.

2 Streets and space where everyone respects each other's right to use the road, where they stick to the rules of the road, and where everyone recognises their duty of care to other road users.

3 An increase in secure cycle parking on streets, in workplaces, and at stations and schools.

4 A reduction in cycling casualties, with a particular focus on reducing the risk of collisions between cyclists and HGVs.

5 Cycle theft tackled through dedicated police attention so people can be confident they'll find their bike where they lock it.

6 Cycling promoted as an enjoyable, everyday, healthy activity.

7 Cycling embedded in the way our city is planned and run.

8 Investment in cycling maximised – from both public and private sectors.

9 Key partners working together to deliver cycling initiatives.

10 New routes and opportunities for commuting, leisure and local cycling trips.

Direct improvements to cycle routes, cycle parking and security, an improvement in the visibility of cycling through increased cyclist numbers, and more inclusive urban environments have resulted in the 2010 introduction of the Barclays Cycle Hire scheme, which has 6000 bikes available from 400 stations. Based on successful schemes used in cities such as Paris, the bikes are free to use for 30 minutes, encouraging short trips (Transport for London 2010)

The Australian National Cycling Strategy 2005–2010 (Austroads 2005) was developed under the guidance of the Australian Bicycle Council. This involved members of government agencies working alongside cyclist user groups and representatives of Bicycle Industries Australia and Retail Cycle Traders Australia. This approach ensured that the strategy considered the needs of the bicycle industry and offered an opportunity to develop collaborations between government and industry at a strategic level. The vision is to increase cycling through increasing participation in cycling and improving safety for cyclists. As with many New Zealand strategy documents, this vision doesn't differentiate between recreational and transport cycling.

The first Australian National Cycling Strategy was published in 1999. Currently, three states (out of six states and two territories) have cycling strategies. The earliest of these was the Western Australia strategy developed in 1995. The history of cycling strategy development in Australia is similar to that in New Zealand, with the national strategy used to encourage the development of state and local government strategies. However, the current national strategy highlights several changes to cycling in Australia that have heightened the importance of a national strategy. These include significant increases of funding for cycling at state, territory and local levels, cycling infrastructure improvements through the development of design guidelines and effective urban planning, and integrated promotion of cycling resulting in greater acceptance of cycling in the community.

The strategy document demonstrates a clear understanding of cycling potential and key issues. It recognises EU research showing that 14 of 21 member states have a national strategy, highlighting the Dutch example of integrated transport policies since the 1970s resulting in 28% of trips now being made by bicycle. It also lists barriers to increased cycling in Australia as institutional impediments within government agencies and local government, and the attitude of the non-cycling public. The fear of cycling is also mentioned, both as a perception of danger (despite cycling being good for health), and the attitude

of motorists. It is promising that a national strategy recognises the inherent reluctance of local government to support cycling, and the social factors that may prevent cycling reaching its potential.

The priorities for action listed in the document differ from the New Zealand strategy in a few key areas related to the provision of products, services and facilities. In particular, goals for cycling support and promotion highlight potential for valuable partnerships within and across the bicycle industry, non-government cycling organisations and private businesses, including major employers. It is likely that this focus on services and facilities, and role of the bicycle industry, comes from the involvement of industry in the strategic planning process. This involvement, and corresponding recognition of the cycling industry, is missing in New Zealand cycling strategies.

While no conclusions can be drawn, it is suggested that this integration of government and industry has paved the way for facilities such as the end-of-trip facility in Brisbane (which is council owned and funded, but operated by private enterprise) and the public bikes scheme in Brisbane which, through a partnership with JC Decaux, will return profit back to the council while providing a means to encourage cycling in the city. Census data shows that cycling in Brisbane, as a method of travel to work, did not increase between 2001 and 2006, with 1.4% of all commuting trips made by bicycle. It would be interesting to review data from the 2011 census to determine if the end-of-trip facility, public bicycles and increased focus on commuting routes to the city has had an effect on cycling mode share.

2.3.3 New Zealand local cycling strategies

The three most populous urban areas of New Zealand: Auckland, Wellington and Christchurch, all have cycling strategies developed since 2004. The content of these demonstrates the practical implementation of the government's direction for cycling in New Zealand.

2.3.3.1 Auckland

Up until 2010 the Auckland region contained seven city councils, each with their own transport responsibilities. Transport throughout the region was governed by ARTA, part of the Auckland Regional Council. In 2010 the seven city councils were combined into a single Auckland Council, and Auckland Transport superceded ARTA and the transport functions of the seven local councils.

In 2010, Auckland Regional Council published a *Regional land transport strategy* (RLTS) *2010–2040* (Auckland Regional Council 2010). This sets quantifiable targets to increase the mode share of cycling and the distance cycled. The council aims to increase the share of walking and cycling trips made in the region from the 2009 level of 9.5% to at least 15.3% by 2040 and the walking and cycling mode share in urban areas from the 2009 level of 17.3% to 23% in 2020 and 35% in 2040. Additional targets are stated to increase the number of cyclist movements at defined survey points (in 2009 the cycle mode share across CBD screenlines was 1.4%). The RLTS states that the appropriate role for cycling is the safe and efficient movement of people over short-to-medium distances as an alternative to cars and as a form of recreation, and that the biggest perceived barrier to cycling is safety. It is logical, then, that further targets are set based on the perception of convenience and safety of cycling. The perception that cycling in the region is safe is targeted to rise from the 2008 level of 26% of residents to more than 80% in 2040. The proportion of people who feel that a person can get around the region extremely or quite well by cycling is desired to increase from 39% (2008 figure) and the proportion of people who think cycling is suitable for most or all of their trips to study or work is expected to increase from the 2009 figure of 14%.

The main activities of Auckland Transport are the construction of the regional cycle network infrastructure and the encouragement of cycling through behaviour change measures. The RLTS states a goal of completing 50% of the regional cycle network by 2016 and 100% by 2026 (21% was completed by 2009). The infrastructure activity includes increasing on- and off-road cycle lanes, improving end-of-trip facilities

(such as cycle storage and changing facilities) and providing opportunity for inter-modal travel (such as carrying bicycles on public transport). It also includes using good urban design principles to increase active transport choices by increasing safety through natural surveillance and reducing the speed of passing vehicles. Behaviour change is aimed at educating people about alternative transport options. Schools, workplaces and communities are encouraged to become cycle friendly through a travel plan programme, which is facilitated by improvements in cycling infrastructure. There is little specific information in the RLTS regarding other behaviour change activities (such as the provision of cycle network maps or cycle training).

It is interesting to note that Auckland Council recognises the RLTS priorities do not align with those presented in the 2009–2012 National Land Transport Programme. If 2009–2012 funding was extended to the 30-year period to 2040, there would be a significant funding shortfall for walking and cycling facilities (less than 30% of the funding required), the renewal of local roads and building of new local road infrastructure and a significant surplus (more than 200% of that required) for state highway infrastructure in the region.

Until Auckland Transport has reviewed current documents, the cycling strategies of the previous city councils remain in place. The four city councils that formed the core of the Auckland region: Auckland, North Shore, Waitakere and Manukau all had cycling or active transport strategies adopted between 2005 and 2009 (Auckland City Council 2007; North Shore City 2009; Waitakere City Council 2009; Manukau City Council 2005). Each states a vision for cycling in the city, for example 'more Aucklanders choose to walk and cycle more often' (Auckland). Auckland, North Shore and Waitakere City have set quantifiable targets for cycling, while Manukau lists objectives. All strategic targets include a safety improvement (measured by the number of crashes reported to Police or the number of cyclist hospitalisations). North Shore and Auckland also specifically aim to measure the perception of safety of cycling (and satisfaction with provision for cycling) amongst cyclists and non-cyclists through residents' satisfaction surveys. All of the measurable cycling targets state a focus on trips to work and school. The reasons are not clear as to why. It could be a reflection of government or regional focus, recognition that peak-hour traffic should be targeted, or simply because measurement data exists for these trips, or would be easiest to obtain.

The Auckland Council has plans to develop and improve cyclepath networks and to run traffic education and cycling encouragement activities. However, there are relatively few implementation actions that relate to encouraging or providing products and services aimed at increasing short cycle trips. Prior to the formation of Auckland Council, North Shore City introduced the concept of 'Bike Aid'. This was a matched funding mechanism to encourage businesses, schools, or community institutions to install bicycle facilities (lockers, showers, secure parking etc) on their site. The intention of the plan was to pilot the programme for one year. It is unclear if the programme continued beyond this pilot, or what facilities resulted from it.

The Auckland Council does not clearly define who the 'next 1%' of cyclists are, or who are most ready to change transport mode. Prior to the formation of Auckland Council, ARTA recognised the need to define this target market, but city council marketing and implementation activities focused on the general population, or on easily identifiable groups with a common socio-demographic (for example North Shore City decided to target teenagers).

2.3.3.2 Wellington

The Greater Wellington Regional Council (GWRC) created a *Draft regional cycling plan* in 2008 (Greater Wellington Regional Council 2008). The aspiration is that 'People will generally walk or cycle for short and medium length trips. Pedestrian and cycling networks will be convenient, safe and pleasant to use'. The plan states that, by 2016, active travel modes will account for at least 15% of region-wide journey to work trips. There is no discussion or further definition of this target, and no indication of measurement

techniques. Much of the responsibility for the cycle network is held by local council authorities, with the main activity of the GWRC being to advocate for the implementation of the regional cycling plan and to facilitate regional coordination. Actions listed under the GWRC plan are quite generic. However, one of the actions is an investigation into creating a 'journey planner' for travellers in the region. For cyclists, this would provide information such as preferred cycling routes and cycling times and distances to destination. The journey planner was launched at the end of 2009 and is accessible through the council website and at www.journeyplanner.org.nz. This resource expands on printed cycling maps produced by the GWRC. In 2010, the GWRC also published a guide to cyclist visibility on its website. This included a demonstration of several brands of bicycle lights. Further efforts to increase cycling are included in travel planning and demand management activities. The schools travel planning programme includes an element of cycling skills training.

Hutt City Council published a draft cycling strategy in 2006 (Hutt City Council 2006) and Wellington City Council (WCC) released a *Draft cycling policy* in 2008 (WCC 2008). The Hutt City vision is 'Proud to be a great city for cycling'. The WCC strategy strategic intent is to 'make cycling in Wellington safer and more convenient for those who choose to cycle'. The objectives of Hutt City are to encourage more cycling and cyclists by changing community attitudes towards cycling, removing major barriers to the uptake of cycling, and demonstrating the economic and environmental value of cycling. The WCC, however, focuses on safety and convenience and improving the experience of cycling and does not aim to actively encourage more cycling until safety is improved. Both councils set clear and quantifiable targets for cycling. The councils plan to investigate some products and services that are relevant to short cycling trips, and the feasibility of more secure cycle parking, lockers and shower facilities. The WCC also plans to use the regional online journey planner being created by the GWRC. Hutt City plans to use travel plans to encourage schools and workplaces to become bicycle friendly. They also want to encourage businesses to adopt 'workplace bicycles'. The target is for two additional workplaces per annum to provide facilities for cyclists to an appropriate standard. This also stresses the importance of aligning local authority approaches within a region.

As for Auckland, there is little demonstrated understanding of who would be most likely to take up cycling. The WCC seems to assume that infrastructure changes may result in more people cycling, but there is no specific targeting of non-cyclists. Hutt City, however, wants to encourage non-cyclists to cycle. A clear understanding of the 'next 1%' of cyclists will be essential.

2.3.3.3 Christchurch

Christchurch is ideally suited to cycling, with flat terrain and many wide streets. Christchurch City Council introduced a cycling strategy in 1996, which was replaced by the current cycling strategy released in 2004 (Christchurch City Council 2004). The vision is: 'Christchurch is a cycle friendly city'. Objectives are to increase cycling, increase the enjoyment of cycling and improve the safety of cycling. The objectives are confirmed by quantifiable targets, including an increase in the population who cycle to work (from 7.3% in 2001 to 10% in 2011) and to school (from 18% in 2003 to 24% in 2012). Safety is measured using crash data and enjoyment of cycling (and therefore perceptions of cycling) are measured using resident surveys and a bi-annual survey of current cyclists used to determine their views on cycling in Christchurch. The ongoing commitment to cycling in Christchurch is evident in proposed actions and plans for implementation. Alongside development of the cycling infrastructure and enforcement, education and promotional activities there is mention of provision of products and services and an understanding of the target market. In 2010, Christchurch City Council produced a cycle guide, with maps of the city cycle network and information about recreational cycling in the area.

Environment Canterbury and bus companies Leopard Coachlines and Christchurch Bus Services ran a trial of carrying bikes on buses between November 2007 and May 2008 (Environment Canterbury 2007).

External bicycle racks were fitted to buses on several routes in the city and district (including through the Lyttelton tunnel). Each front-mounted rack was capable of carrying two bicycles. Feedback presented by the Canterbury Cyclists' Association (Spokes) shows that the cycling community embraced the system and was eager for it to be rolled out on all bus services (Canterbury Cyclists' Association 2008). In 2010 the service was extended to all buses on 19 routes in Christchurch (Environment Canterbury 2010). The successful trial resulted in a Vehicle Mass and Dimensions Amendment (MoT 2010) that allowed the fitting of bicycle racks to the front of buses in New Zealand.

Data from 1991 and 1996 shows a declining incidence of cycling in Christchurch (reducing from over 10% of population over 15 years old cycling to work in 1991 to 8% in 1996). However, by 2001 the decline had slowed and 7.3% of the population were cycling to work. The cause and effect of this slowing rate of decline is unknown, but it suggests that the introduction of the 1996 cycling policy may have had a positive effect on cycling in the city.

2.3.4 Summary of New Zealand cycling policy

Between 2002 and 2009, the New Zealand government took a lead in encouraging cycling for transport purposes and short trips. The NZ Transport Strategy of 2002 and the 'Getting there' walking and cycling strategy of 2005 encouraged district and local councils to develop their own cycling and active travel strategies (no doubt assisted by the requirement for a strategy to access funding for cycling and walking projects). This top-down encouragement can only help the perception of cycling as a 'normal' choice of transport mode. The government has been successful in encouraging the majority of councils to produce a cycling or active travel strategy. Many of these are now into their second or third iterations. This includes the original NZ Transport Strategy which was updated in 2008 with stronger and quantifiable targets for cycling and active travel. However, a change of government in 2009 saw a corresponding change in national cycling policy implementation. Priorities shifted to improvement of roading infrastructure, safety and transport effect on economic success. Cycling was sidelined in land transport policies released in 2009 and 2010. Investment in cycling was focused on helping to reduce traffic congestion in New Zealand urban areas. Two model cycling and walking communities in New Plymouth and Hastings have been created, which are essentially pilot projects for the government to observe the effectiveness of cycling and walking modes in reducing congestion and positively affecting economic measures of success.

The policy progression between 2002 and 2009 was encouraging, as evidence suggests that a consistent policy message has a positive effect on cycling. However, there was a large variation in content and tone of individual council strategies during this period, evident from those in the Auckland and Wellington regions. This suggests that the government message was being embraced in some regions more than in others. The effect of the significant shift in national land transport policy in 2009 remains to be seen. However, the reduction in the desire to create travel mode shifts and the focus on roading infrastructure at state and local levels suggest that the government will provide reduced support to local authorities who wish to develop improved cycling policies and encourage cycling at a local level.

The historical context of New Zealand cycling strategy development shows many local council policies being developed after central government required such a policy to obtain funding. This contrasts with Northern European experience, where long-term local investment in cycling has been complemented by central government policy. This research must question the impact of cycling policy development on cycling in New Zealand. There is a significant lag between cycling policy in New Zealand and the best practice examples from northern Europe. Can we overcome this through gradual adoption of policy best practice alone, or do we need to be more innovative in our approach? Any approach must consider the historical and physical differences between New Zealand and northern Europe: the local conditions such as

car availability, suitability of roading infrastructure and population density. Adoption of any policy best practice needs to be adapted and localised to enable success.

This research was interested in the products and services that would encourage short cycling trips, and hence the size and demographic of the target market was an essential consideration. This market may consist of current cyclists, non-cyclists who may change their travel mode, and current recreational cyclists who may be encouraged to cycle for transport. Government and local council strategies and activities will affect the size and demographic of this cycling market, as evidenced in Christchurch. The Auckland, Wellington and Christchurch cycling strategies show four themes of interest which relate government and council cycling strategies to the supply of suitable products and services to encourage short cycling trips. These could be explored further to offer direction to this research:

1 **Building the market.** Does the cycling strategy focus on existing cyclists or aim to encourage non-cyclists to cycle?
It is critical to understand the size and demographic of the market. The local focus may be on encouraging existing cyclists to cycle further and more often (eg WCC). In this case the key elements of the strategy tend towards making cycling safer (in reality and perception) and more convenient. These actions may also lead to an increased uptake of cycling for current non-cyclists as cycling is seen more frequently. However, it is possible that it has a negative effect, building barriers between cyclists and non-cyclists. The focus on safety could lead to increased perceptions of cycling being an unsafe activity. The WCC strategy also does little to add cycling to the 'normal' activities of non-cyclists, and for many it may not even be perceived as a choice of travel mode. A focus on encouraging non-cyclists to cycle, however, is more in line with the New Zealand government strategy. This requires an understanding of the potential market (ie Who are 'ready to change' their travel mode for short trips?), which will allow the market to be targeted with education and promotional activities, and products and services that allow cycling to fit into their lifestyle (ie make the choice to cycle an easy one). Such a policy may contain more emphasis on the benefits of cycling, alongside a goal to increase the perception of cycling as a convenient, enjoyable and comfortable form of transport.

2 **Understanding the market**. Does the strategy specifically target those who may be ready to change mode?
Many local authorities around the world encourage cycling and change community travel behaviour through social marketing. This is the application of commercial marketing techniques to the analysis, planning, execution and evaluation of programmes designed to influence personal welfare and that of society. Unlike commercial marketing, social marketing benefits the targeted individual and society, not the seller. However, in both cases the market share (or mode share) and target audience both have a primary role in the marketing process (James and Brog 2003). A critical aspect of commercial marketing is to understand the market segmentation, and target only the group of consumers most likely to purchase or use the particular product or service. The approach taken in council cycling strategies is inconsistent. Some, such as ARTA, recognise that such an understanding is necessary. However, many take a less-defined approach and tend to target groups using simple socio-demographic segments such as teenagers, women or those without access to a car. There is little evidence given to demonstrate that these groups contain a significant proportion of the 'next 1%' of cyclists. The simple approach may reach some of the target market, but it is not an efficient use of limited resources.

3 **Providing products and services.** Does the strategy aim to provide particular products and services in addition to the cycle route network (eg inter-modal solutions, journey planners, end-of-trip facilities)?
The focus of local councils is to provide an integrated, safe and convenient cycle network. An often quoted benefit of car travel is the comfort offered by the controlled environment inside the car. For a

cyclist, the immediate space around them can be likened to this, so developing an on- and off-road cycle lane infrastructure is essential. Few councils offer products or services targeted at particular groups of cyclists or would-be cyclists. There is evidence of a move towards integrating cycling with public transport and this is a feature of many overseas cities that see significantly higher cyclist numbers than cities in New Zealand. A case for inter-modal integration in New Zealand is made by the success of bikes on ferries in the Auckland region and the trial of bikes on buses in Christchurch. However, this approach is not the only option, as most Danish, German and Dutch cities do not allow bikes on public transport, and instead provide secure and convenient bicycle parking at stations and interchanges. A further service planned, or provided by some councils, is an interactive journey planner. Such planners may become useful services and make it easier for those considering a mode shift to cycling. The addition of products and services correctly targeted at those ready to change travel mode, possibly provided through council partnership with private enterprise, may complement the ongoing focus on infrastructure, education and promotion.

4 **Working with businesses and community organisations**. Does the strategy aim to offer incentives to businesses/communities to adopt or encourage cycling?
There is little evidence of a desire for councils to work with businesses and community groups to promote cycling. This activity has enormous potential to encourage cycling in normal life. Councils are increasingly involved with encouraging businesses and schools to adopt travel plans with the aim of reducing car travel. However, no councils offer incentives to employers, employees, schools or parents to put the plans into action. There is no further assistance or incentive for businesses to provide bicycles for the use of employees or customers, or for schools and businesses to provide cycle parking or changing facilities (Waitakere is a significant exception). Responsibility for implementing any changes is with the business or school. The New Zealand Sport and Recreation Agency (SPARC) is responsible for encouraging 'bike friendly employers' (Sport and Recreation New Zealand 2008). SPARC offers guidance to employers who want to provide cycle facilities for their employees (secure parking, showers, lockers etc) and in setting up 'bicycle user groups'. However, examples on the SPARC website are dated, and it is unclear what its current activities are. There may be considerable scope for councils to offer incentives and support for businesses, schools and community groups who want to provide products, services or facilities that encourage short cycling trips. The current focus is a step in the right direction. The separation of responsibility between council and SPARC is intriguing, particularly given the suggestion that recreational cycling and transport cycling are not necessarily complementary.

2.4 Understanding the market

New Zealand is a nation of motor vehicle owners and drivers. Motor vehicle ownership in New Zealand is the eighth highest in the world at 560 vehicles per 1000 people (of all ages). According to 2006 census data, 92% of households in New Zealand had access to one or more motor vehicles, and 15% of households had access to three or more motor vehicles. The New Zealand Household Travel Survey of 2000 stated that 92% of European New Zealand males and 85% of females of driving age could drive. For Māori the figure was 84% of males and 64% of females, and for Pacific Islanders 72% of males and 53% of females (MoT 2005).

However, data also showed that 41% of people had access to a bicycle in good working order, and only 6% of people claimed never to have learned to ride a bicycle properly (Sullivan and O'Fallon 2006). Furthermore, the SPARC Active New Zealand survey of 2007/8 (SPARC 2009) revealed cycling as the fifth most popular recreational activity with almost 750,000 (23%) New Zealanders participating annually.

It is clear that New Zealand has a 'car culture'. However, bicycles are common and the ability to ride them is widespread throughout New Zealand, with 23% of the population claiming to participate in cycling activities. Why is it, then, that the primary mode of transport for New Zealanders is the motor car with cycling marginalised to less than 2% of trips?

2.4.1 Why do we choose to drive? Why don't we choose to cycle?

There are very few published studies that consider the reasons why New Zealanders choose to drive a car for short journeys, but there is more data available from overseas. As the pattern of car ownership and use for short trips in New Zealand is similar to that observed in North America and Western Europe, it is reasonable to consider data arising from studies in these areas.

Several approaches are applied to try to understand why cars are used. One method is to analyse data on either spatial variation (for example urban density and area of residence) or socio-economic variation (for example education and ethnicity) in car use. The former is typified by Srinivasan and Ferreira (2002) who analysed travel behaviour for households in the Boston metropolitan area. They concluded that land use, network and accessibility characteristics affected mode choice and trip planning for households and that urban planners could influence travel mode at a household level. Kim and Ulfarsson (2008) analysed socio-economic statistics for short home-based trips in Washington State. They found many correlations between mode choice and factors such as age, ethnicity, marital status, household type etc. They also found that trip purpose had a statistically significant effect on short trip mode choice. Although these studies show correlation between simple socio-economic factors and cycling levels, it is difficult to quantify the strength of the relationships as the studies often show a strong correlation between all of the factors investigated.

A further approach to determine reasons for car use is 'opinion polling'. In these studies, participants are asked why they drive and offer general reasons. Often the studies focus on a particular type of travel, for example the journey to work. The approach complements work to change travel behaviour through individualised marketing campaigns, such as TravelSmart in Australia (TravelSmart Australia 2008).

Mackett and Ahearn (2000) used an opinion polling type approach to determine reasons for car use on specific trips, rather than the more usual methods of questioning regarding hypothetical trips or obtaining general opinions regarding transport modes. They questioned 377 people in the UK who had recently made a short trip (< 8 km) by car. Participants offered an average of 1.7 reasons for each short car trip. Mackett and Ahearn analysed the data to determine the main reasons offered. These were:

- carrying heavy goods (19%)
- giving lifts (17%)
- shortage of time (11%)
- trip was a long way (11%)
- the car was convenient (10%)
- the car was needed for a further trip (9%).

A further analysis considered the main reasons for driving the car for different trip purposes. For work or business trips, the main reasons given were 'needed for work' (28%) and 'short of time' (20%). Shopping trips involved 'heavy goods' (36%) and 'long way' (15%). The majority of educational escort trips, unsurprisingly, were for 'lift to family'. However, many (15%) also included 'short of time'. For other trip purposes, the reasons given mostly aligned with the overall findings.

The study also found that as trip length increased, 'long way' became a more significant reason for using the car. However, 'long way' was still the main reason for driving in 8% of trips less than 1.6km in length (compared with 10% in trips 1.6km to 3.2km and 13% in trips 3.2km to 8km long).

The car drivers were asked to identify alternative modes of transport for their car trip. In 22% of cases, no alternative could be identified, despite extensive prompting by the researcher. However, 7% of the trips could be replaced by riding a bicycle. These trips tended to be when the car was being used because of bad weather (18% could be replaced by bicycle) or a shortage of time (15%). The lowest potential for mode transfer to bicycle was when the car was convenient (3%) and needed at work (2%). However, the data was contradictory as these trips also scored highly for walking as an alternative (>30% could be replaced by walking).

In the opinion polling approach, car drivers usually offer a rational reason for choosing to drive on the short journey. Interpreting the results assumes that each trip is preceded by a logical analysis of the trip needs, and only then does the traveller choose the mode of transport. However, there are many psychological reasons for choosing to drive that are not expressed in the opinion polling study approach. These may be related to social status, the fear of being 'different' or an ignorance of the choices available for travel.

The study of attitudes has been used to further understand these psychological reasons. An attitude is defined as an internal state (as opposed to a behaviour, which is an observable act) that includes both evaluative and emotional components and predisposes an individual to respond either favourably or unfavourably to an 'attitude object' (Forward 2003).

McClintock (2003) explored the individual, social and institutional attitudes to cycling in the UK in a review of research. The background data for the UK matches the patterns seen in New Zealand: low use of bicycles for transport (3.4% of trips to work for men and 2.4% for women), but increasing cycle ownership and leisure cycling (19% of National Household Travel Survey respondents in 2001 listed leisure cycling as an activity). McClintock highlighted that change of attitude was a gradual process, and involved understanding both individual motivations and preconceptions to cycling, and the social and cultural context (for example: societal norms, peer pressure and influence of official attitudes). The review concluded that attitudes to the use of bicycles could be changed over the longer term by a consistent and coordinated approach. This should include physical provision for cycling (on- and off-road routes, speed reduction and enforcement on the roads, and bike parking) and coordinated action by local authorities, employers, police, education, leisure, tourism and health agencies. The report emphasised avoiding a negative preoccupation with traffic dangers, and focusing instead on the positive aspects of cycling. It also highlighted a discrepancy between national and local cycling strategy and actual cyclist satisfaction in the UK, and suggested that incorporating the views of a variety of cyclists was essential to promote cycling from a second-rate form of transport.

The *Theory of planned behaviour* (Ajzen 1985) has been used to link attitudes and behaviour in transport mode choice (Forward 2003). The theory predicts the personal decisions, or intentions, of behaviour based on attitudes towards the act (salient beliefs about the consequences of the act), subjective norms (an individual's belief about the expectations of persons significant to them) and perceived behavioural control (a person's perception about their own capability to perform an act – based on past experience or second-hand information). Forward (2003) reported a good link between the model and the intention to walk or cycle, based on studies in Amsterdam, Copenhagen, Barcelona and Gothenburg, and discussed a number of factors in relation to attitudes to cycling:

- **Time**. Cyclists argued that it would be faster to cycle a distance of 2.5km than to drive a car. However, drivers believed it would be much faster by car. It was also suggested that when we were immersed in an experience, time might not be an issue. It was only when the space between departure and arrival was left unfilled that we became aware of time. A person's attitude to how long

it might take to travel by different modes of transport told us something about how the experience was perceived.

- **Cost**. The cost of car travel was not accurately estimated by participants. This might be because cost, like time, was not based on real value. Many accepted the high cost of running a car unquestioningly, others believed cost was balanced by the time saving, and a third group argued that they already owned a car (and had committed to its fixed costs) and using it would be cheaper than leaving it idle and using alternative modes.
- **Safety**. Non-cyclists who lived in areas with low levels of cycling were most worried about safety. Regular cyclists living in areas where cycling was common were less worried about safety. This was partly because of a measurable 'safety in numbers' effect (accident rates per kilometre were lower in areas with high cycling levels), and partly due to their exposure to cycling (more kilometres cycled or more cyclists seen per accident lowered the perception of risk).
- **Relaxation**. Non-cyclists tended to perceive cycling as strenuous, rather than relaxing. However, cyclists considered cycling to be relaxing. This might be explained by the effort involved. If the effort required to carry out a task was unwelcome or unanticipated, it was regarded as inconvenient (and therefore stressful). For a regular cyclist, the effort required was neither unanticipated nor unwelcome and could even be an aim in itself.
- **Independence**. Regular cyclists believed the bicycle offered a sense of freedom. This view was not shared by non-cyclists, who obtained a feeling of freedom from the car, which allowed them to travel when they wanted and where they wanted. Car drivers thought the bicycle allowed travel when they wanted, but not where they wanted.
- **Environmental issues**. Cyclists agreed that bicycle use contributed to a better environment. Car drivers did not disagree, but did not always link their car use to their general environmental concerns. There was a dilemma between their personal interests and social issues (car convenience versus environmental pollution). Drivers saw the immediate advantages of using the car outweighing the long-term disadvantages to the environment.
- **Health issues**. Similarly to environmental issues, cyclists and car drivers saw health benefits to cycling. However, drivers often disassociated transportation and exercise, and did not see driving as contributing to an unhealthy lifestyle. Indeed, the car could be used to take them to sporting and leisure facilities.

Many of the conclusions offered by Forward echoed findings in the UK (Davies et al 1997). Through a series of focus groups and in-depth interviews, the researchers found that many people had a positive attitude to cycling and related it to enjoyable childhood experiences but still saw it as a minority activity. As adults, they suggested traffic danger, concerns about personal safety, and poor image (relative to the car) as deterrents to cycling. The report concluded that, for non-cyclists, the decision to cycle was a complex one and many simply did not see a need to consider cycling.

A similar study considered car users in Auckland (Colmar Brunton 2008). In the study, 10 households were interviewed about their attitudes to and perceptions of different transport modes. A general finding agreed with Forward in that car users acknowledged the need for people to use their car less, but deemed other transport options to be far less convenient and restricting for their own hectic lifestyle. Car users viewed cycling as environmentally friendly, convenient (could choose routes and travel times) and a good way to avoid traffic and parking problems. However, they also thought cycling was unsafe on busy Auckland roads, affected by weather and hilly terrain, was limited in luggage capacity and was not as fast as a car. There were also concerns around cycle parking and theft. Intriguingly respondents offered

physical exertion of cycling as a weakness of the mode, but also suggested the exercise would make them feel good. Cycling was perceived as a male leisure activity. The same car driving respondents said the car offered control (of time, destination and company), was fun and convenient and assured them of personal space. However, they also noted the high cost of driving, recognised that breakdowns and accidents were a concern, and that driving in Auckland traffic could be stressful. Driving was seen as the norm: 'everyone drives a car'.

The study of attitudes to transport modes and the link to mode choice behaviour highlights the complexity of the decision-making process. Decision making has been described as a combination of extended problem solving (EPS) and limited problem solving (LPS) (Blackwell et al 2005). LPS is related to impulse purchasing or perceived easy activities (such as walking the dog), while EPS entails a rigorous series of evaluations and is applied to purchases of high-value items, such as cars. LPS tends to be more prevalent as most consumers do not have the motivation to indulge in a need recognition, information search and evaluation process for every purchase or decision, so they simplify or bypass it. However, for non-cyclists, the decision to cycle *is* an extended problem-solving (EPS) decision. There are many aspects of driving they perceive they must give up in order to choose to cycle (such as the convenience and personal space of the car). The decision becomes an involved process that weighs up aspects such as the ego relationship (the poor image of cyclists), perceived risk of negative consequences (danger of cycling), social sanctions (the 'eccentric' perception of cyclists), and a hedonistic significance (pleasure of utility cycling) (Ajzen and Fishbein 1980). Many non-cyclists are insufficiently interested in cycling and do not even embark on the decision process. For those who do, it is relatively easy to perceive negative associations in one or more aspects. It is unsurprising, then, that most drivers take the easy decision to use the car.

Forward (2003) extended this rationale, and suggested that car use was a habitual process for many travellers. Once an action became a habit, a rational decision was not made each time (it became a simple decision). When compared with the theory of planned behaviour approach used to relate attitudes and behaviours in travel mode selection, it was found that the association between habit and behaviour was many times stronger. It may be that habitual car users needed an extraordinary event to intervene and break their habitual behaviour.

A more informal review of cycling excuses is shown in *Bike to work*, (Grahl and Reid 2009). The authors attempt to dispel 24 commonly cited excuses for not cycling. These include many focused on cycling products and services, and are:

- Cycling is dangerous
- I don't have the time
- Rain! I hate getting wet
- I'll get all sweaty
- My co-workers will laugh at me
- I'll smell
- It costs the earth to buy a bike
- Only expensive bikes are good
- I'll get a flat tyre
- I'm too out of shape
- It's too dark when I go home

- You can't carry much on a bike
- I can't, I have to wear a suit
- I want to get fit, but I don't want thunder thighs
- I travel long distances, too far to cycle
- Biking will be bad for my sex life
- I have to take clients out to lunch and we need to drive
- I don't know of any bike routes to work
- Bikes don't have air-con, I don't want to breathe in city fumes
- I would cycle, but my town is too hilly
- My bike will get stolen
- Bikes are oily
- I can't cycle, I lug a laptop
- I've got kids to drop off at school before work, I need an SUV
- Cycling requires too much specialist clothing and gear.

These excuses, although expressed in consumer language, reflect many of the reasons for not cycling reported in academic literature. However, Davies and Hartley (1998) surveyed new bicycle owners in the UK. They found that many fears of non-cyclists (such as the ability to carry luggage, distance, or the effort required to cycle) were overestimated.

The issue of 'fear of cycling' has been cited in an ongoing New Zealand study as the largest factor preventing more people riding bicycles (a brief summary debate was broadcast on Radio NZ on 28 January 2009). A number of cyclists and non-cyclists were questioned regarding their travel choices. The 'fear' of cycling arises from attitudes and behaviour of motor vehicle drivers towards cyclists. This could manifest as an invasion of personal space of the cyclist, through to aggressive behaviour and collisions. It is interesting to note that many non-cyclists have not directly experienced the attitude of drivers towards cyclists, so must be developing their attitude through second-hand sources. The research was echoed by Horton (2007) who cites many UK studies which found fear to be a significant barrier to cycling, with the focus on the perception of danger and safety. The UK Department for Transport reported that 47% of adults strongly agreed that 'the idea of cycling on busy roads frightens me'. Horton contends that the fear of cycling as a dangerous activity has been constructed through three strands:

1 Promotion of road safety education which focuses on the need of pedestrians and cyclists to be careful of motor vehicles, rather than attempting to control the speed and behaviour of motor vehicles to create an integrated travelscape for all.

2 Promotion of cycling helmet use reinforces that cycling is a dangerous activity and encourages the fear of cycling.

3 The development of new cycling spaces separating cycling from motorised traffic develops a feeling that cycling is best in safe and pleasant places, rather than on the road.

Horton also suggests that the identity of the cyclist, as something different from the 'norm' encourages fear in non-cyclists. Cycling is a marginalised practice in the UK (and New Zealand). Cyclists are seen as strangers by mainstream society, and actions of cyclists that draw attention are prone to attract a negative

response. Horton concludes that, if cycling becomes more mainstream and people feel increasing pressure to ride a bike, the fear of cyclist danger will initially rise as more non-cyclists experience the current cycling facilities. At the same time they may feel and fear the loss of a way of automobilised life. This increased level of fear for cycling may signal that cycling is ready to become mainstream.

The focus on attitudes to transport modes and the fear of cycling links into the discipline of affective design. The Massey University Centre for Affective Design (AFFECT) describes successful product design as offering people experiences that are appropriate, desirable and meaningful – sensorially, cognitively and emotionally. Functionality and usability are still key characteristics for a good product, but unless the product is also instantly appealing and continues to appeal over time, it will not be a sustainable product from a business, societal nor environmental point of view (Massey University 2008). Affective design grew out of human-computer interaction in the late 1980s, which developed the area of affective computing in the late 1990s. The idea of using affective design to understand and design for the emotional response to transportation modes is not widely published or understood. A UK study examined the positive and negative affective experiences of commuters (Gatersleben and Uzzell 2007). They questioned 389 staff at the University of Surrey about their feelings regarding their commute. Of the respondents, 42% drove a car to work, and a further 14% were car passengers. Of these car users, 35% lived within 4.8km of their workplace. The study supported previous research that showed travel by car and public transport could be stressful. This stress is caused by traffic volume, behaviour of other road users (for car users) and poor infrastructure (for public transport users). However, the study also showed that other factors, such as boredom, should be taken into account. Driving is relatively unpleasant while cycling is pleasant. Both activities were seen as arousing. An interesting note was that a lack of control (ie being stuck in traffic) was an important source of stress for drivers. Conversely, the unstressed travellers (walkers and cyclists) did not cite control or flexibility as important positive aspects of their journey. Many studies report that flexibility and control offered by the car is an important reason for driving. However, this study questions whether these are real advantages of car travel, and to what extent drivers report these as reasons when asked to make cognitive evaluations to justify their choice? The authors of the study note that the results only relate to the respondents' current choice of transport mode, and are linked to their attitudes towards these modes. It is not possible to draw any causal conclusions from the results. However, the study does suggest that affective evaluations of transport mode are worth further investigation.

In any strategy to encourage cycling levels, it is important to consider the positive attributes of cycling. Products and services must address the needs of cyclists and non-cyclists, but care must be taken when deciding which stated needs are most important to target. The best focus might be to provide a high-quality and positive cycling experience. If we assume that non-cyclists are looking for a reason not to cycle, then we need to do everything to stop them finding that reason. This means ensuring that cycling receives the desired positive emotional response. We can also help to move cycling more into the mainstream, making it more of the 'norm'. This strategy would focus on quality of design to meet user needs (eg bike parking and facilities), supply of appropriate bicycles, accessories and clothing and methods to get these products to the non-cycling public. Products and services cannot generally have a direct influence on factors affecting the cycling experience, such as weather, traffic, motorist behaviour and quality of cycle paths. However, by recognising the potential negative experiences their impact can be minimised by the design of products and services such as bicycle and rider weatherproofing and interactive cycle planning maps. The affective design approach may be useful here, to address the emotional response to transport modes and cycling in particular, and to ensure that cycling products, services and facilities are designed to maximise the positive aspects of this experience.

We can also consider the considerable group of recreational cyclists who do not cycle for transport. In New Zealand, cycling is the fifth most popular recreational activity with almost 750,000 New Zealanders

(23%) participating annually. Why do the majority of these people, who must enjoy cycling, choose not to use a bicycle for transport trips? There is little literature available to explain their behaviour. A leisure cycling trip is defined as a trip made purely for the journey itself. These trips might include family cycling, road cyclists training and mountain biking on off-road trails. Gardner (1998) interviewed more than 500 leisure cyclists, non-cyclists and commuter cyclists in the UK in an attempt to discover why a substantial increase in leisure cycling did not lead to more people cycling to work. The study found that leisure cyclists viewed utility cycling as dangerous, demanding, stressful and requiring immense self-discipline. This contrasted with their image of leisure cycling as being calm, peaceful and liberating. The main barrier to more utility cycling by leisure cyclists is their fear of traffic. However, the study also found that leisure cycling, and particularly mountain biking, has preserved the cycling habit that usually lapses after childhood ends. The impact of leisure cycling might also be extended to the travel mode chosen to get to the start and end of the leisure trip. Many family and all mountain bike rides are on off-road trails. Anecdotally, the car is the most likely choice of these leisure cyclists to transport themselves and their bikes to and from the trails, adding to the number of motorised trips undertaken.

The reasons for individual travel mode choice are complex. The simplistic view is to ask why someone chooses to drive, or not to cycle, and to gather the responses. These can be related as customer 'needs', and can be provided for (bicycle parking, end of trip facilities, cycle lanes etc). The approach assumes that providing for stated needs is sufficient to remove barriers for mode change. However, this approach overlooks the underlying attitudes inherent in travel mode choice. These are shaped over time by individual experiences, society, media and government and council policies. A more thorough approach to travel mode change would consider how individuals, groups, organisations and whole communities influence attitudes to driving and cycling. It is reasonable to conclude that the final approach to encouraging transport mode change from the car to the bicycle would integrate the products, services and facilities directly requested by individuals, techniques to make these available to drivers, and methods to gradually influence and change underlying societal attitudes.

2.5 How do we target the 'next 1%' of cyclists?

Developing a cycling culture and raising cyclist numbers in New Zealand will not happen overnight. Given that we do not have endless resources, we need to target the most likely people to change their transport mode for short trips. New Zealand government and councils are beginning to recognise that any approach needs to be targeted to the most likely people to switch travel modes to cycling. However, there is less understanding of who these people might be.

Davies et al (1997) proposed a framework to promote individual change of mode. This included two models that offered insights into who the next 1% of cyclists would be, the contemplation of change and diffusions of innovation models.

The contemplation of change model is a psycho-social model which asserts that an individual passes through several discrete stages of contemplation when making fundamental changes away from personal 'norms'. The stages are:

1 Pre-contemplation (would not consider change)

2 Contemplation (conceive of the possibility of change)

3 Ready for action (actively considering actions and implications of change)

4 Action (has tried the change, has experienced the effects and is assessing the change)

5 Maintenance (may revert to previous behaviour and will benefit from reinforcement)

Movement through these stages is cyclical, involving a pattern of adoption, maintenance, relapse and readoption over time. This theory offers possible direction for marketing targeted at individuals in various stages of contemplation and suggests that interventions such as New Zealand's 'Bike Wise Business Battle' (supported by NZTA funding) may be effective at accelerating people from stage (2) to (4) by encouraging them to try cycling to work.

In New Zealand, Sullivan and O'Fallon (2006) considered the contemplation of change model for cycling and walking modes. They used data collected from 8000 respondents to a SPARC survey in 2003. The results showed that 41% of respondents had not even considered using a bicycle (stage 1: pre-contemplation). A further 22% realised that the bicycle was an option, but would not actually do it (stage 2: contemplation) or had actively considered the pros and cons of cycling (stage 3: ready for action). This suggests that, while 41% of the population may never be convinced to cycle, nearly a quarter of the population might respond to an initiative that encourages them to try cycling, or makes cycling products or services readily available to them. A further 18% of respondents claimed to have tried cycling on some occasions (stage 4: action). These people would have first-hand experience of the pros and cons of cycling, and would need interventions targeted at addressing any negative perceptions of bicycle transportation. The data also showed clear regional and gender differences. More women were at pre-contemplative (stage 1) than men (46% vs 36%) and fewer women were active bicycle riders. Most regions in New Zealand showed a similar spread in contemplation of change. However, the Nelson-Marlborough region had a significantly different split, with only 27% of respondents in pre-contemplation (stage 1). More respondents from Nelson-Marlborough were either at the contemplation or ready for action stages 2 and 3 (27%), or were active cyclists (22% at maintenance stage compared with 14% nationally). It would be important to understand what is different in Nelson-Marlborough and how that impacts on readiness to change to cycling.

The diffusion of innovations model (Rogers 2003) can be applied to the social innovation of cycling for short trips. The model identifies five categories in relation to their predisposition to innovative change:

1 **Innovators** (venturesome, experimental, maverick, may comprise an avant-garde minority sub-culture).

2 **Early adopters** (the 'Jones's', like to be in the established forefront of new ideas – trend setters).

3 **Early majority** (will follow a trend once someone else has set it – need peer leader Jones's to show the way).

4 **Late majority** (will join once it is clear most people are going along with it).

5 **Laggards** (resist change, suspicious, may never change at all, may become a resistant sub-culture).

Rogers argued that the diffusion of an innovation is enhanced when the perceived superiority of an innovation is high compared with existing practice (ie the relative advantage), and when the compatibility of the innovation with the existing social system is perceived to be high. Further observations show that complexity, trialability and observability are important influences. This suggests that cycling should display a relative advantage over driving, and needs to be socially acceptable in order to diffuse more effectively. There must also be consideration of social context when considering an individual's propensity to change. An individual's perception of what others are doing, the social acceptability of their behaviour, and their ability to try the innovation will affect their decision to change and to take up a 'new' idea (such as bicycle riding).

The models for mode change promotion offer a multi-layered approach to understand who the 'next 1%' of cyclists might be. They also offer guidance for targeting these people with suitable interventions.

The concept of a more complex framework for mode change was tested by Anable (2005). An expanded version of the theory of planned behaviour, incorporating additional factors such as habit, moral norm and

environmental attitudes, was used to segment a population of day trip travellers into potential 'mode switchers'. A sample group of 666 visitors to two UK National Trust properties were questioned to determine their attitudes to travel. A statistical analysis of the results showed that the respondents could be split into six segments. These were *malcontent motorists* (the largest segment – car owners who were unhappy with car travel and believed they had a moral responsibility to change behaviour); *complacent car addicts* (car owners who acknowledged that the use of other transport modes was possible, but did not feel a moral or other incentive to change behaviour), *aspiring environmentalists* (car owners who had substantially reduced car use, but were unlikely to give it up entirely), *die hard drivers* (car owners who were fond of cars and car travel and had negative feelings to all other travel modes), *car-less crusaders* (had sacrificed car ownership for environmental reasons), and *reluctant riders* (involuntary non-car users due to health or financial reasons, but would own a car in the future or accept lifts by car when possible). Anable found very few statistically significant socio-demographic differences in the groups and reported that attitudes and opinions largely cut uniformly across demographic characteristics. Education did distinguish the groups, with significantly more car-owning aspiring environmentalists (69%) and significantly fewer complacent car addicts (48%) being educated to degree level and beyond. Any other notable socio-demographic differences separated the car-owning groups from the car-less groups. The car-less groups tended to be older, include more retirees and have fewer children at home.

'TravelSmart' is an individualised marketing programme applied by Australian state governments, including Victoria, Queensland and Western Australia. It aims to reduce people's dependency on cars and encourage them to choose sustainable alternatives such as walking, cycling or public transport (TravelSmart Australia 2008; State Government of Victoria 2009). The programme was developed by the Government of Western Australia in the mid-1990s, as a response to the Western Australia Metropolitan Transport Strategy findings that recognised continuing trends in car use were unsustainable. The approach of TravelSmart is to work with individuals in their households to help them make informed travel choices beyond the car. This approach allows the programme to address the subjective attitudes and misconceptions towards the travel modes, as these are the reasons for driving that can be changed by offering interventions and experiences. TravelSmart teams also work with local governments, schools, universities, hospitals and workplaces to help them self-manage the process of change. This is a longer-term approach to travel mode change, and will help to address the societal influences that make driving the norm.

A review of TravelSmart application in the city of South Perth established the potential for mode share by considering only subjective views regarding transport mode (ignoring constraints and objective reasons as unchangeable) (James and Brog 2003). This resulted in the potential for 25% of trips to be made by bicycle in South Perth, which compared with 3% of existing trips made by bicycle. The research also showed there was more potential to change shopping trips (30%) than work trips (19%). They concluded that the potential for mode change, solely through influencing subjective views of cycling was substantial. An important stage in the programme was to identify households that had an interest in mode change. In South Perth, this resulted in 40% of households contacted being offered advice and interventions. A further 39% showed no interest in mode change, and were left alone to minimise any negative response to the programme. After application of the TravelSmart programme, the researchers found that relative changes in travel modes were consistent with the potential for change. Cycling rose by 61%, albeit from a low base (from 2% to 3% of all trips). Overall results for the programme were good, with a reduction in car trips of 14% (from a 60% mode share to 52%) and an increase in walking, cycling and public transport mode share. Challenges identified for the programme were to realise the high potential for cycling as a form of transport, to quantify the benefits of reduced car trips, and to address an increase in age profile of cyclists (there are fewer children cycling).

The programme has proven success in creating mode change in several Australian states over the last decade. Targeting the subjective reasons for transport mode choice is effective in instigating mode change. Any focus on products, services and facilities must consider this subjectivity, and integrate with programmes such as TravelSmart. Through the application of accepted social marketing models, we may be able to identify a section of non-cyclists who are most suitable to target for mode change. Just as the successful TravelSmart programme is founded on the idea that one type of promotion does not suit everyone; one type of product or service, or one distribution channel, will not suit everyone either. When considering products, services and facilities we must focus on identifying and targeting particular market segments, and designing the solutions for them.

In 2010, the GWRC completed an 'Active A2B' pilot study in travel planning (GWRC 2010). The approach identified and targeted employees of 50 companies who were most willing to change travel mode. These participants, numbering approximately 900 (or 3% of eligible employees), were offered information about cycling and walking, and support through initiatives such as cycle skills and maintenance training and a 'bike buddy' scheme. The programme reported that within an Active A2B 'plus' group (who previously drove to work at least twice a week), their average number of car trips to work had reduced from 82% to 61% and cycle trips had increased from 5% to 14%. Participants reported that the timing of the programme (starting in January) and the individualised nature of the support were key factors for its success.

3 Solution review

3.1 Cycling solutions

3.1.1 Why do cyclists need products and services?

This solution review focuses on products and services available in New Zealand. In particular we looked for those that might encourage or facilitate cycling for short trips. No significant attempt was made to assess the suitability of the products and service to the short trip cycling market, or their relative success or failure. Products and services have been split into separate categories:

- *Products* are defined as something an individual generally pays for, and personally owns. These items are not usually shared with the wider community, for example, a bicycle or helmet.
- A *service* is defined as a system which assists cyclists to use a bicycle or encourages non-cyclists to cycle. These may be supplied to the public by local governing bodies or service providers and include, for example, end-of-trip facilities and bicycle maintenance services. These services may be free or carry a cost. Services are shared with a wider group of cyclists or other members of the community.

This study used qualitative data (interviews, observation and email dialogues) to discover major recurring and intersecting themes. These were interpreted in conjunction with relevant findings from the literature review.

The research team interviewed participants using projective questioning and a conversational style. The content of each interview was necessarily affected by the views of the individual interviewee. Some non-local participants were interviewed individually by telephone and/or by email.

Participants were selected on a convenience basis. For bicycle stores and manufacturers/suppliers of equipment, the selection process replicated that typically used by a customer. Internet searches, business directories and local knowledge were used to identify stores in an area. Preference was given to those whose marketing suggested practical cycling. Retail stores were located in Dunedin, Christchurch, Wellington, Palmerston North, Cambridge and Auckland in New Zealand, and Melbourne and Brisbane in Australia. Cycle advocacy and council representatives were drawn from Dunedin, Christchurch and Auckland in New Zealand, and Melbourne and Brisbane in Australia. Cyclists and potential cyclists were identified through personal association during travel between the areas identified above:

- retail bicycle shop staff and owners (n=15) (Australia n=7)
- cycle advocacy group representatives, members and coordinators (n=6) (Australia n=8)
- city and regional council representatives (n=7) (Australia n=2)
- manufacturers and suppliers of cycling-related equipment (n=6) (Australia n=2)
- cyclists and potential cyclists (n=16) (Australia n=10).

Observations were conducted in a style consistent with good design practice and included:

- interactions and behaviours between customers and sales representatives
- assessing retail space layouts and the priority given to each cycling type
- personal experience and analysis of use of a number of services in urban centres including cycle lanes, trip planners, cycle maps and rental bicycles.

When considering short urban trips, all that a cyclist needs is any sort of bicycle and, legally in New Zealand, a helmet. Lights and reflectors can be added as necessities for travel at night. Any further products, services and facilities available to cyclists in New Zealand (or overseas) are therefore not a necessity. However, they can serve to:

- enhance the experience of riding
- personalise the experience of riding
- encourage non-riders to ride, or existing riders to ride more often
- increase the comfort of cycling
- reduce the effort of cycling
- ease the fit of cycling into daily routine;
- make riding safer or feel safer.

The literature review shows that cycling competes for travel mode share with the car (public transport and walking are also competitors, but not the focus of this study). Given the significant and long-term investment in the supply of products, services and facilities aimed at enhancing the car driving experience, it is unsurprising that the car is the primary form of transport in New Zealand. Cycling has received a small proportion of this investment, and is currently marginalised. This study aimed to discover if the provision of products, services and facilities could increase cycling levels, and make it a more normal transport mode. While there had to be a focus on the essentials, bicycles and helmets, there was also consideration of the supporting products and services that help to create a positive cycling experience.

3.2 Products in New Zealand

3.2.1 Can cyclists easily source suitable products in New Zealand?

Is it easy for potential cyclists to source products and advice that will help make their cycling experience enjoyable?

When gaining an understanding of products available in the market we must consider how easily accessible they are. *Access* is used here as a blanket term to cover the process of noticing, researching, trialling, purchasing and personalising a bicycle or cycling accessory. In other words access to a product can vary based on:

- How visible or common is it in the community? Do I even know it exists? (Is it easily noticed?)
- How easily can people find out more about the product and how much prior experience do people have in this area? (Is it easily researched or understood?)
- How easily can people experience or test that the product will suit their needs prior to purchase? (Is it easily trialled?)
- How easily can people afford or get access to buy the product? Do I have to wait weeks for it to arrive from overseas or can I walk into a store and take it away? (Is it easily purchased?)
- How easily can people adapt it to their own use patterns for existing equipment and how well do the aesthetic or material qualities of the product represent them as individuals or members of groups? This can come down to a matter of being able to choose from a wide variety of products that are very adaptable. (Is it easily personalised?).

While bicycles are versatile enough that any type can be used for short urban trips, some are much better suited than others. Bicycles best suited to urban use generally feature a more upright riding position,

features that allow riders to wear normal work clothing (rather than cycling-specific clothing, such as tight Spandex shorts) and built-in load carrying features like carriers and baskets. From our observations these types of bicycles are currently seen much less often on New Zealand roads than in European cities.

The vast majority of retail sources for bicycles and bicycle accessories in New Zealand hold recreational cycling as the most important part of their business. This is apparent from the range of products on display and the products that are displayed most prominently in the store. A common theme emerging from discussions with retail store staff and owners was that, while there seemed to be some demand for urban style bicycles, there was little chance that stores would become more dedicated to the sale of these bicycles. Reasons differed, but summarising the main ones:

- Recreational cycling was a proven income earner and should not be reduced in order to cater for urban cycling (which is an unproven market in New Zealand).
- Some types of urban bicycles were very hard to source in New Zealand. Wholesalers were unwilling or unable to supply or continue to supply them.
- Staff were enthusiast cyclists and their understanding of the urban cycling market was much less developed than that of the recreational market.
- Interest in urban cycling seemed to have peaked along with the height of the fuel prices (in 2008), ie there didn't seemed to be a consistent growth trend.

The result is that a limited choice of mostly cheaper, design-compromised urban-specific bicycles are available in stores throughout New Zealand and these are being sold mostly by shop staff who are not enthusiastic about this type of product. Cyclists or potential cyclists who want more choice are forced to seek more information and a wider range of products online and through word of mouth or from a handful of specialist cycle retailers who are enthusiastic about urban specific cycling. This becomes an issue when we consider that the local bicycle store is the natural first point of call for non-cyclists. These customers do not know what is available, and may rely on the advice given by store staff or conclude that the bicycles available are not suitable for them. They may review the experience of the store, staff advice and products available, and simply conclude that cycling is not for them. Assuming that the potential cyclist does make a purchase, outcomes may be that:

1. Determined researchers get the bicycle they want from a non-local source, but potentially at greater expense (money and time).
2. Less determined researchers end up with a locally bought bicycle that may not be as enjoyable to ride or as durable due to its compromised design and quality.
3. Other new cyclists will end up with a locally bought bicycle poorly suited to their needs and, as a result, their cycling experience will be of poorer quality. (For example one of our team was directed to a low-quality mountain bicycle in a store when he had asked for a bicycle for 'riding around town and to work' and told the retailer he was happy to spend 'a fair amount of money'. The store stocked exactly the sort of bicycle he wanted.)

There are a few exceptions. Some retailers hold a much greater variety of stock and awareness of urban cycling. This was noticeable in some Nelson stores, for example, where a good range of urban specific bicycles (including electric-assist bicycles) and accessories were displayed in the prime area at the front of store and were given a significant amount of floor space. There are a few examples of retail stores with a stronger focus on practical bicycles and equipment. In Havelock North, Hawkes Bay, floor stock at Revolution Bikes includes cargo and transport bikes by Kona, and they are agents for the Gazelle brand of Dutch city bicycle. In Port Chevalier, Auckland, Rode is a new bicycle store that stocks commuter and city

bicycles from the Schwinn, Gazelle, Electra and Swobo brands alongside the more usual selection of road and mountain bicycles. They are the only source of Swobo urban bicycles in New Zealand, which retail for between $1350 and $1980. In Wellington, the established Burkes Cycles store regularly has examples of folding, Euro-city and commuter bicycles on the floor amongst their vast range of recreational bicycles.

The New Zealand bicycle retail market does not reflect developments overseas. In many Northern European countries (such as Denmark, Germany and The Netherlands), the dominant urban bicycle is the 'Euro commuter' style bicycle. This is complemented by a wide range of other urban bicycles, catering for specific trip needs (speed, luggage capacity etc). Of course, these countries have higher cycling levels than New Zealand, and many of the products will have appeared in response to market demand. However, countries that display similar levels of urban cycling to New Zealand also have a wider range of urban cycling products available. In the UK and Australia, while recreational bicycles are the primary markets, there is relatively easy access to a good range of urban bicycles. Experience in Melbourne and Brisbane showed that local bicycle stores offer a more balanced product range. There are also more instances of stores specialising in urban cycling.

This review divides the market for cycling products in New Zealand into two main groups: directly related products (bicycles, for example) and indirectly related products (items which make use of a bicycle easier or safer, for example reflective clothing or bicycle locks).

3.2.1.1 Bicycles

There a large number of types of bicycles available to cater for an equally large number of uses or types of trips. Some bicycle types are specifically well suited to urban cycling while others are not. Factors such as frame geometry, gearing ratios, tyres, durability, load capacity and maintenance issues all have an effect on how suitable each bicycle is for urban use.

Observation leads us to believe that some of the bicycle types most suited to urban utility cycling use are some of the hardest to find in New Zealand. It is essential to consider the complete experience, rather than just the ability to purchase a bicycle. Research presented in the literature review shows that trialling a new or unfamiliar product or experience can be the catalyst to change, particularly as it allows second-hand preconceptions and misconceptions to be replaced with first-hand experiences.

The types of bicycles available in New Zealand have been defined by the research team. These are marketed either as recreational bicycles, transport bicycles or suitable for both purposes. The vast majority of bicycles available in New Zealand are either recreational, or recreational bicycles also useful for transport.

The following are brief definitions to illustrate the many available bicycles and explain why they are suited, or unsuited, to the urban environment. The assertions are based on our observations and experiences of the New Zealand cycling market:

Bicycles primarily aimed at the recreational market

Mountain (figure 3.1). These are probably the most common type of bicycle seen in New Zealand. The mountain bicycle is designed for recreational off-road cycling on dirt trails and is built to withstand the heavy abuse of crossing rough terrain. The standard wheels are 26 inches in diameter and tyres are high volume with tread that is well suited to loose or slippery surfaces. This 'knobbly' tread creates significant rolling resistance on smoother surfaces. Mountain bicycles are further divided into sub-categories, and each is designed for a specific branch of the sport. This makes some types of mountain bicycle more suited to urban use than others (for example, full suspension bicycles designed for downhill racing are heavy and difficult to pedal on flat terrain, whereas many recreational cross-country mountain bicycles are more suited for urban use, with more efficient pedalling and comfortable seating position). It is common to see inexpensive recreational cross-country mountain bicycles sold and used for urban transport.

Figure 3.1 Cross-country hard-tail and full suspension downhill mountain bicycles

Road or racing (figure 3.2). These bicycles are available in almost all bicycle stores in New Zealand, and along with the mountain bicycle, they form a significant proportion of bicycles on display at most stores. Road bicycles are specifically designed for racing (or training for racing) on paved roads. Their design is focused around speed and efficiency, usually at the expense of comfort. The standard wheels are 700c, a larger diameter than the mountain bicycle and their tyres are typically narrow and with a low air volume, reducing their comfort. While other bicycles are designed to be ridden on paved roads, the name 'road bicycle' is used almost exclusively to describe this racing oriented style.

Figure 3.2 Road (or racing) bicycle

BMX (figure 3.3). A BMX typically has smaller wheels than both road and mountain bicycles, a very compact, sturdy frame and only one gear ratio. There are two main styles of BMX, those for racing on tracks and those performing tricks or freestyle. The simplicity and style of BMX bicycles can make them a fun bicycle to ride in urban environments. However, the compact frame gives an uncomfortable riding position for anything but very short trips (and is unsuitable for riders of average height or taller), the single gear ratio means that pedalling is frustrating, and they have a poor load carrying ability.

Figure 3.3 Freestyle and track racing BMX bicycles

Track (figure 3.4). Track bicycles are designed for racing at velodromes (bicycle racing tracks). Their design is biased towards efficiency and speed on a smooth, flat surface. Track bicycles have no freewheel (so the riders' legs must always spin as the bicycle moves), no brakes and only one gear. They also have very narrow tires that use high pressures in order to reduce rolling resistance. All these characteristics combined make track bicycles particularly unsuited to urban riding.

Figure 3.4 Track bicycle

Touring and cyclocross (figure 3.5). A touring bicycle is designed for travelling long distances, and is well suited to carrying loads in bags mounted to racks on the front and back of the frame. They often have a reasonably relaxed riding position when compared with a racing road bicycle, and have mounting points for mudguards. These features combined make touring bicycles a reasonable bicycle for urban use. Cyclocross bicycles are very similar to road racing cycles except that they are designed around racing on short off-road tracks in the autumn and winter. They often have larger tyres than road cycles but with tread more like a mountain bicycle. Cyclocross bicycles are often tougher and may be better suited to urban riding than road bicycles, especially with the addition of slick tyres.

Figure 3.5 Touring and cyclocross bicycles

Bicycles sold to the recreational and transport markets

Townies. A significant observation is the number of older mountain and road bicycles that have been converted (usually by the owner) for urban use. We have called these 'townies', but they may also be known as '10-speeds'. These bicycles typically have mudguards and luggage carriers added and the handlebar position may be changed to achieve a more upright and comfortable riding position. Road bicycles sometimes have the low dropped handlebars replaced with straight, flat bars. Tyres are typically changed to larger volume slick tyres. These changes are made in favour of comfort and/or efficiency. These bicycles are not available new from bicycle stores, but they are commonly sold on the second-hand market or made available by community bicycle programmes. They are of interest to this study as they demonstrate personalisation of the bicycle by the owner, and can help to identify elements that make the bicycle more suitable for urban transport, that may be missing from new bicycles.

Hybrid and Fitness (figure 3.6). A hybrid bicycle is part way between a road bicycle and a mountain bicycle. They are intended for use as a commuting and recreation vehicle, but are also sold to recreational cyclists with no aspirations to race (families, for example). They normally have a relaxed, upright riding

position and large diameter wheels with wide high-volume tyres for speed and comfort on smoother surfaces. Hybrid bicycles in New Zealand often have low-quality suspension on the front wheel and no mudguards. Fitness bicycles are similar to hybrid bicycles but are sportier in their appearance, generally lighter than hybrids and more suited to speed. They have large diameter wheels fitted with narrower tyres than hybrids and straight flat handle bars (and so are faster but generally less comfortable).

Figure 3.6 Hybrid and fitness bicycles

European city or Euro commuter (figure 3.7). This style of bicycle is specifically designed for urban use. They are designed to carry a range of loads, usually having baskets and carriers. They are also designed to be ridden wearing everyday clothing such as suits and skirts – there are protective guards on the chains and over the wheels in addition to extensive mudguards. Many of the accessories (eg locks, pumps, lights) are integrated into the bicycle so that the rider does not have to carry them or gather them together before each ride. The typical riding position of a European city bicycle is very upright, relaxed and focused on comfort (at the expense of speed). These bicycles are less suited to longer distance riding, as they are heavy, relatively slow, and often have reduced gear ranges for simplicity.

Figure 3.7 Male and female frame European city or Euro commuter bicycles

New Zealand commuter (figure 3.8). This term is used to describe the bicycles available in some New Zealand cycle stores that are customised hybrid bicycles. These have been fitted with accessories to resemble the European city bicycles, either by the manufacturer, importer or retailer. They are generally very well suited to urban riding and usually have a wide range of gears that make them suitable for hilly areas, but components may not be as integrated as on a European city bicycle.

Figure 3.8 New Zealand commuter bicycle

Cargo, utility or work (figure 3.9)**.** Utility bicycles are designed specifically for practical urban use and load carrying, and many are developments of European city or mountain bicycles. They may only vary in visual style and some aspects of accessories. Cargo utility bicycles have been designed to carry larger and/or heavier loads than standard city bicycles (including children). These vehicles are sometimes tricycles to help with balance of the load. Others have large trays over the front wheels, extra long wheelbases with a tray between the front wheel and the rider, or long wheel bases and a large rack behind the rider over the back wheel. These bicycles are particularly well suited to urban riding and can offer advantages over motor vehicles for the delivery of goods in urban areas. They are well suited to efficient delivery of smaller loads, and are commonly used in Northern Europe for shopping trips or to carry children to school. However, they tend to be very heavy (so less suited to hilly terrain), slow, wide, and can be difficult to manoeuvre in traffic.

Figure 3.9 Cargo, utility or work bicycles

Folding (figure 3.10). Folding bicycles are designed to work with multi-modal travelling (they can be folded to the size of a small suitcase and carried onboard trains, buses, ferries) and for riders who have limited storage space at one or both ends of their journey. They generally have relatively small wheels for convenient folding and storage, although there are designs that use wheels as large as those on mountain and road bicycles. The riding position varies from that of a Euro commuter through to that of a racing road bicycle. Many have the ability to carry luggage and come fitted with mudguards. The few examples that were observed in New Zealand cycle stores were very suited to urban use.

Figure 3.10 Folding bicycles

Power assist and electric (figure 3.11). Power-assist bicycles have supplementary power sources, most commonly electric motors, that reduce the effort required to pedal the bicycle. Power-assist bicycles are still reasonably difficult to find in New Zealand despite their growing popularity overseas. They are usually based on the Euro commuter or New Zealand commuter style of bicycle. Recent versions use sensors in the bicycle drivetrain to automatically match the motor drive to the effort applied by the rider. These bicycles, or a retro-fit electric motor kit, could extend bicycle use in hilly areas, when heavy loads are carried, or to people who consider themselves too unfit to otherwise cycle. However, if we aim to encourage cycling for transport, with the benefits of increased health and reduced environmental impact, we need to be careful to distinguish electric bicycles that require no pedalling assistance from those that only provide motor assistance when the pedals are being turned (Pedalec).

Figure 3.11 Power assist or electric bicycles

Fixed wheel urban (figure 3.12). Fixed-wheel urban bicycles, or 'fixies', are essentially track bicycles adapted to some degree for urban use. Sometimes they have higher volume tyres, straight handlebars and brakes added. An alternative approach is to build them from road bicycle frames. Despite being largely unsuited to urban use, they are a growing (fashion) trend in urban centres. However, they are very much the territory of either experienced enthusiast cyclists or highly fashionable inexperienced cyclists. The 'fixie' trend has been noticed by major cycling manufacturers and many large brands now have urban specific fixed-wheel bicycles in their ranges.

Figure 3.12 Fixed-wheel urban bicycle ('fixie')

Recumbents (figure 3.13). A recumbent bicycle has a radically different riding position when compared with most bicycles. Enthusiasts of recumbent bicycles claim they have an ergonomic advantage due to the reclined sitting position. For urban environments they have a number of disadvantages when compared with conventional upright bicycles, for example they are harder to manoeuvre in tight spaces and to ride at slow speed. Their low position also makes it harder to see and be seen.

Figure 3.13 Recumbent bicycle

Public rental (figure 3.14). Strictly speaking, bicycles available to rent fall into the *service* category. However, a global trend for urban rental bicycles has seen the style of bicycle develop into something quite different from other bicycles available for sale (primarily to limit theft). In New Zealand, those available in urban centres are usually inexpensive cross-country mountain bicycles. These bicycles are often rented from bicycle stores to tourists for local off-road trail riding. An emerging trend in New Zealand is the urban specific short-term public rental. These bicycles are based on the European city bicycle model with fewer accessories (basket, lights, lock and mud/skirt/chain guards) and advertising inside the frame triangle. Bicycles can be rented for periods from half an hour from multiple sites around the central city (Auckland only at time of writing) and dropped off again at any site. The model seems to be well accepted in Europe but is yet to be fully proven here. The bicycle design is necessarily compromised to allow a wide range of people to use a standard bicycle (size, simplified gearing etc) and to allow advertising and to discourage theft. It is reasonable to question what effect these compromises have on the cycling experience. These bicycles are discussed further in the *services* section. One barrier to public rental schemes in New Zealand might be the compulsory helmet law. However public rental schemes have been recently set up in Melbourne and Brisbane, where there are similar helmet laws in place.

Figure 3.14 Public rental bicycle (Next bicycle)

The definitions above, and the diagram presented in figure 3.15 generalise the findings, and should be used for guidance only. Figure 3.15 shows the bicycle types and ease of accessibility in New Zealand. This is divided into four quadrants based on observed accessibility and suitability for urban use of each bicycle type. While this is clearly a subjective view based on qualitative data and observation, it seems clear there may be an opportunity to make urban cycling more commonplace by moving the bicycles in the bottom right quadrant into the top right quadrant by improving their accessibility.

The investigation into suitable bicycle styles for new cyclists should also take into account the heavy focus on recreational cycling in New Zealand. Introducing bicycles that appear radically different from those currently seen (for example, the Euro commuter) may limit their appeal. It may be sensible to focus on a step change from current bicycles, for example the New Zealand commuter style of adapted hybrid and

fitness bicycles. However, the introduction of bicycles such as the Euro commuter may create a market based on latent demand for such bicycles, and being seen as something totally different may generate momentum by appealing to the innovators and early adopters in the market.

There are suggestions that a shift is happening in the New Zealand bicycle market. The availability of European-style city and commuter bikes in bicycle stores in Auckland, Wellington and Hawke's Bay is discussed in section 3.2.1. These stores are supported by a few importers such as the Urban Bicycle Company[4] and Velo Ideale[5] who have started to supply urban and euro-city bicycles to New Zealand. There is also evidence of the growth of a direct retail channel, outside of the bicycle retailer network. Velo Ideale import and retail their Pashley, Civia and Linus bicycle brands direct through their website. Mamachari[6] in Wellington import city bicycles from Japan, refurbish them and sell them through their website and their workshop in the Wellington suburb of Island Bay. Their bicycles are the least expensive of the city bikes available in New Zealand, typically priced between $500 and $800. Electra cruiser bicycles are aimed at a beach and relaxed recreational use more than city transportation. Several models are available through the websites of Retro Cycles[7] (based in Christchurch) and Beach Bikes[8] (in Albany, North Shore City). Ballarat Bicycles[9] in Christchurch is a new bicycle company and offers mens and ladies versions of euro-city bicycles through their website, for $1150. The appearance of importers focused on the niche market of urban and city bicycles, and their alternative approach to retail is a promising sign for the growth of practical cycling products in New Zealand as it breaks away from the dominant recreational retail model. These companies are both responding to and creating a trend in bicycle use, supported by groups such as Frocks on Bikes[10], who aim to promote cycling as a fun and sustainable way for women to travel in the city.

[4] See www.urbanbicycle.co.nz/ for more information

[5] See www.velo-ideale.com/ for more information

[6] See http://mamachari.co.nz/ for more information

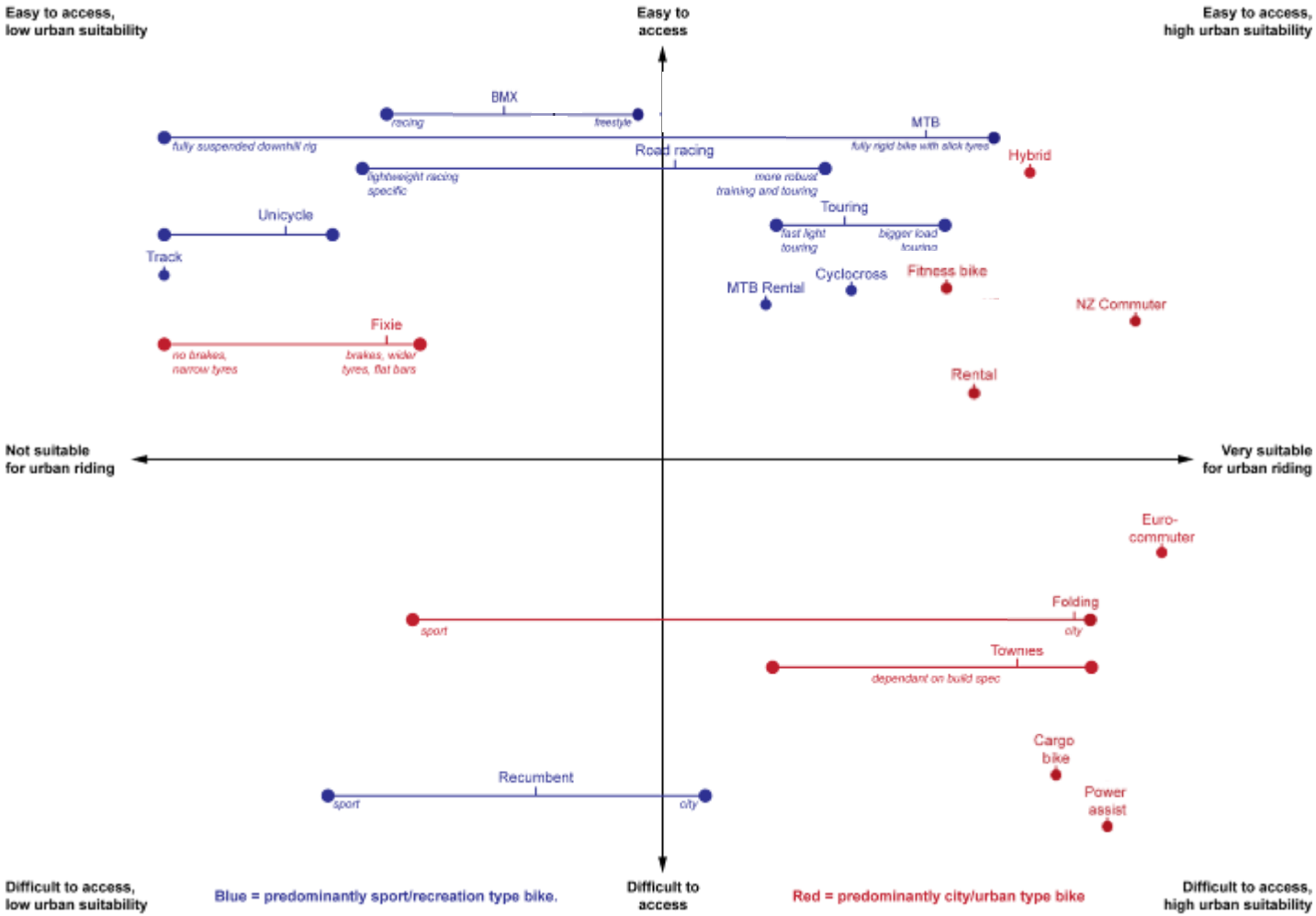
[7] See www.retrocycles.co.nz/ for more information

[8] See www.beachbikes.co.nz/ for more information

[9] See www.ballaratbicycles.com/ for more information

[10] See http://frocksonbikes.wordpress.com/ for more information

Figure 3.15 Bicycle types and ease of accessibility in New Zealand



3.2.2 Accessories

In order to ride a bicycle, all that is really needed is a bicycle and (legally in New Zealand) a helmet. Further cycling accessories are used to customise and personalise the functionality, appearance and experience of riding a bicycle as well as complying with laws and improving (or increasing the perception of) safety.

The types of accessories available to cyclists are categorised and listed with examples below. While many are available through bicycle stores in New Zealand, some of those listed are either unavailable, or difficult to source in New Zealand. This may be because they are not imported either at all or in insignificant quantities, or because the bicycle store staff do not know which importer to call to obtain them. The accessories, based on our observations, most difficult to source in New Zealand are shown in italic text. The list is not exhaustive and has not been expanded to describe sub-categories of each accessory. It is included as a starting point to identify products that warrant further research.

Legal compliance:

- lighting: battery or *wheel generator* powered, *automatic* or manual, *daytime running lights*
- helmets
- reflectors (wheel and frame).

Safety:

- high-visibility clothing, reflective bands and sashes
- rear-view mirrors (either helmet or handlebar mounted)
- reflectors
- bells
- *air horns* (powered by compressed air stored in a bottle on the bicycle frame.

Comfort/convenience:

- cycling clothing: hats, shorts, tops, rain shells, wind shells, shoes, gloves
- *work acceptable cycle clothing* (clothing that looks like normal work clothing but with hidden features to improve the cycling experience)
- trouser clips (to stop trouser cuff from rubbing on a dirty chain)
- eyewear
- mudguards (to stop water from tyres/wet roads being sprayed on rider)
- *chain guards* (to stop trousers and skirts getting tangled in or dirty from the chain)
- *skirt guards* (to stop skirts getting tangled in the rear wheel)
- kickstand (no need to lean the bicycle up against something when you hop off it)
- *power assist units* (usually electric motors built into a wheel that can be added to a standard bicycle and provide assistance to the rider)
- cycle computers (distance travelled, speed, sometimes cadence (pedal rate) and heart rate.

Load carrying:

- carriers or racks (to go over the front and/or rear wheel to put loads on)
- child seats
- plastic box (to sit on the carrier)
- *bicycle specific hard luggage* (more secure alternative to the plastic box)

- backpacks and satchels
- baskets (usually mounted to front handlebars)
- saddle and handle bar bags (smaller bags for under the seat and handlebars)
- panniers (soft bags for carrying luggage on carriers)
- trailers (available for cargo and children)
- *cargo bicycle conversion kits* (such as the Xtracyle)
- water bottles and racks.

Storage/transportation:

- car racks (for transporting bicycles on the back of motor vehicles)
- roof racks (for transporting bicycles on the roof of motor vehicles)
- hooks (for hanging bicycles in storage)
- stands (for organising storage of multiple bicycles)
- pulley systems (for hanging bicycles in overhead storage).

Security:

- *bicycle storage lockers* (for storing bicycle in a secure, enclosed space)
- *alarm systems* (100+ dB alarms that sense movement or tampering)
- 'D' or 'U' locks (D-shaped locks that have a reputation for being hard to break)
- cable locks (steel cable with built in or separate key or combination padlock)
- chain and padlock
- *integrated lock* (built into frame design or mounted at the brake and always attached to the bicycle).

Maintenance:

- tool kits (for minor on road repairs right through to tools for major overhauls)
- consumables: tyres, brake pads, batteries, tyre patch kits
- tyre pump.

The access points for accessories in New Zealand range from local bicycle stores, to online retailers and direct resellers. Investigation into these access points suggests that most of the accessories an urban cyclist may need are available and easily accessible. What seems to be lacking at New Zealand-based physical and online retailers, is choice. This reduces the cyclist's ability to personalise or refine functionality. It may also build the impression that transport cycling is a marginal cycling activity, even among cyclists. The section of most retailers dedicated to urban-specific accessories has between one to three choices for each product type. This does not offer a true indication of the large variety of choices available in the wider market, and may limit the functional compatibility of the accessories with different bicycles, or the perceived compatibility with the cyclist. To illustrate this, a comparison was made of the range of bicycle mudguards available at two online retailers, Bike 24 in Germany (www.bike24.de) and Burkes Cycles in New Zealand (www.burkescycles.co.nz). Bike 24 offered 48 different mudguard products from four manufacturers, ranging in price from 6.50 to 49.95 euros. Burkes Cycles, one of the most established online bicycle retailers in New Zealand, offered only four mudguard products from one manufacturer, ranging in price from NZ$33.15 to NZ$72. While most accessories are available in New Zealand, even if with limited choice, there are some that are not represented at all in New Zealand or are very difficult to source.

It must be noted that global markets are accessible to New Zealanders, primarily through the internet. However, this medium of distribution is limited by the inability to handle and trial the products, and the very limited advice available to the less-informed purchaser. It is reasonable to expect new cyclists to visit their local bicycle store first. Given the commitment required to enter into an extended decision-making process (such as the one to switch travel mode to the bicycle), it is unlikely that an inexperienced cyclist would choose to shop from overseas online retailers.

There was little evidence of retailers offering packages of bicycles and accessories targeted at new cyclists. The ability to purchase a complete cycling package may be a considerable incentive for a new cyclist, particularly if that package allowed the customer to personalise the bicycle and accessories to suit their personality and needs. This process could be likened to the purchase of a new car, with the opportunity to select optional equipment and add services such as planned maintenance and support. Such a package would promote the bicycle as a simple worry-free purchase, rather than placing excessive emphasis on the customer's knowledge.

3.2.3 Accessibility

New Zealand has an interesting retail model, in that there are a large number of small importer/ distributors, bringing in sometimes as few as one or two brands, as well as several larger players who might deal in as many as 20 or so brands or product ranges. The Bicycle Industry Association of New Zealand (BIANZ) lists 21 bicycle distributor members (BIANZ 2009), and there are many smaller importers who act independently of BIANZ.

Retailers may deal with some or all of these distributors, complicating the business models and making it potentially difficult to know who supplies particular cycling equipment that is not commonplace in New Zealand (for example skirt guards). This may it easier for some store staff to say 'no, we can't get those' rather than seeking them out. This model appears relatively fragmented compared with markets such as the USA, where distribution is more consolidated and consequently easier for retailers to obtain products.

Generally speaking, cyclists seem to be early adopters of online stores. This sector of the market, in New Zealand and overseas, has grown substantially in the last decade. In the last few years, many New Zealand bicycle dealers operating out of physical shops have added an online, internet-based shop. Most of these operate as an extension of the physical store, offering a similar product range and pricing. Some New Zealand distributors are now retailing directly through an internet store (such as www.puresports.co.nz) or bicycle services reaching a wider market through internet sales (for example www.wheelworks.co.nz).

Figure 3.16 provides a visual overview of the supply chain in New Zealand. A simple scale of the average customer's level of experience (cycling *and* purchasing) at each of these points of access is supplied. Note that the chart is based on our observations and should be used as a rough guide only. It is not intended to provide a quantifiable measure of retail channels, rather it is a starting point for further investigation.

3.2.3.1 New products

Physical shops. It is a reasonable assumption to consider these as the first port of call for new cyclists. They offer face-to-face service and advice, and can be further categorised as:

- **Specialist cycle dealers**. These stores focus solely on sales and service of bicycles and associated accessories. These types of stores are generally recognised as being the 'local experts'. A small number of these retailers also have an online component to their business, in an attempt to keep pace with market trends.

- **General retailers**. These include The Warehouse, Smith's City and Kmart (for example). These are large shops with a section of their floor space dedicated to bicycle sales. They do not necessarily offer the same level of knowledge or service as a specialist bicycle shop, and often stock less expensive products. A significant market share for inexpensive bicycles in New Zealand is held by this type of store. It does seem that the main customers of these bicycles are seeking good value, and possibly shop at the general retailer through familiarity and an unwillingness to commit too much effort to the bicycle purchase. However, observation of the quality of the bicycles on offer suggests that overall the customer experience is likely to be negative.

Online stores. For example www.Torpedo7.co.nz, www.burkescycles.co.nz, www.activekiwi.co.nz and www.chainreactioncycles.com. These are web-based retailers who sell to customers from all over the world Many of the larger stores offer a vast range of products, often at lower prices than their physical counterparts, due to their lower overheads. Customers can browse and purchase products online and often have access to product reviews and further information. Commonly, advice/service is available via email or web-based instant messaging. There is usually a freight component to the cost of the purchase. The store can be located anywhere in the world. If a customer purchases from overseas, the transaction is complicated by increased freight costs and consideration of local and overseas taxes and import charges. These stores attract a more experienced type of shopper, or someone who knows a little more about what they want.

Online auctions. For example, www.trademe.co.nz and www.ebay.com. These websites are dedicated to the sale of goods through an auction process. Registered members can view, ask questions about, and bid on a huge range of items covering categories such as general household items, motor vehicles and property. New Zealand's major site 'Trademe' has been operating since 1999, and at the time of writing 2,135,588 people (just over half New Zealand's population) were registered users. On Trademe, sellers are limited to New Zealanders and Australians with New Zealand bank accounts to reduce the potential for fraud. Though still largely used for buying or selling second-hand or used items, there are a growing number of individuals and retailers selling new products through this channel. All auction websites have a dedicated cycling section, with many providing an easy method to search for specific types of bicycles and accessories (Ebay now offers a search based on bicycle size).

Direct sales from manufacturers. These are usually accessed online via the manufacturers' website, over the phone, or in some cases a dedicated retail space. Often these customers are at the more experienced end of the range, and have sought out products that are otherwise unavailable through the 'normal' retail channels. These manufacturers are based both in New Zealand and offshore, and tend to offer specialised or niche products. This is a relatively common retail method for transport cycling products in New Zealand, as this activity is still part of a niche market.

3.2.3.2 Used products

Specialised cycle dealers. Some retailers offer trade-ins or ex-rental bicycles for sale; generally these are reconditioned and brought back up to a good standard, often with a limited warranty for a set period of time. This option may be perceived as a safer option than other forms of second-hand sales, due to the back-up support and advice provided by the shop.

Online auctions. As discussed above, this has become a major channel of used products in New Zealand over the last decade. Auction sites offer guidelines for safe buying, and simple methods of reviewing an individual's trading history, giving some peace of mind, as well as some back up in the event of a problem occurring with a trade. There is a wide range of used cycling equipment offered for sale by private individuals. However, unless the product can be viewed locally, there is always a risk in purchasing. This

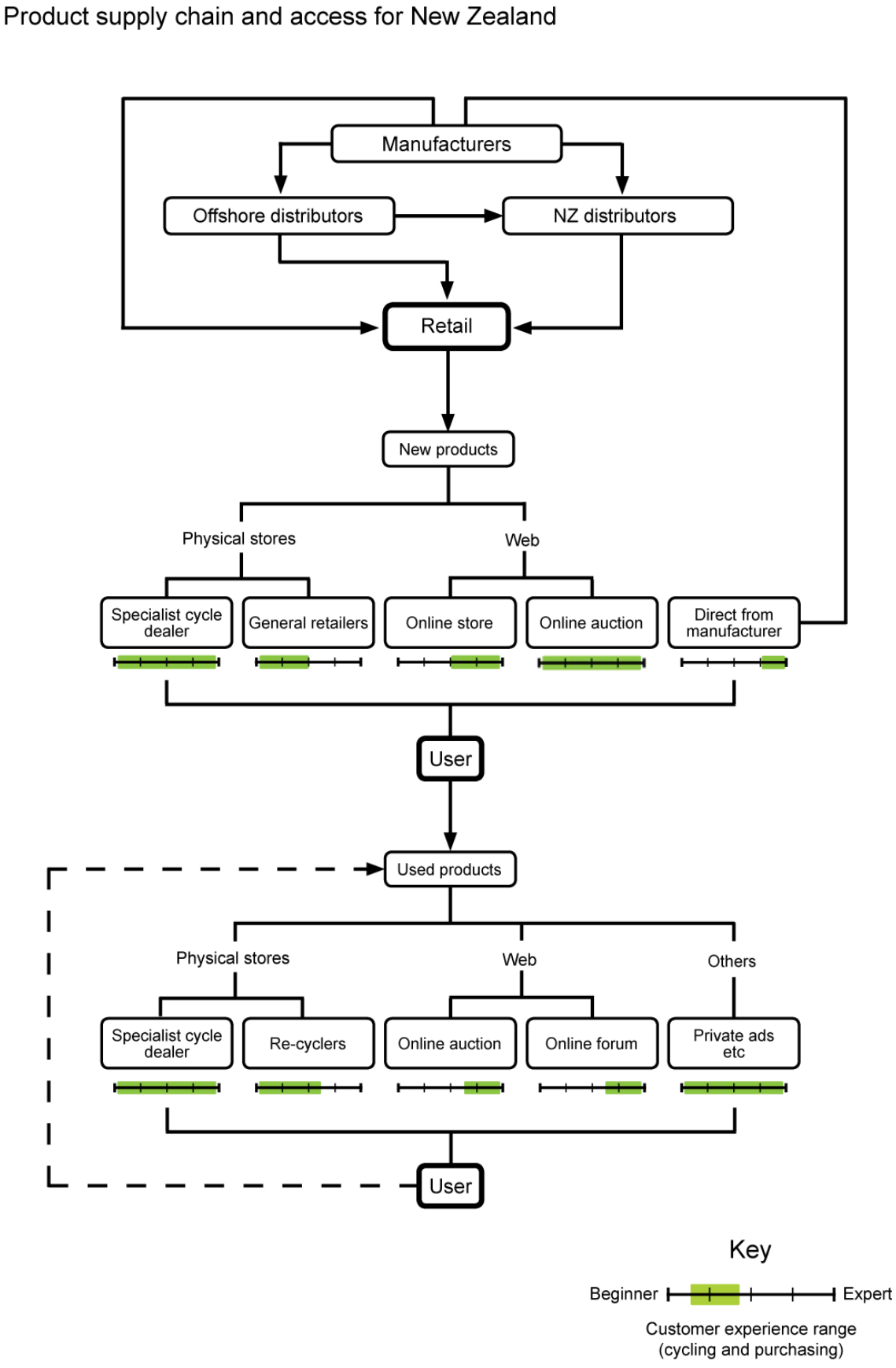
may range from purchase of the wrong size (of bicycle, for example) to fraudulent trading and misdescribed goods.

Online forums. For example www.vorb.org.nz, www.mountainbike.co.nz. New Zealand online forum-based communities are predominantly sport- and recreation-based. From a product access point of view, one aspect of these communities is the classified listings of members unwanted cycle parts, bicycles and equipment and wanted ads from members seeking the same. Another key aspect is often in-depth discussion to very fine detail of the experience of various aspects of cycling equipment. This can be a very helpful experience for experienced and new riders alike. It can also be fraught with confusing opinion.

Recyclers. These are often community-based trusts who collect unwanted, donated, or no longer road worthy bicycles and refurbish them as cheaply as possible so that they can be made available to the community at a very low cost. At the time of writing the Palmerston North Green Bikes Trust, based in the old boiler house at Massey University, had a large selection of refurbished bicycles available to be taken away for $20. On return of the bicycle in good condition the trust guarantees buy back of the bicycles for the same amount. Aside from providing a good source of extremely cheap bicycles, according to Massey University facilities staff, this has also contributed to a significant drop in bicycle theft on campus (from approximately 300 bicycles per annum in the mid 1990s to around 10 bicycles in 2007). It is reasonable to expect that most of the purchasers of bicycles from recyclers will be of low to mid experience.

Others. For example personal sales, private advertisements and word of mouth. As with many other second-hand products there are a number of other person-to-person ways of purchasing bicycles and related equipment or parts. Cyclists of all levels of experience may use these methods.

Figure 3.16 Product supply chain and access for bicycles and related accessories in New Zealand



3.2.4 Services in New Zealand

3.2.4.1 What services are available to urban cyclists in New Zealand? How do we compare to overseas?

Services are not essential to urban riding but go beyond the basic experience to help make cycling more enjoyable or achievable. Overseas experience presented in the literature review demonstrates that good urban cycling services can have a positive impact on urban cycling.

There are a number of different types of services available to cyclists and potential cyclists in New Zealand. These include:

1 **Information services**:

   a physical – information centres and bicycle stores (advice given by staff, maps or brochures available)

   b virtual – web-based maps, journey planners and advice on local council websites

2 **Multi-modal services**: providing the ability to combine different modes of transport in a trip

3 **End of journey services**: employer, council, school or commercially provided facilities ranging from bicycle parking to showers, lockers and bicycle maintenance

4 **Maintenance services**: bicycle repairs and maintenance providers usually based either in retail bicycle stores or working independently

5 **Non-owned bicycle services**:

   a workplace provided bicycle fleets

   b bicycle rentals – short-term urban specific through to recreational long-term rentals

   c provision of bicycles for communities and disadvantaged families

   d bicycle fleet lease services to tertiary institutions and companies

6 **Skills training**: most commonly available to schools, but in some areas there are adult skills courses available from councils or advocacy groups, and 'bike buddy' schemes that offer personal support and some informal tuition.

7 **Advocacy:** mostly community based and volunteer groups focused on promotion of cycling and lobbying for improved urban development

8 **Consultancy services:** specialist advice for businesses about reducing the impact of their transport fleet.

The overall impression is that there are more services that encourage or enhance urban cycling available in New Zealand than we originally expected to find. However there seems to be a large variance in quality of implementation or delivery across the country. There is no urban centre in New Zealand that offers an integrated system of these services. In most areas, the local council provides cycle mapping and basic end-of-trip parking. There are pockets of integration with public transport that have shown some success (for example, bicycles on Auckland ferries, Christchurch buses and Wellington trains). Services more common overseas (shower facilities, bicycle rentals, fleet bicycles, maintenance etc) are left to private enterprise to develop, with little direct support from the councils. Employers are starting to supply end-of-trip facilities to their staff, but this is usually driven by a cycling 'champion' within the organisation. There are few examples of direct council support for such initiatives.

Many of the services are also in the early stages of their development and yet to be fully proven. The stakeholders involved with the services are uniformly enthusiastic about urban cycling and it seems that maintaining this enthusiasm, as these services mature, is one of the key factors that will ensure future success. It is also essential to provide statistical data to prove the success (or failure) of the services. In this way we can develop best practice and apply successful services in other urban centres. It does seem that, while New Zealand urban cycling services are modelling themselves on best practice from overseas, we have a long way to go to make these services the 'norm' and gain widespread support for them.

An area not explored in depth in this research is incentives to cycle (monetary or otherwise). There is strong evidence that 'carrots and sticks' provided by governments, councils, employers and businesses to encourage cycling can have significant positive effects on cycling. Incentives for consideration include the UK tax incentives for bicycle purchases, a US government tax rebate for cycle commuters, a Victorian State mandate to ensure new commercial and residential building developments provide secure bicycle parking, and local businesses in Melbourne lobbying the council to remove car parking spaces and replace them with bicycle parking.

A further review of cycling services should consider the experience offered to the cyclist, and must consider the focus on short (<6km) trips. This may remove services such as end-of-trip showers from the scope of the review. We must also be aware of the literature review findings that cyclist needs are complex. We must ensure that we concentrate on those services that encourage cycling by offering an enhanced experience, and that we don't simply provide services directly requested by non-cyclists, as we may discover that these are not essential and do not result in significant increases in cycling.

4 Practical cycling survey

4.1 Survey methodology

The participants were solicited through invitations sent to all staff at Otago Polytechnic in Dunedin and Massey University School of Engineering at Wellington. Further invitations were distributed to friends and acquaintances of the research team. In all cases, the invitations were further distributed through word of mouth and peer networks of survey respondents. A total of 234 survey responses, gathered between 19 November 2009 and 19 January 2010 were included for analysis. Respondents indicating disability were excluded from the analysis. A summary of the basic demographic data of the respondents is shown in section 3.2.1 below.

The survey was delivered online using www.surveymonkey.com/. The question order and wording appeared to the respondents as shown in the results sections below. Questions 1 to 21 appeared individually, with the exception of question 15 (parts a, b and c) which appeared on a single page to aid in understanding of the terms. The survey was introduced as a study on 'bicycle transportation' and it was stated that no previous experience of riding a bicycle was required to participate. An additional definition of the term 'practical cycling' was given before question 15: *Practical cycling is defined as riding a bicycle as transportation to achieve another purpose (such as commuting to work or to the shops).* For questions 22 to 32, the images of cyclists and bicycles appeared in full colour, as presented in the survey results sections below. No captions were included to identify or label the group of cyclists or type of bicycle.

4.2 Survey results

The results in the tables below are shown for all respondents (*all*), and three subgroups: those who do not currently ride a bicycle (*non-riders*) (based on responses to question 13), those who do currently ride a bicycle (*riders*) (based on responses to question 13), and those current riders who use ride for transportation purposes (*transport*) (based on responses to question 13b). All results are shown as a percentage of respondents, unless otherwise stated.

When interpreting the results, note that *riders* could have selected any or all of the transportation, competition and recreation responses offered in question 13b, while *transport* riders must have selected the transportation option, but could also have selected recreation and/or competition.

We have made no attempt to perform tests of statistical significance on the results of the survey. For the purposes of this study, we have looked for patterns in the data that might suggest areas worthy of further investigation. In many cases, we have used these patterns to inform the design model presented in section 5.

The commentary included with the results is a train of thought leading to the development of the design model. The commentary highlights trends and patterns in the data and relates these to findings of the literature and solution reviews presented in sections 2 and 3.

4.2.1 Demographic

Table 4.1 Survey question 1

Are you:	all	non-riders	riders	transport
Male	42.7	35.8	47.5	56.1
Female	57.3	64.2	52.5	43.9

Table 4.2 Survey question 2

In which age range do you belong:	all	non-riders	riders	transport
18–25	14.6	22.2	10.1	9.8
26–35	22.7	17.3	26.6	34.1
36–45	23.6	16.0	28.8	25.6
46–60	31.8	37.0	29.5	26.8
61 or over	7.3	7.4	5.0	3.7

Table 4.3 Survey question 3

Which ethnic group do you belong to?	all	non-riders	riders	transport
New Zealand European	77.9	80.2	76.3	70.7
Māori	2.7	1.2	2.9	4.9
European	7.1	4.9	8.6	8.5
Other (<2.0%)	12.4	13.6	12.2	15.8

Table 4.4 Survey question 4

What is your highest level of education?	all	non-riders	riders	transport
Secondary school	10.2	13.6	8.6	9.8
Bachelor degree or higher	68.6	59.3	74.1	75.6
Other complete qualification taking more than 3 months of full-time study equivalent (eg diploma, trade certificate)	21.2	27.2	17.3	14.6

Table 4.5 Survey question 5

Which of these best describes you income before tax in the last year (NZD)?	all	non-riders	riders	transport
0–25,000	22.6	27.2	19.4	19.5
25,000–50,000	24.3	32.1	19.4	19.5
50,000–5000	32.7	27.2	36.7	35.4
75,000–100,000	13.3	9.9	15.1	15.9
Over 100,000	7.1	3.7	9.4	9.8

Tables 4.1 to 4.5 show the fundamental demographic differences between the groups. Compared with non-riders, current riders are more likely to be male, aged between 26 and 45 years old, educated to bachelor degree or higher and earn more than $50,000 per annum.

The demographic profile of transport riders follows that of all riders to some extent. However, riders who also ride for transportation purposes are more likely to be male and aged between 26 and 35 years old.

We suspected that New Zealand cyclists would more likely be young males, due to the recreational bias of New Zealand cycling, and these tables confirm that suspicion. A higher level of education tends to mean higher earnings in general, so these results make sense. The pattern here would be expected from the diffusion of innovations theory. If cycling is an ‘innovation’ for most New Zealanders, the small percentage of cyclists would be innovators or early adopters. Many previous diffusion studies have shown that these

people tend to be more educated and with a high social (or workplace) status compared with the rest of the population.

4.2.2 Location

Table 4.6 Survey question 6

In which New Zealand region do you live?	all	non-riders	riders	transport
Auckland	2.2	0.0	2.9	1.2
Hawke's Bay	1.8	1.2	2.2	1.2
Manawatu-Wanganui	8.0	8.6	7.2	7.3
Wellington	13.8	14.8	13.7	15.9
Canterbury	4.9	4.9	5.0	7.3
Otago	66.7	69.1	65.5	65.9
Other	2.4	1.2	3.5	2.4

Table 4.7 Survey question 7

Which location best describes where you live?	all	non-riders	riders	transport
Large city (>100,000 people)	58.5	56.8	59.0	62.2
Small city (30,000–100,000 people)	26.8	33.3	23.0	25.6
Town (1000–30,000 people)	8.9	3.7	12.2	9.8
Small town, community or village (<1000 people)	2.7	3.7	2.2	1.2
Rural	3.1	2.5	3.6	1.2

Table 4.8 Survey question 8

Can you estimate the distance between the closest shops and amenities and your home?	all	non-riders	riders	transport
<1km	42.0	40.7	42.4	47.6
1km–5km	49.1	50.6	48.2	42.7
>5km	8.9	8.6	9.4	9.8

Table 4.9 Survey question 9

How often do you visit those local shops and amenities?	all	non-riders	riders	transport
Daily	14.3	13.6	14.4	15.9
More than once a week	46.2	48.1	44.6	48.8
Once a week	21.1	13.6	25.9	23.2
Occasionally	15.2	21.0	12.2	8.5
Rarely	3.1	3.7	2.9	3.7

Tables 4.6 to 4.9 describe the location of the respondents. When compared with non-riders, riders and, in particular, transport riders are more likely to live in a large city (>100,000 people) or a smaller town (between 1000 and 30,000 people) and live less than 1km from their local shops or amenities. They are more likely to visit these shops or amenities once a week or more frequently.

A larger city potentially means more (and better?) cycling and pedestrian infrastructure, more road traffic, more and closer shopping and amenity centres, and hence more reasons to cycle for transport. Small towns are easy to travel around (by any form of transport) and the lower urbanisation and weight of traffic may make them feel safer for cycling. Regular riders tend to live closer to shops and amenities possibly because they are more likely to live in urban areas, but they may also use these centres more and so are more aware of them.

4.2.3 Overseas experience

Table 4.10 Survey question 10

In the previous two years, how many times have you travelled overseas?	all	non-riders	riders	transport
More than five times	6.3	3.7	7.9	9.8
Four or five times	9.5	8.6	10.1	8.5
Two or three times	27.1	21.0	30.2	28.0
Once	24.0	29.6	20.9	20.7
I haven't travelled overseas in the last two years	33.0	37.0	30.9	32.9

Table 4.11 Survey question 10a. For respondents who have travelled overseas

In the previous two years, which areas have you visited?	all	non-riders	riders	transport
Africa	4.1	3.9	4.2	3.6
Australia	68.9	66.7	69.8	65.5
Europe	42.6	41.2	43.8	49.1
North America	27.	23.5	29.2	36.4
South America	3.4	0.0	5.2	5.5
Asia	35.8	37.3	35.4	36.4
Pacific Islands	16.2	7.8	19.8	18.2

Table 4.12 Survey question 11

Have you ever lived overseas for six months or more?	all	non-riders	riders	transport
Yes	57.0	44.4	64.7	67.1
No	43.0	55.6	35.3	32.9

Overseas travel habits are considered in tables 4.10 to 4.12. Compared with non-riders, riders are more likely to have travelled overseas twice or more in the previous two years or to have lived overseas for six months or more. Travelling riders, and transport riders in particular, are more likely to have visited Europe or the Americas.

Could the travel (particularly to Europe) and overseas living experience make riding for transportation feel more normal and appealing (given that it is far more common in Europe)? This pattern also supports the application of the diffusion of innovations theory to cycling in New Zealand, as diffusion research shows that early adopters of an innovation are more likely to look outside their local environment.

4.2.4 Cycling experience

Table 4.13 Survey question 12. Respondents who have ridden a bicycle (only one had never ridden a bicycle)

When did you first ride a bicycle?	all	non-riders	riders	transport
In my childhood (under 13 years old)	94.5	92.6	95.7	97.6
As a teenager (between 13 and 18 years old)	1.4	2.5	0.7	0.0
As an adult (over 18 years old)	4.1	4.9	3.6	2.4

Table 4.13 shows the initial cycling experience of the respondents. All but one respondent had previously ridden a bicycle, and there was a slight trend for current riders, and in particular for transport riders, to have first ridden a bicycle before they were 13 years old. However, over 90% of all respondent first rode in their childhood.

Table 4.14 Survey question 13a. For respondents who currently ride a bicycle

When did you buy your most recent bicycle?	riders	transport
Less than a year ago	30.2	32.9
1 to 5 years ago	46.0	46.3
5 to 10 years ago	14.4	12.2
More than 10 years ago	8.6	7.3
I have never owned a bicycle	0.7	1.2

Table 4.15 Survey question 13b. For respondents who currently ride a bicycle.

What do you use a bicycle for? (multiple answers)	riders	transport
Recreation	89.2	81.7
Competitive sports	16.5	20.7
Transportation	59.0	100

Table 4.16 Survey question 13c. For respondents who currently ride a bicycle

How often do you ride a bicycle?	riders	transport
More than 4 times a week	20.1	30.5
3 or 4 times a week	18.0	23.2
1 or 2 times a week	23.0	23.2
Monthly	16.5	12.2
Rarely	22.3	11.0

Table 4.17 Survey question 13d. For respondents who currently ride a bicycle

Do you consider yourself to be a cyclist?	riders	transport
Yes	56.1	70.7
No	43.9	29.3

Tables 4.14 to 4.17 show the direct riding experience of current riders. There are comparatively few riders who only ride for transport (18 responses or 5.5% of respondents, not shown in the tables above). Most riders who ride for transport also ride recreationally. Compared with all riders, transport riders ride more

frequently, with over half of them riding three times a week or more, and less than a quarter riding monthly or less frequently. More transport riders consider themselves to be a 'cyclist'.

Transport riders riding more frequently is to be expected as they would include riders who rely more on their bicycle for mobility, whereas recreational riders would include those who choose to ride only when time permits and conditions are favourable. The increased frequency of riding would explain why more transport riders see themselves as 'cyclists'.

Table 4.18 Survey question 14a. For respondents who do not currently ride a bicycle

When did you last ride a bicycle?	
In my childhood (under 13 years old)	4.9
As a teenager (between 13 and 18 years old)	22.2
As an adult (over 18 years old)	72.8

Table 4.19 Survey question 14b. For respondents who do not currently ride a bicycle

What caused you to stop riding a bicycle?	responses
Convenience or personal preference	**66**
I prefer to drive	14
Hills are too steep or numerous	10
I have too far to travel	7
I prefer to walk	6
I have a young family	6
Cycling is inconvenient	5
I prefer to take the bus	3
I am too lazy to ride	3
I am not fit enough	3
I don't like wearing a helmet	3
Cycling doesn't fit into my lifestyle	2
I have no need to cycle	2
I am driven wherever I want to go	1
I am too old to cycle	1
Bicycle design and choice	**30**
I don't have a bicycle	14
My bicycle is broken	4
Cycling is uncomfortable	4
I need to carry big loads	3
The weather is too bad	2
I do not like my bicycle	2
Cycling is too expensive	1
Safety	**27**
Cycling is too dangerous	14
The roads are too busy	9
There are not enough cycle lanes	4
Cultural	**4**
Cycling is not normal	3
I will look stupid if I cycle	1

Note: data presented is the actual response count. Respondents could offer more than one answer

Table 4.20 Survey question 14c. For respondents who do not currently ride a bicycle

Do you own or have regular access to a bicycle?	
I own a bicycle	28.4
I have regular access to a bicycle	11.1
No	60.5

Tables 4.17 to 4.20 show the direct riding experience of non-riders. The majority of non-riders (almost three quarters) stopped riding as an adult. The most common reasons given for stopping riding could be categorised as personal preference, convenience and safety issues. However, there were also a significant number of responses that suggested equipment choice and design issues. Four in 10 non-riders said they either owned or had access to a bicycle.

Many of the reasons given for stopping cycling align with reasons stated in other studies. These respondents form their perceptions of cycling from observing cycling and cyclists and their own limited direct experience of cycling. They might perceive that the roads are too busy, but have no recent experiences to confirm it. Other research has suggested that many of the reasons given may be convenient and the underlying reasons relate more to habit and culture. It is noteworthy here that several respondents simply state that 'cycling is not normal'. It is encouraging that many of the reasons could be minimised through good design of products, services and facilities, and that so many non-riders have access to a bicycle although they choose not to use it.

4.2.5 Observation of cycling

Table 4.21 Survey questions 15a to 15c

To your knowledge, how many of your friends and family use their bicycle for practical transportation?	all	non-riders	riders	transport
None	27.2	38.3	20.9	11.0
1 or 2	42.5	38.3	46.0	46.3
3 or 4	13.6	11.1	15.1	17.1
More than 4	16.7	12.3	18.0	25.6
To your knowledge, how many of your neighbours use their bicycle for practical transportation?	**all**	**non-riders**	**riders**	**transport**
None	64.0	61.7	64.7	58.5
1 or 2	32.5	35.8	30.9	36.6
3 or 4	1.8	1.2	2.2	1.2
More than 4	1.8	1.2	2.2	3.7
To your knowledge, how many of your work colleagues use their bicycle for practical transportation?	**all**	**non-riders**	**riders**	**transport**
None	27.2	28.4	25.9	23.2
1 or 2	31.6	32.1	30.9	24.4
3 or 4	18.9	14.8	22.3	26.8
More than 4	22.4	24.7	20.9	25.6

Table 4.22 Survey questions 16

How often do you see cyclists on the street?	all	non-riders	riders	transport
Many times a day	72.4	60.5	79.1	81.7
Many times a week	25.9	37.0	19.4	17.1
Many times a month	1.3	2.5	0.7	1.2
Rarely or never	0.4	0	0.7	0

Table 4.23 Survey question 17a

When was the last time you saw a cyclist on the street?	all	non-riders	riders	transport
Today	71.5	63.0	75.5	73.2
Yesterday	21.1	22.2	20.9	24.4
This week	6.6	14.8	2.2	1.2
Longer than a week ago	0.9	0	1.4	1.2

Table 4.24 Survey question 17b

Was your impression of the cyclist:	all	non-riders	riders	transport
Negative	11.8	18.5	7.2	2.4
Positive	51.3	32.1	62.6	70.7
Indifferent	36.8	49.4	30.2	26.8

Table 4.25 Survey question 17c

Can you explain?	non-riders *positive impression*	non-riders *negative impression*	riders *positive impression*	riders *negative impression*
Admiration or aspiration	**22**		**77**	
Cycling is good/good on them	5		15	
I like seeing others cycling	5		11	
Health kudos	3		17	
Effort/hard work kudos	3		9	
Traffic skills, road rules kudos	2		13	
It should be me cycling	2		8	
They looked happy	1		2	
Other reasons			2	
Cultural	**1**	**7**		**1**
Arrogant/abusive/inconsiderate behaviour		4		1
Too flash looking		2		
Tight lycra		1		
Cyclists are weird		1		
Normal clothing worn	1			
Sustainability	**1**		**9**	
Sign of a healthy community	1			
Saving the planet			9	

Can you explain?	non-riders *positive impression*	non-riders *negative impression*	riders *positive impression*	riders *negative impression*
Safety	**2**	**19**	**8**	**17**
Cyclists putting themselves in harms way		6		3
Getting in the way of traffic		4		5
Breaking road rules		4		3
Vulnerable/safety concerns		3		4
Highly visible	2		8	
Not using the cycle lane		2		
Not wearing visible clothing				2

Note: data presented is the actual response count. Respondents could offer more than one answer.

Tables 4.21 to 4.25 show the level of direct observation of bicycle riders. Compared with non-riders, current riders are more likely to have more friends and family who ride a bicycle, and this observation is more marked for transport riders. There are no strong trends when the question refers to neighbours or work colleagues. Current riders are more likely to have seen cyclists on the street more recently than non-riders, but non-riders are significantly more likely to form a negative or neutral opinion of the cyclist observed. When asked, 85% of non-riders could recall seeing a cyclist on the street in the previous two days.

The trends seen here can be reasonably explained because current riders are more likely to mix with other riders, and are more likely to notice other riders (who are similar to themselves). It is also more likely that cyclists see any other cyclist as positive. Research suggests that we feel threatened or are likely to feel negative to behaviour that differs from our own. It is expected, then, that a non-rider is more likely to see cycling in general as different and form a negative opinion, whereas a rider would only see negativity if the behaviour of the observed cyclist differed significantly from their own behaviour as a cyclist – not just because they are a cyclist. Whereas riders and non-riders generally give different reasons for their positive or negative opinion of the observed cyclist, there are similar numbers of respondents in both groups that cite safety issues as their reason for forming a negative opinion. It is notable that so many non-cyclists can recall seeing cyclists and half of all non-cyclists form an opinion about the cyclist (and cycling?) based on their observation.

4.2.6 Media consumption

Table 4.26 Survey question 18

Which of these sources do you usually use to follow the news or current affairs? (multiple answers)	all	non-riders	riders	transport
Radio	65.6	62.5	66.9	72.0
Internet	60.8	56.3	64.0	62.2
Television	73.6	86.3	68.3	58.5
Newspapers	59.5	58.8	59.7	57.3
Other	5.7	3.8	5.0	6.1

Table 4.27 Survey question 19

How often do you read/hear about cycling in the media?	all	non-riders	riders	transport
Never	1.8	0	2.2	3.7
Rarely	33.9	38.8	32.4	32.9
Occasionally	51.5	52.5	50.4	52.4
Often	12.8	8.8	15.1	11.0

Table 4.28 Survey question 20

In which media do you most often read/hear a news or current affairs report or editorial item about cycling?	all	non-riders	riders	transport
Radio	8.8	6.3	9.4	11.0
Internet	16.8	10.1	20.9	25.6
Television	34.1	46.8	28.1	20.7
Newspapers	33.6	31.6	35.3	34.1
Other	6.6	5.1	6.5	8.5

Table 4.29 Survey question 21

In your opinion, does the New Zealand media portray cycling:	all	non-riders	riders	transport
Positively	28.3	35.4	23.0	19.5
Negatively	22.6	17.7	26.6	32.9
Neutrally	49.1	46.8	50.4	47.6

Tables 4.26 to 4.29 demonstrate how the respondents relate to mass media, particularly for news and current affairs. Compared with non-riders, significantly fewer riders get their news from the television and more use the radio or internet. This is more marked for transport riders. For all groups, there is little difference in how frequently they hear, see or read of cycling in the New Zealand media. Compared with non-riders, current riders are more likely to think that New Zealand media portrays cycling negatively, and less likely to think it portrays cycling positively. This is also more marked for transport riders.

It seems that everyone notices cycling in the media to roughly the same extent. It is interesting that fewer current riders get their news from the television, but it is difficult to infer any reasons for this. As expected, current riders are more sensitive to negative portrayals of cycling in the media. It is notable that over a third of non-riders think that cycling is portrayed positively in the media. Research shows that mass media doesn't directly cause change of behaviour (ie convince a non-rider to ride a bicycle), but it does strongly influence the underlying culture and attitude, and provide basic information about the activity.

4.2.7 Cyclist imagery

4.2.7.1 Road racing

Table 4.30 Survey question 22a

Based on your experiences, how much do you think the images above reflect New Zealand cyclists?	all	non-riders	riders	transport
Substantially	24.3	30.8	22.1	18.8
To some extent	49.1	43.6	51.5	51.3
A little	23.0	20.5	23.5	28.8
Not at all	3.6	5.1	2.9	1.3

Table 4.31 Survey question 22b

In your opinion, do these people generate a positive, negative or neutral image of cycling?	all	non-riders	riders	transport
Positive	52.9	45.5	58.1	58.8
Negative	13.6	18.2	11.0	11.3
Neutral	33.5	36.4	30.9	30.0

These images were seen as a strong reflection of cyclists in New Zealand (74.8% of non-riders and 73.6% of current riders responded 'to some extent' or more). On balance, all groups thought the people pictured generated a positive image of cycling, although the net positivity was stronger for riders and transport riders. There was a higher proportion of non-riders who saw the people pictured as generating a negative image (up to 18% of non-riders compared with 11.0% of riders).

Table 4.32 Survey question 22c

Choose up to six of the following words that you feel are best associated with the cyclists pictured above:	all	non-riders	riders	transport
Fit	88.6	86.8	89.6	93.8
Healthy	82.6	84.2	83.0	82.5
Fast	57.5	51.3	60.0	68.8
Confident	55.3	53.9	56.3	52.5
Independent	29.7	30.3	27.4	31.3
Efficient	21.5	13.2	24.4	30.0
Safe	20.1	17.1	21.5	21.3
Youthful	19.6	25.0	16.3	13.8
Risk-taker	19.2	22.4	17.0	13.8
Normal	19.2	21.1	18.5	15.0
Fun-loving	15.5	21.1	13.3	12.5
Intelligent	11.4	6.6	14.8	16.3
Comfortable	10.0	9.2	10.4	8.8
Exciting	7.3	7.9	7.4	8.8
Friendly	6.4	7.9	5.2	5.0
Alternative	5.5	6.6	4.4	7.5
Strange	3.2	6.6	1.5	2.5
Nervous	2.3	2.6	2.2	3.8
Irresponsible	2.3	1.3	3.0	2.5
Elegant	1.4	0	2.2	3.8
Poor	0.9	1.3	0.7	1.3

The most popular words associated with these cyclists, by over 30% of current riders and non-riders, were **fit**, **healthy**, **fast** and **confident**. More than 30% of non-riders also associated the word **independent** with the people pictured. The most significant differences between the opinion of non-riders and riders were more non-riders associated **youthful** (8.7% more) and **fun-loving** (7.8% more) with the people pictured, and fewer non-riders associated **efficient** (11.2% fewer), **fast** (8.7% fewer) and **intelligent** (8.2% fewer).

Comparing transport riders with all current riders, there was a slight trend (>5% difference) for more transport riders to associate the words **fast** and **efficient.**

4.2.7.2 Recreational

Table 4.33 Survey question 23a

Based on your experiences, how much do you think the images above reflect New Zealand cyclists?	all	non-riders	riders	transport
Substantially	61.1	57.1	62.5	63.8
To some extent	32.6	32.5	33.1	28.8
A little	5.4	9.1	3.7	6.3
Not at all	0.9	1.3	0.7	1.3

Table 4.34 Survey question 23b

In your opinion, do these people generate a positive, negative or neutral image of cycling?	all	non-riders	riders	transport
Positive	50.7	41.6	55.1	56.3
Negative	8.1	7.8	8.8	7.5
Neutral	41.2	50.6	36.0	36.3

These images were seen as a very strong reflection of cyclists in New Zealand (89.6% of non-riders and 95.6% of current riders responded 'to some extent' or more). On balance, all groups thought the people pictured generated a positive image of cycling, although the net positivity was stronger for riders and transport riders. There was no difference in the proportion of non-riders and riders who saw the people pictured as generating a negative image (<10% for all groups).

Table 4.35 Survey question 23c

Choose up to six of the following words that you feel are best associated with the cyclists pictured above:	all	non-riders	riders	transport
Healthy	62.7	60.5	64.7	68.4
Fit	56.7	50.0	60.2	63.3
Independent	53.5	46.1	57.1	60.8
Normal	51.6	51.3	51.9	50.6
Efficient	27.6	22.4	29.3	30.4
Confident	27.6	34.2	24.1	31.6
Risk-taker	26.7	34.2	23.3	19.0
Youthful	22.6	30.3	17.3	7.6

Choose up to six of the following words that you feel are best associated with the cyclists pictured above:	all	non-riders	riders	transport
Comfortable	19.4	18.4	19.5	20.3
Alternative	18.0	17.1	18.0	20.3
Safe	12.9	3.9	16.5	17.7
Fast	12.0	11.8	12.0	13.9
Fun-loving	12.0	10.5	13.5	16.5
Friendly	9.2	10.5	8.3	8.9
Irresponsible	8.8	13.2	6.8	6.3
Intelligent	5.5	1.3	8.3	12.7
Nervous	4.6	6.6	3.8	5.1
Exciting	4.1	2.6	5.3	7.6
Poor	3.2	3.9	3.0	5.1
Strange	1.8	2.6	1.5	2.5
Elegant	0	0	0	0

The most popular words associated with these cyclists, by over 30% of current riders and non-riders, were **healthy**, **fit, independent** and **normal**. More than 30% of non-riders also associated the words **confident**, **youthful** and **risk-taker** with the people pictured. The most significant differences between the opinion of non-riders and riders were more non-riders associated **youthful** (13.0% more), **risk-taker** (10.9% more) and **confident** (10.1% more) with the people pictured, and fewer non-riders associated **safe** (12.6% fewer), **independent** (11.0% fewer), **fit** (10.2% fewer) and **intelligent** (7.0% fewer).

Comparing transport riders with all current riders, there was a slight trend (> 5% difference) for more transport riders to associate the word **confident**, and fewer to associate **youthful.**

4.2.7.3 City (no helmet)

Table 4.36 Survey question 24a

Based on your experiences, how much do you think the images above reflect New Zealand cyclists?	all	non-riders	riders	transport
Substantially	0.9	0	1.5	1.3
To some extent	4.5	2.6	5.2	6.3
A little	10.5	14.3	8.1	8.8
Not at all	84.1	83.1	85.2	83.8

Table 4.37 Survey question 24b

Q24b. In your opinion, do these people generate a positive, negative or neutral image of cycling?	all	non-riders	riders	transport
Positive	57.3	50.6	61.5	62.5
Negative	15.0	18.2	11.9	10.0
Neutral	27.7	31.2	26.7	27.5

These images were not seen as a reflection of cyclists in New Zealand (2.6% of non-riders and 6.7% of current riders responded 'to some extent' or more). On balance, all groups thought the people pictured generated a positive image of cycling, although the net positivity was stronger for riders and transport riders. There was a higher proportion of non-riders who saw the people pictured as generating a negative image (up to 18.2% of non-riders compared with 11.9% of riders).

Table 4.38 Survey question 24c

Choose up to six of the following words that you feel are best associated with the cyclists pictured above:	all	non-riders	riders	transport
Healthy	44.7	32.5	52.2	57.5
Comfortable	36.5	27.3	41.8	40.0
Independent	32.9	35.1	32.1	38.8
Normal	32.4	24.7	35.8	37.5
Friendly	30.6	36.4	26.1	31.3
Fun-loving	30.6	45.5	23.9	25.0
Confident	28.8	33.8	26.9	27.5
Elegant	24.2	22.1	24.6	23.8
Efficient	23.7	18.2	27.6	26.3
Intelligent	23.3	19.5	24.6	27.5
Alternative	21.9	33.8	15.7	11.3
Fit	18.3	13.0	20.9	22.5
Irresponsible	16.0	16.9	14.9	11.3
Safe	15.1	15.6	14.2	16.3
Strange	15.1	19.5	13.4	11.3
Risk-taker	14.6	14.3	14.2	11.3
Nervous	6.4	7.8	6.0	5.0
Youthful	5.9	6.5	6.0	3.8
Exciting	4.6	6.5	3.7	5.0
Poor	3.2	3.9	2.2	0
Fast	0.5	0	0.7	1.3

The distribution of responses was quite even for these pictures, with 11 of the 21 words being selected by more than 20% of overall respondents. The most popular words associated with the people pictured, selected by over 30% of current riders and non-riders, were **healthy** and **independent**. More than 30% of non-riders also associated the words **confident**, **fun-loving**, **alternative** and **friendly** with the people

pictured while more than 30% of current riders also associated the words **comfortable** and **normal.** The most significant differences between the opinion of non-riders and riders were more non-riders associated **fun-loving** (21.6% more), **alternative** (18.1% more) and **friendly** (10.3% more) with the people pictured, and fewer non-riders associated **healthy** (19.7% fewer), **comfortable** (14.5% fewer), **normal** (11.1% fewer), **efficient** (9.4% fewer) and **fit** (7.9% fewer).

Comparing transport riders with all current riders, there was a slight trend (>5% difference) for more transport riders to associate the words **healthy, independent** and **friendly.**

4.2.7.4 Everyday

Table 4.39 Survey question 25a

Based on your experiences, how much do you think the images above reflect New Zealand cyclists?	all	non-riders	riders	transport
Substantially	44.7	34.7	49.3	48.1
To some extent	41.0	45.3	38.8	39.2
A little	12.4	16.0	11.2	11.4
Not at all	1.8	4.0	0.7	1.3

Table 4.40 Survey question 25b

In your opinion, do these people generate a positive, negative or neutral image of cycling?	all	non-riders	riders	transport
Positive	43.3	36.0	47.8	51.9
Negative	6.5	8.0	6.0	5.1
Neutral	50.2	56.0	46.3	43.0

These images were seen as a strong reflection of cyclists in New Zealand (80.0% of non-riders and 88.1% of current riders responded 'to some extent' or more). On balance, all groups thought the people pictured generated a positive image of cycling, although the net positivity was stronger for riders and transport riders. There was a higher proportion of non-riders who saw the people pictured as generating neither a positive or negative image (up to 56.0% of non-riders compared to 46.3% of riders).

Table 4.41 Survey question 25c

Choose up to six of the following words that you feel are best associated with the cyclists pictured above:	all	non-riders	riders	transport
Normal	56.1	56.8	55.7	58.4
Healthy	50.9	40.5	55.7	61.0
Independent	48.1	48.6	47.3	51.9
Comfortable	33.5	37.8	30.5	30.5
Efficient	26.4	24.3	27.5	27.3
Fit	26.4	27.0	26.7	29.9
Safe	23.6	20.3	24.4	22.1
Confident	19.8	17.6	21.4	24.7
Alternative	19.8	20.3	19.1	15.6
Friendly	12.7	16.2	10.7	7.8
Nervous	10.8	12.2	10.7	10.4
Youthful	10.8	8.1	13.0	15.6
Poor	10.4	14.9	7.6	7.8
Risk-taker	9.0	6.8	10.7	10.4
Intelligent	5.7	0	9.2	11.7
Strange	5.2	8.1	3.8	5.2
Fun-loving	4.7	6.8	3.8	1.3
Irresponsible	3.8	2.7	4.6	2.6
Fast	2.4	2.7	2.3	3.9
Elegant	0.5	0	0.8	1.3
Exciting	0.5	1.4	0	0

The most popular words associated with the people pictured, selected by over 40% of current riders and non-riders, were **normal**, **healthy, independent and comfortable**. The most significant differences between the opinion of non-riders and riders were more non-riders associated **poor** (7.3% more) and **comfortable** (7.3% more) with the people pictured, and fewer non-riders associated **healthy** (15.2% fewer) and **intelligent** (9.2% fewer) with the people pictured.

Comparing transport riders with all current riders, there was a slight trend (>5% difference) for more transport riders to associate the word **healthy.**

4.2.7.5 High visibility

Table 4.42 Survey question 26a

Based on your experiences, how much do you think the images above reflect New Zealand cyclists?	all	non-riders	riders	transport
Substantially	46.8	43.2	50.0	50.6
To some extent	44.4	40.5	44.8	44.3
A little	7.9	13.5	5.2	5.1
Not at all	0.9	2.7	0	0

Table 4.43 Survey question 26b

In your opinion, do these people generate a positive, negative or neutral image of cycling?	all	non-riders	riders	transport
Positive	69.9	56.8	78.4	77.2
Negative	5.1	9.5	3.0	3.8
Neutral	25.0	33.8	18.7	19.0

These images were seen as a very strong reflection of cyclists in New Zealand, particularly by current riders (83.7% of non-riders and 94.8% of current riders responded 'to some extent' or more). On balance, all groups thought the people pictured generated a positive image of cycling, although the net positivity was much stronger for riders and transport riders. There was a higher proportion of non-riders who saw the people pictured as generating neither a positive or negative image (up to 33.8% of non-riders compared with 18.7% of riders).

Table 4.44 Survey question 26c

Choose up to six of the following words that you feel are best associated with the cyclists pictured above:	all	non-riders	riders	transport
Safe	65.6	58.9	71.0	67.5
Healthy	62.3	54.8	65.6	68.8
Fit	55.2	50.7	57.3	61.0
Independent	40.1	37.0	42.0	45.5
Normal	36.3	34.2	38.2	42.9
Efficient	32.5	27.4	34.4	31.2
Confident	31.1	26.0	34.4	33.8

Choose up to six of the following words that you feel are best associated with the cyclists pictured above:	all	non-riders	riders	transport
Comfortable	22.2	16.4	24.4	27.3
Intelligent	17.9	16.4	19.8	23.4
Youthful	12.3	17.8	9.2	3.9
Nervous	9.4	9.6	9.2	11.7
Fast	9.0	11.0	7.6	6.5
Alternative	8.0	9.6	6.9	5.2
Friendly	7.1	6.8	7.6	7.8
Risk-taker	6.6	4.1	7.6	9.1
Poor	2.8	5.5	1.5	2.6
Fun-loving	2.4	0	3.8	3.9
Strange	1.9	2.7	1.5	2.6
Irresponsible	1.4	2.7	0.8	1.3
Elegant	0.5	0	0.8	1.3
Exciting	0.9	2.7	0	0

The most popular words associated with the people pictured, selected by over 30% of current riders and non-riders, were **safe, healthy**, **fit, independent** and **normal**. More than 30% of current riders also associated the words **efficient** and **confident** with the people pictured. The most significant differences between the opinion of non-riders and riders were that more non-riders associated **youthful** (8.6% more) with the people pictured, and fewer non-riders associated **safe** (12.1% fewer), **healthy** (9.2% fewer) and **confident** (9.2% fewer).

Comparing transport riders with all current riders, there was a slight trend (>5% difference) for fewer transport riders to associate the word **youthful.**

4.2.7.6 City (helmet)

Table 4.45 Survey question 27a

Based on your experiences, how much do you think the images above reflect New Zealand cyclists?	all	non-riders	riders	transport
Substantially	3.8	2.7	4.5	5.2
To some extent	18.3	17.8	17.4	19.5
A little	27.2	20.5	30.3	28.6
Not at all	50.7	58.9	47.7	46.8

Table 4.46 Survey question 27b

In your opinion, do these people generate a positive, negative or neutral image of cycling?	all	non-riders	riders	transport
Positive	46.0	43.8	46.2	53.2
Negative	9.9	13.7	7.6	3.9
Neutral	44.1	42.5	46.2	42.9

These images were seen as a slight reflection of cyclists in New Zealand (20.5% of non-riders and 21.9% of current riders responded 'to some extent' or more). On balance, all groups thought the people pictured generated a positive image of cycling, although the net positivity was stronger for riders and stronger still for transport riders.

Table 4.47 Survey question 27c

Choose up to six of the following words that you feel are best associated with the cyclists pictured above:	all	non-riders	riders	transport
Independent	44.0	38.0	46.9	54.7
Healthy	42.5	36.6	46.1	52.0
Normal	38.2	29.6	42.2	44.0
Alternative	33.8	32.4	35.9	34.7
Comfortable	30.0	33.8	26.6	22.7
Fit	23.2	23.9	23.4	25.3
Safe	21.3	15.5	23.4	24.0
Efficient	20.8	21.1	19.5	16.0
Confident	20.3	23.9	16.4	18.7
Intelligent	19.3	21.1	18.0	18.7
Strange	19.3	25.4	16.4	12.0
Friendly	18.8	23.9	15.6	12.0
Nervous	13.5	16.9	11.7	12.0
Risk-taker	9.7	14.1	7.0	9.3
Elegant	8.2	9.9	7.8	9.3
Irresponsible	5.3	7.0	3.9	5.3
Fun-loving	5.3	8.5	3.9	4.0
Poor	3.4	4.2	3.1	4.0
Youthful	1.9	0	3.1	2.7
Exciting	1.4	1.4	1.6	2.7
Fast	1.0	1.4	0.8	1.3

The most popular words associated with the people pictured, selected by over 30% of current riders and non-riders, were **independent, healthy** and **alternative**. More than 30% of non-riders also associated the word **comfortable** with the people pictured while more than 30% of current riders also associated the word **normal**. The most significant differences between the opinion of non-riders and riders were more non-riders associated **strange** (9.0% more), **friendly** (8.3% more), **confident** (7.5% more), **comfortable** (7.2% more) and **risk-taker** (7.1% more) with the people pictured, and fewer non-riders associated **normal** (12.6% fewer), **healthy** (9.5% fewer), **independent** (8.9% fewer) and **safe** (7.9% fewer).

Comparing transport riders with all current riders, there was a slight trend (>5% difference) for more transport riders to associate the words **healthy** and **independent.**

4.2.8 Cyclist imagery – summary and analysis

Across all respondents, the images of cyclists most associated with New Zealand cycling were of *recreational*, *high visibility*, *everyday* and *road racing* riders (at least 73% of respondents saw these as associated 'to some extent or more'). The two images of *city* riders (with and without helmets) were least associated with New Zealand riding. This result shows that both riders and non-riders strongly associate cycling in New Zealand with recreation. There is recognition of cyclists wearing high-visibility clothing, but also of riders wearing everyday clothing while riding. The style of bicycles and/or clothing in the *city* images was not recognised as associated with New Zealand cycling. The images used were a mixture of those taken in New Zealand, Europe and the United States. There is a possibility that the background and scenery in the images influenced the respondents. However, the *everyday* images were a mix of these locations and were still strongly associated with New Zealand cycling.

The pictures that generated the most positive image of cycling for both non-riders and riders were the *high visibility* images. However, there was a marked difference between the positivity of riders and non-riders (78.4% positive for riders and 56.8% positive for non-riders). Very few riders and 9.5% of non-riders saw these pictures as negative for cycling. Current riders saw high-visibility as generating a strongly positive image of cycling. However, this opinion was not so strongly shared by non-riders, who were as likely to see the pictures offering a negative or neutral image of cycling.

It is also notable that the only other pictures to generate a positive response from more than 50% of non-riders were of the *city (no helmet)* riders. Although this was tempered by the pictures generating a negative response in 18.5% of non-riders (the same response as for the *road racing* pictures), it suggests many respondents either did not notice, or overlooked, the missing helmets. For all pictures, the minimum negative response from non-riders was 7.8%, which suggests any cycling will be seen negatively by some.

Table 4.48 Words associated with the images of cyclists, selected by over 30% of respondents

	Road racing	Recreational	Everyday	City (no helmet)	High visibility	City (helmet)
All	Healthy Fit Fast Confident	Healthy Independent Normal Fit	Healthy Independent Normal Comfortable	Healthy Independent	Healthy Independent Normal Fit Safe	Healthy Independent Alternative
Non-riders	Independent	Confident Youthful Risk-taker		Confident Fun-Loving Alternative Friendly		Comfortable
Riders				Comfortable Normal	Efficient Confident	Normal

Riders and non-riders associated **healthy** with all of the pictures.

Non-riders associated the word **independent** with all of the pictures. Current riders agreed, with the exception of *road racing* pictures. The pictures showing riders obviously wearing cycling specific clothing (*road racing*, *recreational* and *high visibility*) were seen as **fit** by both non-riders and riders.

The pictures less associated with New Zealand, *city (helmet)* and *city (no helmet*), were seen as **alternative** by non-riders, but **normal** by riders. The pictures containing riders wearing normal clothing (*everyday*) or high-visibility clothing (*high visibility*) were seen as **normal** by both riders and non-riders.

Table 4.49 Words associated with the images of cyclists, which show significant difference between the selections of non-riders and current riders

	Road racing	Recreational	Everyday	City (no helmet)	High visibility	City (helmet)
Fewer non-riders selected:	Efficient Fast Intelligent	Safe Independent Fit Intelligent	Healthy Intelligent	Healthy Comfortable Normal Efficient Fit	Safe Healthy Confident	Normal Healthy Independent Safe
More non-riders selected:	Youthful Fun-loving	Youthful Risk-taker Confident	Poor Comfortable	Fun-loving Alternative Friendly	Youthful	Strange Friendly Confident Comfortable Risk-taker

When compared with riders, fewer non-riders associated **healthy** with cycling, with the exception of the *recreational* and *road racing* pictures. Cyclists in the pictures with cycling specific clothing (*road racing*, *recreational* and *high visibility*) were more likely to be seen as **youthful** by the non-riders.

When more non-riders associated **confident** with the images, more also associated **risk-taker** (for *city helmet* and *recreational* images). Conversely, when fewer non-riders associated **confident** with the images, fewer also associated **safe** (*high visibility*).

For three of the six pictures (*road racing, recreational* and *everyday*), fewer non-riders associated **intelligent**. For the *everyday* pictures, this also corresponded with more non-riders associating **poor**. This is at odds with the demographic data presented in the survey results, which shows riders and, in particular, transport riders, to be educated to a higher level and to earn more per annum.

There are obvious differences in the way riders and non-riders view images of cyclists. While there is general agreement as to which images relate to cycling in New Zealand, the opinions generated may be significantly different for riders and non-riders. Furthermore, the positive and negative words associated with each of the cyclist images are different. This suggests that many of the positive reasons for cycling held by current riders are not seen as reasons to cycle by non-riders. While all tend to recognise cycling as healthy and cyclists as independent, there are strong suggestions that non-cyclists view cyclists as 'different' and the activity requires a level of confidence and fitness and a willingness to take risks.

4.2.9 Bicycle imagery

4.2.9.1 New Zealand commuter bicycle

Table 4.50 Survey question 28a

Based on your experiences, how much do you think this bicycle reflects cycling in New Zealand?	all	non-riders	riders	transport
Substantially	10.3	12.3	9.8	10.4
To some extent	31.9	38.4	26.5	26.0
A little	40.8	30.1	47.7	51.9
Not at all	16.9	19.2	15.9	11.7

This bicycle was seen as a reasonable reflection of cycling in New Zealand (50.7% of non-riders and 36.3% of current riders responded 'to some extent' or more).

Table 4.51 Survey question 28b

Do you agree with the following statements regarding this bicycle?	all	non-riders	riders	transport
This bicycle appears functional	99.0	98.5	99.2	98.7
This bicycle is suitable for use on city roads	96.6	94.1	97.7	98.7
This bicycle looks easy to ride	96.1	94.1	96.9	98.7
This bicycle looks durable	95.6	94.1	96.1	96.0
This bicycle is suitable for short trips	94.1	92.6	94.5	94.7
This bicycle makes load carrying easy	90.2	82.4	94.5	97.3
This bicycle is comfortable	88.7	85.3	90.6	90.7
The rider of this bicycle would feel safe	82.4	82.4	82.8	85.3
This bicycle is suitable for a longer daily commute to and from work	75.0	75.0	74.2	78.7
The rider of this bicycle might be a friend of mine	66.7	67.6	65.6	73.3
Riding this bicycle would be fun	62.7	64.7	60.2	65.3
This bicycle is suitable for riding in a hilly area	43.1	41.2	44.5	54.7
This bicycle requires expert maintenance	25.5	33.8	21.9	18.7
The rider of this bicycle is fit and athletic	22.5	27.9	19.5	24.0
The rider of this bicycle is young	13.7	26.5	7.8	6.7

Do you agree with the following statements regarding this bicycle?	all	non-riders	riders	transport
This bicycle requires special cycling clothing	13.2	17.6	10.9	8.0
The rider of this bicycle is an extrovert	12.7	14.7	11.7	9.3

More than 70% of current riders and non-riders thought this bicycle was **functional**, **comfortable**, **easy to ride**, **durable**, **suitable for short trips**, made **load carrying easy** and **suitable for city roads** and a longer **commute to and from work**. They thought the rider would not be an **extrovert, young** or **fit and athletic,** they would feel **safe** and would not need **special cycling clothing**. More than 70% of current riders also thought the bicycle would not need **expert maintenance**.

The most significant differences between the opinion of non-riders and riders were more non-riders thought the rider would be **young** (18.7% more) and the bicycle would require **expert maintenance** (11.9% more), and fewer non-riders thought the bicycle made **load carrying easy** (12.1% fewer).

Comparing transport riders with all current riders, there was a trend for more practical riders (>10%) difference) to think the bicycle was suitable for a **hilly area**, and a slight trend (>5% difference) for more transport riders to think the rider would be a **friend** and the bicycle would be **fun**.

Table 4.52 Survey question 28c

Choose up to five of the following words that you feel are best associated with the bicycle pictured above:	all	non-riders	riders	transport
Functional	82.3	79.4	82.7	83.8
Durable	68.0	63.2	69.3	66.2
Comfortable	60.6	55.9	63.8	56.8
Safe	59.6	51.5	65.4	62.2
Efficient	38.4	35.3	38.6	40.5
Normal	29.6	27.9	29.1	32.4
Feminine	18.7	23.5	17.3	18.9
Cheap	14.8	16.2	13.4	16.2
Quirky	13.3	14.7	12.6	12.2
Fun	12.8	11.8	14.2	13.5
Expensive	8.4	10.3	7.1	6.8
Alternative	8.4	8.8	8.7	6.8
Elegant	5.4	2.9	6.3	9.5
Youthful	4.4	8.8	2.4	2.7
Masculine	3.4	7.4	1.6	1.4
Strenuous	2.0	2.9	1.6	0
Strange	1.5	2.9	0.8	0
Risky	1.0	1.5	0.8	1.4
Fast	1.0	0	1.6	2.7
Rebellious	0.5	0	0.8	1.4
Exciting	0	0	0	0

The most popular words associated with the bicycle pictured, selected by over 30% of current riders and non-riders, were **functional, durable, comfortable, safe** and **efficient.** The most significant differences between the opinion of non-riders and riders were fewer non-riders associated **safe** (13.9% fewer) with the bicycle pictured.

Comparing transport riders with all current riders, there was a slight trend (>5% difference) for fewer transport riders to associate the word **comfortable.**

4.2.9.2 Mountain bicycle

Table 4.53 Survey question 29a

Based on your experiences, how much do you think this bicycle reflects cycling in New Zealand?	all	non-riders	riders	transport
Substantially	36.5	35.3	38.6	41.9
To some extent	48.3	47.1	48.0	48.6
A little	12.8	14.7	11.8	9.5
Not at all	2.5	2.9	1.6	0

This bicycle was seen as a strong reflection of cycling in New Zealand (82.4% of non-riders and 86.6% of current riders responded 'to some extent' or more).

Table 4.54 Survey question 29b

Do you agree with the following statements regarding this bicycle?	all	non-riders	riders	transport
This bicycle is suitable for riding in a hilly area	97.0	95.6	98.4	98.6
This bicycle looks durable	94.1	92.6	94.5	94.6
Riding this bicycle would be fun	88.2	80.9	91.3	91.9
This bicycle is suitable for short trips	87.2	83.8	89.0	94.6
This bicycle appears functional	85.7	82.4	88.2	89.2
The rider of this bicycle is fit and athletic	84.7	88.2	83.5	82.4
The rider of this bicycle would feel safe	76.8	79.4	76.4	79.7
The rider of this bicycle might be a friend of mine	75.4	60.3	84.3	85.1
This bicycle looks easy to ride	74.9	61.8	82.7	89.2
The rider of this bicycle is young	66.0	76.5	60.6	55.4
This bicycle requires expert maintenance	64.5	75.0	61.4	56.8
This bicycle is comfortable	60.1	52.9	64.6	68.9

Do you agree with the following statements regarding this bicycle?	all	non-riders	riders	transport
This bicycle requires special cycling clothing	58.6	70.6	51.2	50.0
This bicycle is suitable for use on city roads	56.2	52.9	57.5	63.5
This bicycle is suitable for a longer daily commute to and from work	48.8	45.6	49.6	50.0
The rider of this bicycle is an extrovert	45.8	60.3	39.4	37.8
This bicycle makes load carrying easy	4.9	2.9	6.3	9.5

More than 70% of current riders and non-riders thought this bicycle was **suitable for a hilly area, durable**, **fun**, **suitable for short trips** and **functional,** but it would not make **load carrying easy**. They thought the rider was **fit and athletic** and would feel **safe**. More than 70% of current riders also thought the bicycle would be **easy to ride** and the rider would be a **friend,** while more than 70% of non-riders thought the bicycle required **expert maintenance** and the rider would be **young** and would need **special cycling clothing**.

The most significant differences between the opinion of non-riders and riders were more non-riders thought the rider would be an **extrovert** (20.9% more) and **young** (15.9% more) and the bicycle required **special cycling clothing** (19.4% more) and **expert maintenance** (13.6% more), and fewer non-riders thought the bicycle was **easy to ride** (20.9% fewer), **comfortable** (11.7% fewer) or **fun** (10.4%) and the rider was a **friend** (24.0% fewer).

Comparing transport riders with all current riders, there was a slight trend (>5% difference) for more transport riders to think the bicycle was suitable for **city roads** and **short trips**, and fewer to think the bicycle would be **easy to ride** and that the rider would be **young**.

Table 4.55 Survey question 29c

Choose up to five of the following words that you feel are best associated with the bicycle pictured above:	all	non-riders	riders	transport
Durable	46.3	44.1	47.2	50.0
Fast	45.3	44.1	45.7	41.9
Expensive	45.3	55.9	37.8	36.5
Exciting	44.3	33.8	51.2	52.7
Fun	38.4	30.9	44.1	41.9
Masculine	36.5	47.1	32.3	28.4
Functional	30.0	14.7	37.0	37.8
Youthful	30.0	47.1	19.7	13.5
Risky	23.6	32.4	19.7	21.6
Efficient	23.2	13.2	27.6	31.1
Strenuous	22.2	23.5	19.7	25.7
Normal	14.8	10.3	17.3	20.3
Safe	14.3	10.3	16.5	17.6
Comfortable	11.3	5.9	15.0	16.2
Rebellious	9.9	16.2	6.3	6.8
Alternative	5.9	5.9	6.3	4.1

Choose up to five of the following words that you feel are best associated with the bicycle pictured above:	all	non-riders	riders	transport
Quirky	3.4	7.4	1.6	0
Elegant	1.5	0	2.4	0
Strange	1.0	1.5	0.8	0
Cheap	0.5	0	0.8	0
Feminine	0.5	0	0.8	1.4

The most popular words associated with the bicycle pictured, selected by over 30% of current riders and non-riders, were **durable, fast, expensive, exciting, fun** and **masculine.** More than 30% of non-riders also associated the words **youthful** and **risky** with the bicycle pictured while more than 30% of current riders also associated the word **functional**. The most significant differences between the opinion of non-riders and riders were more non-riders associated **youthful** (27.4% more), **expensive** (18.1% more), **masculine** (14.8% more) and **risky** (12.7% more), while fewer non-riders associated **functional** (22.3% fewer), **exciting** (17.4% fewer), **efficient** (14.4% fewer) and **fun** (13.2% fewer) with the bicycle pictured.

Comparing transport riders with all current riders, there was a slight trend (>5% difference) for more transport riders to associate the word **strenuous** and fewer to associate the word **youthful.**

4.2.9.3 V-bike

Table 4.56 Survey question 30a

Based on your experiences, how much do you think this bicycle reflects cycling in New Zealand?	all	non-riders	riders	transport
Substantially	0	0	0	0
To some extent	2.5	1.5	1.6	1.4
A little	21.2	23.5	19.7	21.6
Not at all	76.4	75.0	78.7	77.0

This bicycle was not seen as a reflection of cycling in New Zealand (1.5% of non-riders and 1.6% of current riders responded 'to some extent' or more).

Table 4.57 Survey question 30b

Do you agree with the following statements regarding this bicycle?	all	non-riders	riders	transport
This bicycle is suitable for short trips	97.0	97.0	96.9	98.6
This bicycle makes load carrying easy	91.1	91.0	90.6	91.9
This bicycle is suitable for use on city roads	85.1	76.1	89.8	93.2

Do you agree with the following statements regarding this bicycle?	all	non-riders	riders	transport
This bicycle appears functional	84.7	82.1	85.8	86.5
This bicycle looks easy to ride	76.7	74.6	77.2	79.7
This bicycle is comfortable	66.8	65.7	67.7	73.0
The rider of this bicycle would feel safe	63.9	65.7	64.6	66.2
This bicycle looks durable	63.4	58.2	64.6	68.9
Riding this bicycle would be fun	49.0	58.2	44.9	48.6
The rider of this bicycle is an extrovert	41.1	46.3	40.2	40.5
The rider of this bicycle might be a friend of mine	38.1	41.8	35.4	45.9
This bicycle is suitable for a longer daily commute to and from work	21.8	19.4	21.3	24.3
The rider of this bicycle is young	19.3	32.8	12.6	13.5
This bicycle requires expert maintenance	17.3	17.9	17.3	14.9
This bicycle requires special cycling clothing	7.4	9.0	6.3	5.4
The rider of this bicycle is fit and athletic	7.4	10.4	6.3	2.7
This bicycle is suitable for riding in a hilly area	2.0	1.5	1.6	0

More than 70% of current riders and non-riders thought this bicycle was suitable for **short trips,** made **load carrying easy**, was suitable for use on **city roads, functional** and **easy to ride,** but that it was not suitable for a hilly area or for a longer **commute to work**, and would require **expert maintenance** or **special cycling clothing.** They thought the rider was not **fit and athletic**. More than 70% of current riders also thought the rider would not be **young**.

The most significant differences between the opinion of non-riders and riders were more non-riders thought the rider would be **young** (20.2% more) and the bicycle would be **fun** (13.3% more), and fewer non-riders thought the bicycle was **suitable for city roads** (13.7% fewer).

Comparing transport riders with all current riders, there was a trend (>10% difference) for more transport riders to think the rider of the bicycle would be a **friend**, and a slight trend (>5% difference) for more to think the bicycle was **comfortable**.

Table 4.58 Survey question 30c

Choose up to five of the following words that you feel are best associated with the bicycle pictured above:	all	non-riders	riders	transport
Quirky	59.5	56.1	62.7	65.8
Functional	50.0	36.4	55.6	56.2
Alternative	48.5	48.5	50.0	46.6
Feminine	33.0	47.0	27.0	21.9
Strange	32.0	25.8	35.7	37.0
Comfortable	29.0	22.7	30.2	31.5
Fun	24.0	28.8	22.2	26.0
Efficient	23.0	18.2	23.0	26.0
Safe	22.0	24.2	20.6	23.3
Cheap	20.0	21.2	19.0	19.2

Choose up to five of the following words that you feel are best associated with the bicycle pictured above:	all	non-riders	riders	transport
Durable	19.0	16.7	17.5	17.8
Expensive	8.0	9.1	7.9	5.5
Normal	8.0	9.1	7.1	8.2
Youthful	7.5	19.7	1.6	2.7
Strenuous	6.5	3.0	7.9	8.2
Elegant	4.0	4.5	4.0	4.1
Exciting	3.5	7.6	1.6	1.4
Rebellious	3.0	3.0	3.2	1.4
Risky	2.5	3.0	2.4	2.7
Fast	1.0	1.5	0.8	1.4
Masculine	0	0	0	0.0

The most popular words associated with the bicycle pictured, selected by over 30% of current riders and non-riders, were **quirky, functional** and **alternative.** More than 30% of non-riders also associated the word **feminine** while more than 30% of current riders also associated the words **strange** and **comfortable** with the bicycle pictured.

The most significant differences between the opinion of non-riders and riders were more non-riders associated **feminine** (20.0% more) and **youthful** (18.1% more), while fewer non-riders associated **functional** (19.2% fewer) with the bicycle pictured.

Comparing transport riders with all current riders, there was a slight trend (>5% difference) for fewer transport riders to associate the word **feminine.**

4.2.9.4 Fitness bicycle

Table 4.59 Survey question 31a

Based on your experiences, how much do you think this bicycle reflects cycling in New Zealand?	all	non-riders	riders	transport
Substantially	26.0	25.8	27.8	23.3
To some extent	49.0	50.0	47.6	53.4
A little	22.5	19.7	23.0	21.9
Not at all	2.5	4.5	1.6	1.4

This bicycle was seen as a reflection of cycling in New Zealand (75.8% of non-riders and 75.4% of current riders responded 'to some extent' or more).

Table 4.60 Survey question 31b

Do you agree with the following statements regarding this bicycle?	all	non-riders	riders	transport
This bicycle is suitable for a longer daily commute to and from work	89.9	86.2	94.4	94.5
This bicycle is suitable for use on city roads	88.9	87.7	90.5	91.8
This bicycle appears functional	88.4	80.0	93.7	95.9
The rider of this bicycle is fit and athletic	80.4	89.2	76.2	76.7
This bicycle is suitable for short trips	76.4	64.6	82.5	83.6
This bicycle is suitable for riding in a hilly area	74.9	67.7	79.4	80.8
This bicycle looks durable	74.4	66.2	80.2	82.2
Riding this bicycle would be fun	73.9	61.5	79.4	82.2
The rider of this bicycle might be a friend of mine	72.9	55.4	82.5	80.8
The rider of this bicycle would feel safe	69.3	55.4	77.0	80.8
This bicycle looks easy to ride	67.8	47.7	78.6	80.8
This bicycle requires expert maintenance	61.3	67.7	58.7	53.4
This bicycle requires special cycling clothing	57.3	76.9	46.0	41.1
This bicycle is comfortable	56.8	36.9	67.5	75.3
The rider of this bicycle is young	37.2	47.7	31.7	30.1
The rider of this bicycle is an extrovert	25.6	40.0	17.5	21.9
This bicycle makes load carrying easy	6.5	3.1	8.7	12.3

More than 70% of current riders and non-riders thought this bicycle was **functional**, suitable for a longer **commute to work** and for use on **city roads,** but would not make **load carrying easy.** They thought the rider was **fit and athletic**. More than 70% of current riders also thought the bicycle was suitable for **short trips** and a **hilly area**, and would be **fun** and **durable**. They thought the rider would feel **safe**, be a **friend** and would not be an **extrovert**. More than 70% of non-riders also thought the bicycle required **special cycling clothing**.

The most significant differences between the opinion of non-riders and riders were more non-riders thought the rider would need **special cycling clothing** (30.9% more), be an **extrovert** (22.4% more), be **young** (16.0% more) and **fit and athletic** (13.0% more), and fewer non-riders thought the bicycle was **easy to ride** (30.9% fewer), **comfortable** (30.6% fewer), **fun** (17.9% fewer), **durable** (14.0% fewer), **functional** (13.7% fewer) or suitable for a **hilly area** (13.7% fewer). Fewer non-riders also thought the rider would be a **friend** (27.1% fewer) or feel **safe** (21.6% fewer).

Comparing transport riders with all current riders, there was a slight trend (>5% difference) for more to think the bicycle was **comfortable** and fewer to think it required **expert maintenance.**

Table 4.61 Survey question 31c

Choose up to five of the following words that you feel are best associated with the bicycle pictured above:	all	non-riders	riders	transport
Fast	65.3	63.1	65.1	69.9
Efficient	52.3	38.5	58.7	60.3
Expensive	47.2	58.5	41.3	38.4
Functional	43.7	36.9	46.8	49.3
Durable	26.1	24.6	26.2	26.0
Normal	22.1	16.9	25.4	26.0
Strenuous	18.6	30.8	11.9	11.0
Comfortable	17.1	3.1	24.6	28.8
Exciting	16.1	15.4	16.7	20.5
Safe	15.1	4.6	20.6	21.9
Fun	14.6	12.3	15.9	17.8
Youthful	14.1	20.0	11.1	11.0
Masculine	14.1	15.4	12.7	9.6
Elegant	11.1	10.8	11.9	15.1
Risky	10.1	20.0	4.8	5.5
Feminine	5.5	4.6	5.6	4.1
Alternative	4.5	4.6	4.0	4.1
Cheap	3.0	6.2	1.6	2.7
Strange	1.0	1.5	0.8	0
Quirky	1.0	1.5	0.8	0
Rebellious	0.5	0	0.8	1.4

The most popular words associated with the bicycle pictured, selected by over 30% of current riders and non-riders, were **fast, efficient, expensive** and **functional.** More than 30% of non-riders also associated the word **strenuous** with the bicycle pictured.

The most significant differences between the opinion of non-riders and riders were more non-riders associated **strenuous** (18.9% more), **expensive** (17.2% more) and **risky** (15.2% more), while fewer non-riders associated **functional** (21.5% fewer), **efficient** (20.2% fewer) and **safe** (20.2% fewer) with the bicycle pictured.

4.2.9.5 Traditional city bicycle

Table 4.62 Survey question 32a

Based on your experiences, how much do you think this bicycle reflects cycling in New Zealand?	all	non-riders	riders	transport
Substantially	0	0	0	0
To some extent	5.5	4.6	4.8	4.1
A little	17.6	15.4	19.0	19.2
Not at all	76.9	80.0	76.2	76.7

This bicycle was not seen as a reflection of cycling in New Zealand (4.6 % of non-riders and 4.8 % of current riders responded 'to some extent' or more).

Table 4.63 Survey question 32b

Do you agree with the following statements regarding this bicycle?	all	non-riders	riders	transport
This bicycle is suitable for short trips	98.0	98.5	97.6	98.6
This bicycle makes load carrying easy	91.0	90.8	90.5	90.4
This bicycle appears functional	89.4	92.3	88.1	87.7
This bicycle looks easy to ride	89.4	96.9	84.9	83.6
This bicycle is suitable for use on city roads	86.9	80.0	89.7	90.4
This bicycle looks durable	85.9	81.5	87.3	84.9
This bicycle is comfortable	85.9	87.7	84.1	86.3
The rider of this bicycle would feel safe	79.4	76.9	81.0	80.8
Riding this bicycle would be fun	62.3	67.7	60.3	63.0
The rider of this bicycle might be a friend of mine	43.7	44.6	42.1	47.9
The rider of this bicycle is an extrovert	33.2	38.5	32.5	37.0
This bicycle is suitable for a longer daily commute to and from work	29.1	33.8	25.4	30.1
The rider of this bicycle is young	13.6	21.5	9.5	9.6
This bicycle requires expert maintenance	12.6	12.3	12.7	8.2
This bicycle is suitable for riding in a hilly area	9.0	12.3	7.1	8.2
The rider of this bicycle is fit and athletic	7.0	4.6	8.7	11.0
This bicycle requires special cycling clothing	6.5	6.2	6.3	4.1

More than 70% of current riders and non-riders thought this bicycle was suitable for **short trips**, made **load carrying easy**, was **functional**, **easy to ride**, suitable for **city roads**, **durable** and **comfortable**, but did not require **special cycling clothing** or **expert maintenance** and was not suitable for a **hilly area**. They thought the rider would feel **safe** but would not be **fit and athletic** or **young**. More than 70% of current riders also thought the bicycle was not suitable for a longer **commute to work**.

The most significant differences between the opinion of non-riders and riders were more non-riders thought the bicycle would be **easy to ride** (12.0% more) and the rider would be **young** (12.0% more), while fewer non-riders thought the bicycle was suitable for **city roads** (9.7% fewer).

Comparing transport riders with all current riders, there was a slight trend (>5% difference) for more to think the rider would be a **friend.**

Table 4.64 Survey question 32c

Choose up to five of the following words that you feel are best associated with the bicycle pictured above:	all	non-riders	riders	transport
Functional	60.3	53.8	63.5	64.4
Comfortable	51.8	46.2	54.0	52.1
Feminine	48.7	56.9	46.0	42.5
Quirky	37.2	38.5	36.5	31.5
Durable	35.2	29.2	36.5	37.0
Elegant	30.2	30.8	30.2	30.1
Safe	29.6	20.0	35.7	35.6
Alternative	26.1	29.2	24.6	21.9
Fun	22.1	30.8	19.0	20.5
Efficient	20.1	15.4	20.6	23.3
Strange	11.6	12.3	11.9	12.3
Normal	10.6	10.8	9.5	13.7
Cheap	8.0	12.3	4.8	5.5
Strenuous	6.5	4.6	7.1	8.2
Expensive	5.0	4.6	5.6	6.8
Youthful	3.0	6.2	1.6	2.7
Exciting	2.5	6.2	0.8	1.4
Rebellious	1.0	0	1.6	1.4
Fast	0.5	0	0.8	1.4
Risky	0	0	0	0
Masculine	0	0	0	0

The most popular words associated with the bicycle pictured, selected by over 30% of current riders and non-riders, were **functional, comfortable, feminine, quirky** and **elegant.** More than 30% of non-riders also associated the word **fun** and more than 30% of current riders also associated the words **durable** and **safe** with the bicycle pictured.

The most significant differences between the opinion of non-riders and riders were more non-riders associated **fun** (11.8% more) and **feminine** (10.9% more), while fewer non-riders associated **safe** (15.7% fewer) with the bicycle pictured.

4.2.10 Bicycle imagery – summary and analysis

Across all respondents, the images of bicycles most associated with New Zealand cycling were the mountain and fitness bicycles (at least 75.4% of respondents associated these 'to some extent or more'). The New Zealand commuter bicycle was recognised by 50.7% of non-riders, but only 36.3% of riders. This discrepancy could be due to the New Zealand commuter bicycle containing visual cues similar to the mountain bicycle, making it seem more familiar to a non-rider. The V-bike and the traditional city bicycle were not considered to represent New Zealand cycling. These results show both riders and non-riders strongly associated cycling in New Zealand with recreation. As expected, the pattern of recognition of the bicycles followed the pattern of availability. The solution review found mountain and fitness bicycles were readily available and given prominent display in all of the cycle stores visited in New Zealand, while the

New Zealand commuter bicycle was less widely stocked or visible. The traditional city bicycle was available in very few outlets, and the V-bike was available via importation from Australia.

Table 4.65 Statements associated with the pictures of bicycles (tables 4.51, 4.54, 4.57, 4.60 and 4.63), showing agreement and disagreement between rider and non-rider groups

	NZ commuter	Mountain	V-bike	Fitness	Traditional city
All	Functional Comfortable Easy to ride Durable Short trips Load carrying City roads Long commute Safe ~~Extrovert~~ ~~Young~~ ~~Fit and athletic~~ ~~Cycle clothes~~	Hilly area Durable Fun Short trips Functional Fit and athletic Safe ~~Load carrying~~	Short trips Load carrying City roads Functional Easy to ride ~~Hilly area~~ ~~Long commute~~ ~~Maintenance~~ ~~Cycle clothes~~ ~~Fit and athletic~~	Functional Long commute City roads ~~Load carrying~~ Fit and athletic	Short trips Load carrying Functional Easy to ride City roads Durable Comfortable Safe ~~Cycle clothes~~ ~~Maintenance~~ ~~Hilly area~~ ~~Fit and athletic~~ ~~Young~~
Non-riders		Maintenance Young Cycle clothes		Cycle clothes	
Riders	~~Maintenance~~	Easy to ride Friend	~~Young~~	Short trips Hilly area Fun Durable Safe Friend ~~Extrovert~~	~~Long commute~~

~~Strikethrough~~ indicates that few respondents associated the word with the bicycle pictured.

Table 4.66 Statements associated with the pictures of bicycles (tables 4.51, 4.54, 4.57, 4.60 and 4.63), which show significant difference between the selections of non-riders and current riders

	NZ commuter	Mountain	V-bike	Fitness	Traditional city
Fewer non-riders selected:	Load carrying	Easy to ride Comfortable Fun Friend	City roads	Easy to ride Comfortable Fun Durable Functional Hilly area Friend Safe	City roads
More non-riders selected:	Young Maintenance	Extrovert Young Cycle clothing Maintenance	Young Fun	Cycle clothing Extrovert Young Fit and athletic	Easy to ride Young

Tables 4.65 and 4.66 show that the bicycles recognised as being typical of New Zealand recreational cycling were perceived quite differently by riders and non-riders. All respondents agreed on statements that described the core application of recreational bicycles. The *mountain* bicycle was seen as fun, functional, durable and safe for fit riders on short rides or in a hilly area, while the *fitness* bicycle was

functional for fit riders undertaking long commutes on city roads. However, the non-riders did not associate statements that aligned with short, practical trips (for example easy to ride and comfortable) and instead they perceived the bicycles to require expert maintenance and special cycle clothing. The balance of statements suggested that these bicycles, while commonly available and visible in New Zealand, did not encourage non-rides to make short, practical trips by bicycle. However, current riders, who were likely to be more familiar with these bicycles and have direct experience with them, perceived them as more versatile. Perhaps this suggests some of the preconceptions of the non-riders could be removed through direct experience with these bicycles?

It is also evident from tables 4.65 and 4.66 that the less familiar bicycles (the *traditional city* bicycle and the *V-bike*) were clearly recognisable as suitable for short practical trips. The statements associated with these bicycles by both riders and non-riders showed, despite a lack of direct experience with these bicycles, they perceived them to have this particular use. The statements selected for these bicycles were, in many cases, opposite to those selected for the familiar recreational bicycles (such as a rider who is not likely to be fit and athletic, making load carrying easy, not requiring special clothing etc). There is a suggestion that the *V-bike* was seen as more fun, for a younger rider, less durable and less safe than the *traditional city* bicycle. Perhaps there were visual cues that reminded viewers of the bicycles in their childhood? However, the two styles of bicycle had the majority of statements in common. It is curious to see that although the bicycles are designed for urban use, non-riders perceived them as less suitable for city roads. Reviewing this statement for all of the bicycles shows, when compared with riders, non-riders actually perceived all bicycles as less suitable for city roads. The *New Zealand commuter* bicycle was more familiar, and the statements associated with it by both riders and non-riders suggested it was ideal for practical short trips or longer commutes by older, less fit, less extroverted people.

Table 4.67 Words associated with the pictures of bicycles (tables 4.52, 4.55, 4.58, 4.61 and 4.64), showing agreement and disagreement between rider and non-rider groups

	NZ commuter	Mountain	V-bike	Fitness	Traditional city
All	Functional Durable Comfortable Safe Efficient	Durable Fast Expensive Exciting Fun Masculine	Quirky Functional Alternative	Fast Efficient Expensive Functional	Functional Comfortable Feminine Quirky Elegant
Non-riders		Youthful Risky	Feminine	Strenuous	Fun
Riders		Functional	Strange Comfortable		Durable Safe

Table 4.68 Words associated with the pictures of bicycles (tables 4.52, 4.55, 4.58, 4.61 and 4.64), which show significant difference between the selections of non-riders and riders

	NZ commuter	Mountain	V-bike	Fitness	Traditional city
Fewer non-riders selected:	Safe	Functional Exciting Efficient Fun	Functional	Functional Efficient Safe	Safe
More non-riders selected:		Youthful Expensive Masculine Risky	Feminine Youthful	Strenuous Expensive Risky	Fun Feminine

The results shown in tables 4.67 and 4.68 confirm the findings from tables 4.65 and 4.66, described previously. In particular, the differences between the perceptions of riders and non-riders for the familiar recreational bicycles (the *mountain* and *fitness* bicycles) are even more apparent here. Table 4.68 shows that non-riders did not perceive these bicycles to be as appealing and they were more likely to select words such as risky, expensive and strenuous in place of words such as functional, efficient and safe. There was, again, more agreement over the application and desirability of the less familiar bicycles (the *V-bike*, *traditional city* bicycle and the *New Zealand commuter* bicycle).

In several areas, there were interesting differences between the words the researchers expected to see and the words actually associated with the bicycles. The *mountain* and *fitness* bicycles were seen as expensive by non-riders, when in reality these were half the price of the *V-bike* and *traditional city* bicycle. This could be explained by non-riders perceiving the visible functional equipment on the bicycles to cost more: the recreational bicycles have obvious multi-gears, disc brakes and suspension. However, it was also possible that recreational bicycles were seen as discretionary products, whereas practical bicycles were a less expensive alternative to car ownership. A further observation was that non-riders were more likely to associate gender with a bicycle. The *mountain* bicycle, firmly in the realm of young males, was seen as masculine, whereas the lower or 'step-through' framed bicycles (the *V-bike* and *traditional city* bicycle) were perceived as feminine. This association was not so strong for current riders, who might see the frame design as useful for easy mounting and dismounting and handling of heavy loads (which is the intention of the *V-bike* design).

An important observation from table 4.67 is that the set of words associated with each of the bicycles define a unique rider or application profile:

- The *mountain* bicycle has a durable functionality expected of its higher cost. The rider is a young male willing to ride fast and take risks in return for fun and excitement.
- The high cost of the *fitness* bicycle buys functionality and efficiency. Rider effort is rewarded with swift progress.
- The *New Zealand commuter* bicycle offers the rider comfort and a safe, efficient ride. It has a high level of functionality that will stand the rigours of time.
- The *traditional city* bicycle is comfortable and safe, functional and durable, and yet it offers the elegant female rider an opportunity to be noticed.
- The *V-bike* offers a high level of comfort and functionality in a quirky package that appeals to the alternative young urban female.

While these are paraphrased from the words shown in table 4.67, they demonstrate how the perception of a product (bicycle) can be formed from a simple image and limited or incomplete direct riding experience.

5 Practical cycling workshops

The main focus of the workshops was to provide us with *qualitative* data, to be used to identify new opportunities and inspire new ideas. Deep understanding, not broad coverage is the strength of qualitative research, which can help uncover deeply held needs, desires and aspirations, not typically drawn out through traditional quantitative data collection methods. Qualitative methods will not determine 'average' behaviours or attitudes, because they do not cover a sample large enough to be statistically significant, therefore they need to be (have been) complemented with other quantitative research methods to round out the picture.

The workshops were held over three days in Dunedin, in early February 2010. The weather on each of the days was sunny with light winds and a temperature rising to a peak of around 25 degrees Celsius.

Participants were identified through the survey, and asked to commit an hour of their time. They had the option of attending individually, or in small groups of up to three people. There were 15 participants in the workshops, 13 of whom also completed our survey. Their survey responses were compared with the responses of the entire survey group and they were deemed to make up a good representative group. The participants in the practical cycling workshops formed a representative group of the survey respondents in terms of demographics, proportions of current riders and non-riders, and the range of perceptions of bicycle and cyclist images.

Roles were assigned within the research group so each person had a clear purpose visible to the participant; ie lead interviewer, note taker and photographer. The interviews were conducted in an informal and relaxed manner without an audience, with the aim of giving the participant greater ease and allowing a good flow of thoughts, opinions and insights.

Most of the 60 minutes was spent at the workshop base, where participants were led through a series of simple tasks. They were also asked to undertake a short (10-minute) bicycle ride on a carefully selected route. Participants were not required to have any knowledge or experience of bicycles to participate.

5.1 Workshop process

The following process was followed for each of the workshop participants:

- Each participant was given time to investigate the selection of bicycles, form and explain their opinion about each bike (prior to test riding), and then given the opportunity to choose a favourite and a least favourite based on initial impressions alone.
- The favourite and least favourite bicycles were recorded by the participant on 'perception sheets'.
- The participants were given the task of riding a short distance (a 2.3km loop) to a local dairy to collect half a dozen eggs, two litres of milk and a newspaper. They returned via a small, easy graded hill (the cumulative ascent for the ride was 25m).
- Following the description of their task, the participants were given the opportunity of changing their choice of bicycle. They were also offered a selection of accessories: cycling helmets, clothing and bags or backpacks to use on their trip if they chose to do so.
- They were observed while preparing for and during their ride.
- On returning from the ride, the participant was questioned on their opinion of the bike, and prompted to give their thoughts on various aspects of their experience.

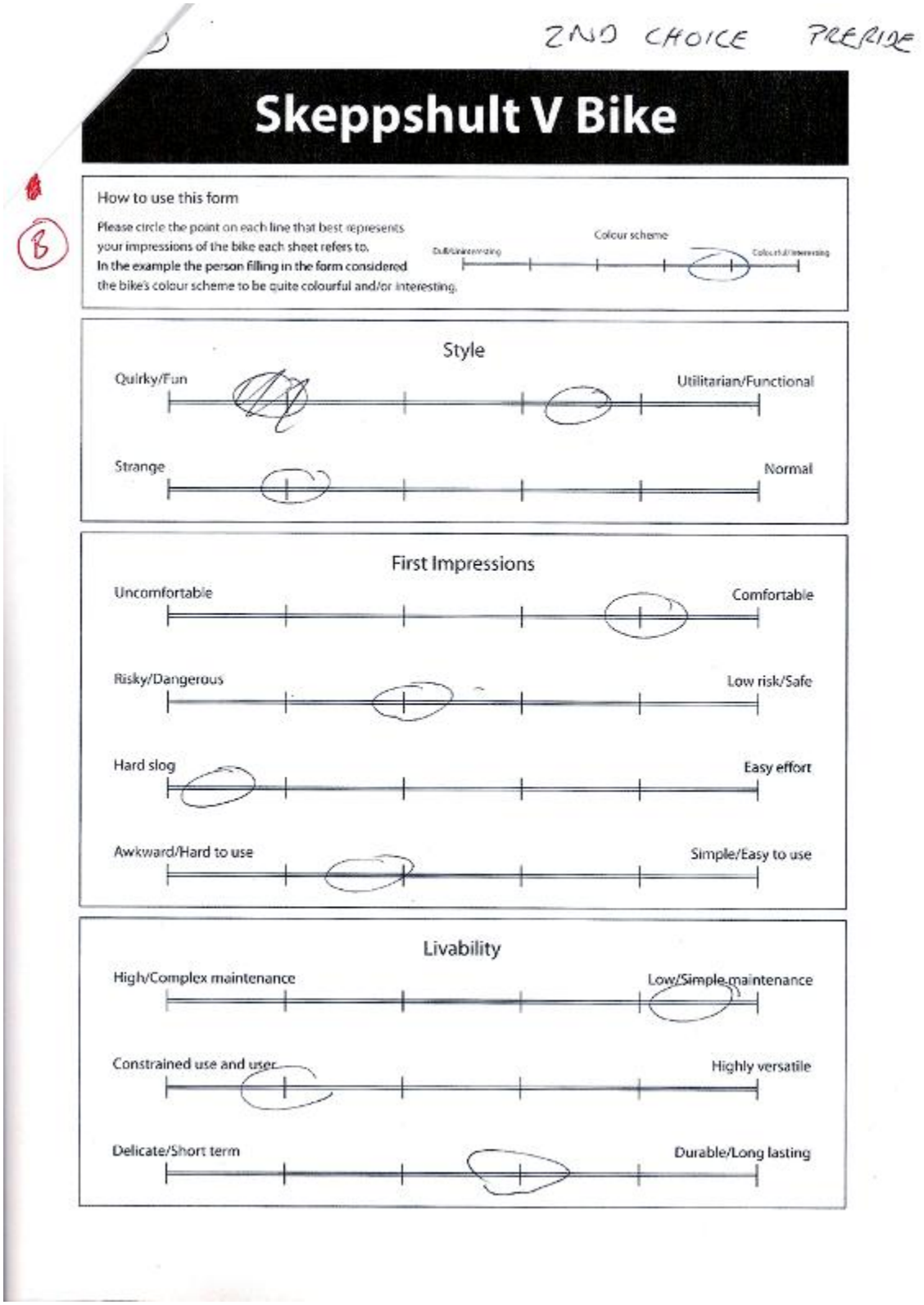
- The participant was then asked if they would change/add/remove anything from the bike, or choose a different one altogether.
- The participant was then asked to revisit the 'perception sheet' for the bike they used, and the results were compared for any change in perception.

Each participant had a different cycling experience and the format of the observation and questioning varied as a result.

Figure 5.1 A sample of participants with their chosen bikes, just prior to their practical ride

Figure 5.2 Map of the route as supplied to participants

Figure 5.3 Sample 'perception sheet' as filled out during the workshop



5.2 Workshop outcomes

5.2.1 Summary of bicycle impressions

The observations made and responses offered by the participants can be summarised as a series of general impressions of the bicycles. These can be analyses by key design features (independent of bicycle type) and for each bicycle in isolation.

By key features:

- **Derailleur gears** were equated by many participants to mean the bike would be good for hill climbing. This was especially so with bicycles with triple chain rings.
- **Hub gears** were generally not noticed by people. They often assumed that the bicycle had only one gear. Once the hub gears were pointed out to the participant and their function was explained, they were often seen as low maintenance but the conclusion that the bike would be well suited for climbing hills was never made.
- **Baskets, boxes, chain guards, mudguards** and **stands** were all seen as positive additions to practical bicycles and were often on the list when people were asked 'what would you change about this bike?' Exceptions to this rule were if any of the above caused rattles (annoying), or had plastic parts (perceived as being likely to break).
- **Skinny or narrow tires** were associated with speed, racing and lycra, and were highlighted as being uncomfortable.
- **Wide tires** were associated with comfort.
- The **leather Brooks sprung saddle** on the Pashley Paramount was mostly perceived as uncomfortable until the bike was ridden, at which point all riders but one said it was comfortable (the latter thought it would become more comfortable with time).
- **Thick padded seats** were commonly perceived as comfortable. However, participants who rode on them said the seat was uncomfortable.
- **Thinly padded, narrow seats** were generally perceived as designed for racing. There were split views on how comfortable they would be, with the recreational cyclists believing they would be comfortable and the others believing the opposite.

By bike:

The notes in italics are the core of common statements about each bike.

Pashley Paramount (figure 5.4)

- *Suited to town, city, and flat areas*
- *Short, non-urgent trips: leisure and practical*
- *Shopping*
- *Heavy (no good for carrying up stairs)*
- *Old or old fashioned*
- *Not recreational*
- *Beautiful*
- *Brakes and gears (both Sturmey Archer) poor quality.*

This bicycle was generally well liked and admired, although it was not often chosen or seemed to be chosen for its novelty value. It was seen as one of the most specialist bikes as its configuration and components seemed to dictate that it would only be used on the flat for practical, non-urgent, non-recreational use. The Pashley was seen as being heavy but those that rode it generally remarked that they didn't notice the weight as much as they imagined they would and enjoyed the ride. The brakes were criticised for being soft and the hub gearing for being imprecise. The lack of a kickstand was seen as a strange omission for a practical bicycle.

Configuration: Seven-speed hub gear bike with fully rigid steel frame, mudguards, chainguard, rack and basket mounted on the handlebars (front basket not pictured in figure 5.4).

Availability in New Zealand: Difficult to source and not found in the vast majority of cycle shops.

Visibility in New Zealand: Very rare.

Figure 5.4 Practical cycling workshop bicycle: Pashley Paramount

Skeppshult V Bike (figure 5.5)

- *Suited to town, city, and flat areas*
- *Short trips*
- *For nerdy/Asian/Japanese/elderly riders.*
- *Not recreational*
- *Nice seat*
- *Coaster brake 'strange'.*

The V-bike was generally, like the Pashley, seen as a specialist town bicycle suited to the flat with a good load carrying ability. It was seen as strange to a greater degree than the Pashley. The small wheels, coaster brake and noise caused by the carry box (booming and rattle) were not well accepted. It did, however, have a definite cool factor for a few of the participants.

Configuration: Low stand-over three-speed with fully rigid steel frame and integrated front and rear carriers (front carrier not pictured in figure 4.71), lockable carry box on rear (not pictured in figure 5.5), mudguards, chainguard, and kickstand. (Note, there was no basket fitted to the test bicycle).

Availability in New Zealand: Difficult to source and not found in any known cycle shops. Imported from Australia.

Visibility in New Zealand: Very rare.

Figure 5.5 Practical cycling workshop bicycle: Skeppshult V-bike.

Strida 3.1 (figure 5.6)

- *Odd*
- *Suited to mixed mode commute*
- *Not safe*
- *Toy*
- *Easily broken.*

Unanimously accepted as strange, the Strida was difficult to comprehend for a number of participants and not seen as useful or practical for others. One did see a use for it in multi-modal commuting but none were keen to ride it on a regular basis. Several participants took the Strida for a very short ride out of curiosity.

Configuration: Single-speed, belt-driven folding bike with fully rigid aluminium frame, mudguards and integrated carrier.

Availability in New Zealand: Difficult to source and not found in any known cycle shops. However, other folding bicycles can be found in a few cycle shops in New Zealand.

Visibility in New Zealand: Extremely rare. Some visibility of other small-wheeled folding bikes.

Figure 5.6 Practical cycling workshop bicycle: Strida 3.1

GT Gutterball (figure 5.7)

- *Simple*
- *Fun*
- *Bombproof*
- *Cool.*

The GT was very well accepted as a 'cool' bike and it drew positive comments for its simple aesthetics. However, it was often disregarded when it came to choosing a bike for a practical trip. It was criticised for its lack of gears and perceived as fun and very low maintenance, but uncomfortable and not a sensible choice. Those that did ride it reported enjoying the ride.

Configuration: Single-speed or fixed gear with fully rigid aluminium frame.

Availability in New Zealand: Easy to source and found in a number of cycle shops. GT is a well known, common brand in New Zealand

Visibility in New Zealand: Not common, but this type of fixed gear bike is currently very fashionable.

Figure 5.7 Practical cycling workshop bicycle: GT Gutterball.

Giant Transend City (figure 5.8)

- *Light*
- *A modern Pashley*
- *Comfortable*
- *Not challenging, normal.*

The Giant Transend was generally seen as a practical, logical choice: a lighter, more modern version of the Pashley. It didn't however, seem to stir many emotions and very few participants were actually interested in it.

Configuration: Eight-speed hub-gear bike with fully rigid aluminium frame, mudguards, chainguard, rear rack with bungee straps and a kickstand.

Availability in New Zealand: Easy to source and found in a number of cycle shops. Giant is a well known and common brand in New Zealand.

Visibility in New Zealand: This type of bike is reasonably common.

Figure 5.8 Practical cycling workshop bicycle: Giant Transend City

Specialized Sirrus (figure 5.9)

- *Racing*
- *Light*
- *Smooth*
- *Not comfortable*
- *Expensive.*

The Sirrus was generally perceived as fast, light and smooth, but not comfortable and not well suited to practical use due to the skinny tires and lack of carriers, baskets and kickstand.

Configuration: 24-speed fitness bike with fully rigid aluminium frame.

Availability in New Zealand: Easy to source and found in nearly all cycle shops. Specialized is a well-known and common brand in New Zealand.

Visibility in New Zealand: Very common, this type of configuration is produced by most bicycle brands.

Figure 5.9 Practical cycling workshop bicycle: Specialized Sirrus.

Specialized Hardrock (figure 5.10)

- *Hardly mentioned*
- *Normal, common*
- *Good for hills*
- *Better suited to off-road or mountain biking.*

The Hardrock received little mention or attention from most participants; reasons given were either because it was a very familiar and accepted style or it was seen as cheap and nasty. Most did not see it as a good choice for practical cycling due to the lack of load carrying ability, but did see it as comfortable and well suited to town riding. Like the Giant, however, it generated little emotion. Unlike the Giant, however, if there was an emotional response it was negative.

Configuration: 21-speed mountain bike with aluminium frame and front suspension.

Availability in New Zealand: Easy to source and found in nearly all cycle shops. Specialized is a well-known and common brand in New Zealand.

Visibility in New Zealand: Very common, this type of configuration is produced by all big brands.

Figure 5.10 Practical cycling workshop bicycle: Specialized Hardrock

5.2.2 Summary of ride impressions

5.2.2.1 The practical cycling workshop ride

The chosen route for the workshop was necessarily simple and mostly on quiet roads, in part to manage risk to the participants. While some aspects of their chosen bicycle disappointed some participants, and some were nervous prior to the ride (due to safety and inexperience issues), all reported enjoying the ride and all returned smiling.

A number of participants with little previous cycling experience, or who did not ride regularly were concerned about the hill on the return route. The total cumulative ascent for the ride was only 25m. None of these participants raised any issues with the hill on their return, some reporting the ride was 'better than expected'. Those who rode regularly or recreationally reported the route as 'flat', 'simple' and 'easy'.

One rider in particular, who had not ridden for a number of years due to nervousness, commented that riding around the course had helped her in 'trusting myself and realising I can do it'.

5.2.2.2 What would stop you riding?

When asked, at the end of the workshop, what would still potentially stop them riding for short practical trips, the responses were similar to those in the survey data and literature: helmets, safety, weather, lack of or bad bike lanes, hills, and cars and buses seen as easier and quicker (these are presented in no particular order).

From the post-ride workshop comments, we can see that the perceived hill on the route was no longer an issue after it had been ridden.

5.2.2.3 What accessibility options might encourage you to use a bicycle?

After their experience of the practical ride, participants were asked which (if any) of the following ways of owning or accessing a bicycle would encourage them to ride for short practical trips:

- **Outright purchase**. Many participants were comfortable with this idea but there were concerns about theft, storage (apartment dweller) and maintenance.
- **Workplace bicycles**. Over half of the participants had workplace bicycles available on their site. Most had not tried them and a number said they were disappointed that the bicycles were poorly maintained (note these comments referred to one particular place). One other participant had a positive experience of workplace bicycles and two others thought that it was a good idea, but one said only if she could be guaranteed use of a bike in her size (small).
- **Bicycle library/public bicycles.** This was often seen as the same thing and seen as a good idea as long as the bicycles were available in all sizes and all places.

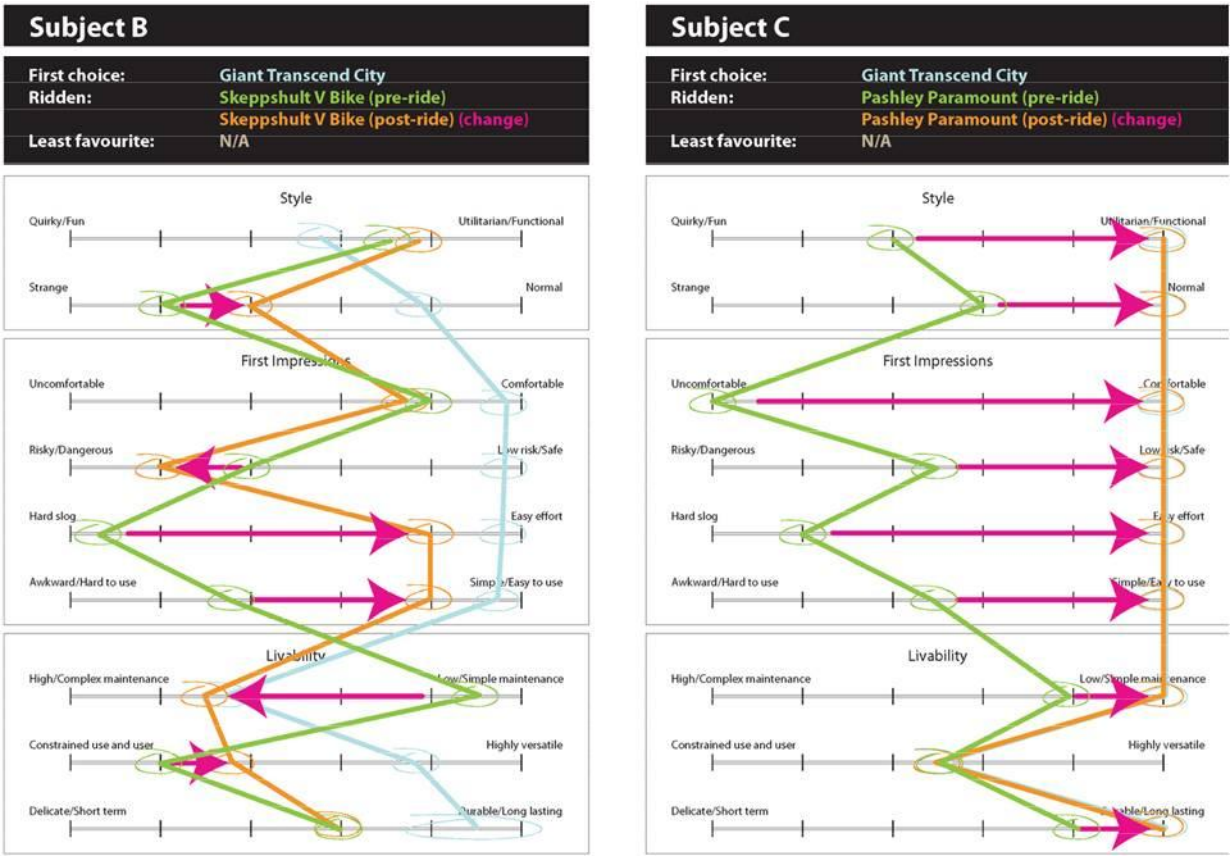
- **Subsidies or loans for purchase.** This was considered to be a good idea with no downsides offered. Some participants had friends who had taken advantage of the UK's Cycle2Work subsidy scheme.

5.2.3 Summary of perception data

5.2.3.1 Perception sheets

Participants' perceptions of the bicycles were collected before and after their practical ride using pre-printed sheets (an example is shown in figure 5.3). This style of sheet is used to map out product characteristics and qualities on a continuous scale (continuum). The participant is instructed to make any mark they feel appropriate, ranging from a simple 'X' to an oval covering the entire continuum scale. Normally, for a well resolved product and a unified target audience, the expected results would be for a narrow line (or cluster of lines) for a single product, and a cluster of lines that is wider in some areas for a group or range of products. The participants were asked to complete sheets for their initial choice of least favourite bicycle, and the bicycle chosen for the short practical ride (this was scored before and after the ride). Examples of the collated results for two of the participants are shown in figure 5.11.

Figure 5.11 Two examples of perception sheets, with results collated for a single participant, showing opinion of the least favourite bicycle and changes between pre and post-ride for the favourite (and ridden) bicycle



An analysis of the shape of the line clusters from the workshops suggests that:

1 The group of participants viewing the bicycles have widely differing perspectives, and/or

2 The bicycles themselves do not offer a clear communication of purpose or intent, and/or

3 The criteria that we asked participants to use to judge the bicycles were not ideally worded.

We believe [1] and [2] to be the key reasons although there were some responses that suggested our wording did not always work for the participants. For example some wanted to say the bike was 'fun' (part of the 'quirky/functional' end of the continuum) and 'functional' (from the 'functional/utilitarian' end of the continuum). These responses were interpreted as an averaged response in the centre of the continuum.

5.2.3.2 Perceptions change through experience

The perceptions recorded for the bicycles before and after the short ride have been analysed and summarised. Figure 5.12 shows the negative and positive changes of opinion for all participants, and an average of the negative and positive changes. By comparing pre- and post-ride responses, it is evident that:

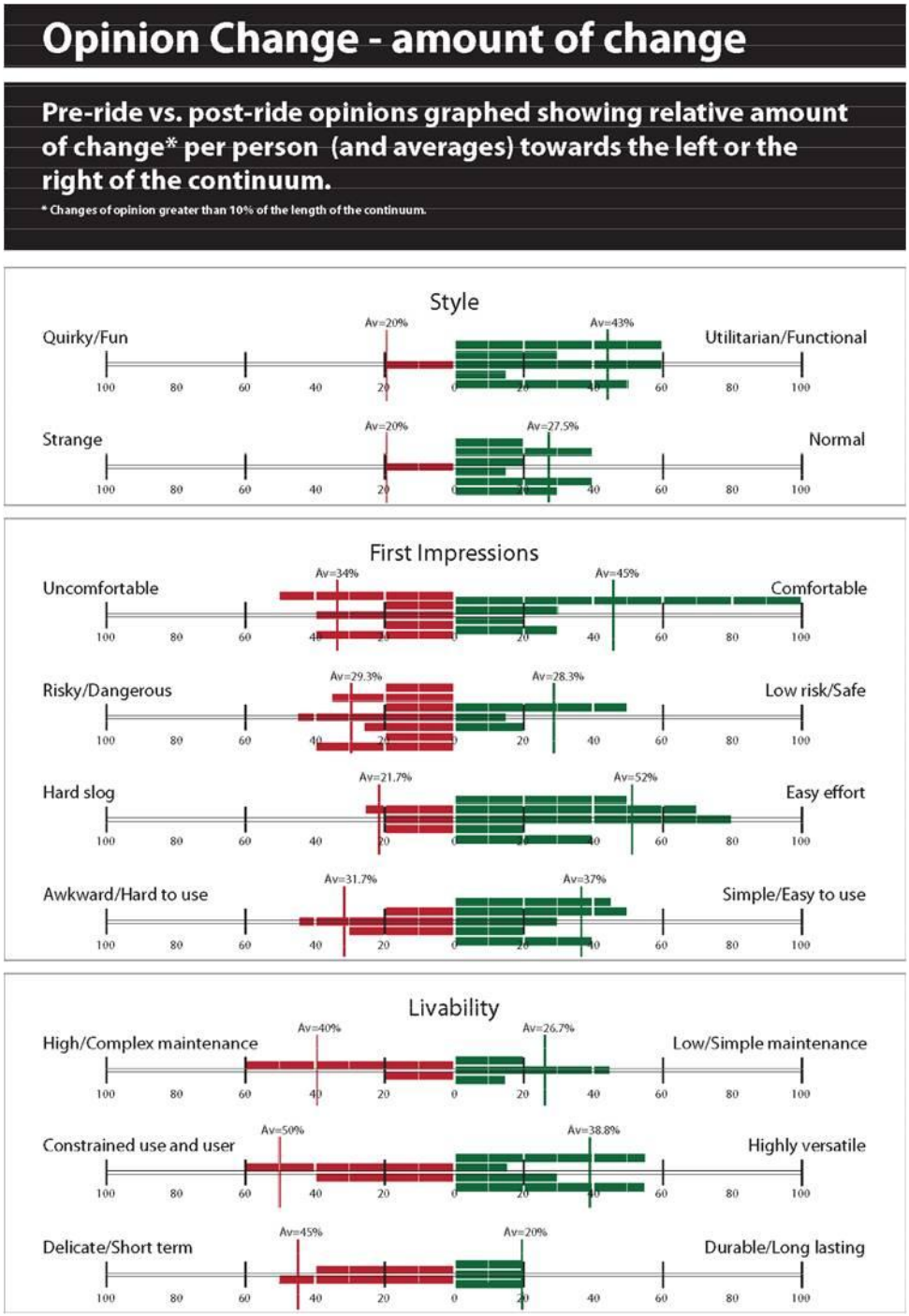
- participants' experiences on the ride affected their perception of the bicycles
- most perception changes resulting from the ride were positive.

This suggests that there could be clear benefits in non-riders gaining real experience riding bicycles. Notable positive perception changes were:

- Most people perceived the bicycle they had ridden to be **more functional** and **more normal** after their ride. They also felt it took **less effort** to ride, was **easier to use**, and **more versatile** than they had anticipated.
- The continuums measuring safety and comfort saw perception change to be more negative. In both cases, more participants shifted their perception to the left (more risky/dangerous and more uncomfortable). However, for comfort, the average amount of perception change to the negative was less than the average perception change to the positive (34% negative, 45% positive). For safety the amount of change was approximately the same. This is shown in figure 5.12.

Both of these shifts could reflect the limited time available for the participants to become familiar with the bicycle and the potential for poor fit (due to there being only one size available of each bicycle type) leading to both discomfort and a less than optimum riding experience. This would need to be taken into consideration when providing a first practical cycling experience for non-riders.

Figure 5.12 Pre-ride versus post-ride opinion change



5.2.3.3 Bicycle choices

Generally, the impressions of all bicycles chosen by the subjects tended to the right-hand, positive side of the continuums. It does make sense that people would choose to ride bicycles they viewed positively. However, after being told they would be undertaking a short, practical trip, most people altered their choice and the general cluster of perceptions on the continuums grew wider, tending more to the left (negative) compared with their first choices – for some reason some of the people now chose bikes they had originally viewed less favourably. On closer inspection though, it seems people were generally choosing bikes they saw as more comfortable, less normal and slightly more constrained in their use. It is

likely they were using their knowledge and making assumptions about the required task, and looking for a bike that was more specialised. Participants' comments noted during the workshops suggest this was the case. It is quite possible that the fact they were attending a 'practical cycling workshop' and being asked to perform a practical cycling task guided them to choose what they saw as a more appropriate bicycle. This type of bias does suggest, however, that given choice and availability, people can identify and choose appropriate, city-specific bicycles when the need arises.

Of those participants who chose a different bicycle when their cycling task was explained all but one changed to a more or equally specialised, city-specific, practical bicycle. Two moved from the Giant Transend City to the equally well suited Pashley or Skeppshult. A summary of the bicycle choices and changes made is shown in table 5.1.

Table 5.1 Bicycle choices made before and after the participant received information about the practical cycling task

Original bicycle chosen (before ride information received)	New bicycle chosen (after ride information received)	Number of participants	Notes
GT Gutterball	Pashley Paramount	2	1 changed back to Gutterball
GT Gutterball	Specialized Sirrus	1	
Giant Transend City	Skeppshult V Bike	1	
Giant Transend City	Pashley Paramount	1	
Giant Transend City	N/A	2	No change
Specialized Hardrock	Giant Transend City	2	
Specialized Hardrock	N/A	1	No change
Specialized Sirrus	Pashley Paramount	1	
Pashley Paramount	GT Gutterball	1	Changed back to Paramount
Skeppshult V Bike	GT Gutterball	1	Changed back to V Bike
Skeppshult V Bike	N/A	2	No change

Of the five participants who did not change their minds only one stayed with a bike not designed specifically for city use (Specialized Hardrock). The results from the perception sheets suggested that this participant was not thinking as critically as others, as the Hardrock received a near perfect score before the ride and a perfect score after the ride (perfect scores are very rare on this sort of perception test).

5.2.3.4 Workshop analysis conclusions

When presented with a range of bikes from the common to very unusual (in New Zealand) it was observed that, while the workshop participants misread a number of design feature cues, they could make smart choices when selecting bicycles for practical urban use. An example of this was interpreting bicycles equipped with multiple hub gears as single-speed bicycles. Some logic leaps were also misplaced, such as reading 21- or 24-speed derailleur gears as better for hill climbing despite the 7- or 8-speed gearing offered covering a similar range. These two examples are likely to have been caused by unfamiliarity with the intricacies of hub-gear systems, and would be typical of most inexperienced non-cyclists. For many of the participants, this was the first time they had seen these types of practical urban bicycles. Without the choice of these bicycles, they would have necessarily defaulted to the more commonly available types (the mountain and fitness bicycles). Compromises in the functional design of these bicycles for long-term practical use lead us to conclude that this could result in a less than optimal continuing practical cycling experience.

The workshop exercise, and in particular the extent to which participants changed their choice of bicycle after a short ride, highlighted the difference between perceived and actual performance of the bicycles. A new or inexperienced cyclist may be attracted to a particular bicycle through preconceptions of functionality, opinion formed through observation of other cyclists, or because of a satisfying aesthetic. Their choice of bicycle may have little relationship to the short or long-term function for short practical trips, and some choices of bicycle may have a strong negative effect on the longer-term desire to cycle, once a few trips are undertaken and the experience of the rider increases. It is reasonable, then, to suggest that the perceptions of the new rider must be balanced with the advice of experienced riders, but not so that the underlying appeal of the bicycle is removed. This may manifest as, for example, adapting the riding position, including a hub gear, and adding wider tyres to a fixie (see figure 3.12), to maintain the aesthetic appeal that encourages the new rider, but ensure longer-term functionality and a more durable experience.

Participants had a good understanding of what accessories to add to make any bicycle more useful for regular practical trips and all were happy cycling in regular clothing (although two felt the need to wear high-visibility safety vests).

Finally, it seems that getting people to ride in a controlled environment can have a positive effect on their perceptions of cycling. This strongly suggests that the experience of cycling is essential for improving attitudes to it, and practical short-trip cycling should be encouraged.

6 Design model

6.1 Introduction

The research conducted throughout this project offers a clear indication that practical cycling is part of a complex system, and any proposal with the aim of encouraging more practical cycling must be developed with a systems approach.

A system is a dynamic and complex whole, interacting as a structured functional unit. Systems thinking is an approach to problem solving that views 'problems' as parts of an overall system, rather than reacting to specific outcomes or events and potentially contributing to further development of unintended consequences. Systems thinking is based on the belief that individual parts of a system can best be understood through their relationships with each other and with other systems, rather than in isolation. Systems thinking focuses on cyclical rather than linear cause and effect.

The system of practical cycling includes products, services, facilities and the environment. The design of one element of this system will interact with many others, and if these interactions aren't considered there may be unwanted consequences. This approach, applied to practical cycling is suggested in a document aimed at transport and urban planning decision-makers and available from the Ministry of Transport website (MoT 2008b). The authors conclude the guidelines with:

> No one initiative undertaken on its own is likely to increase the numbers of people walking and cycling in our towns and cities. Rather, a shared commitment at the national, regional and local level is required that:
>
> - puts designing for liveability in our urban areas at the forefront of encouraging walking and cycling
> - integrates walking and cycling into regional and local transport planning
> - has a comprehensive range of specific initiatives to encourage walking and cycling that are self-reinforcing, integrated and designed specifically for local conditions.

This clearly reflects several of the principles that underpin the research presented here: that no single initiative will sustainably encourage more cycling, that initiatives beyond those that directly impact on cycling numbers must be included, and that the mix of initiatives must be designed to be integrated and to suit local conditions.

The design methodology chosen for this research is that of affective design. This places the user (the cyclist) at the centre of the complex system and considers a multi-dimensional aspect where the system not only extends to other products, services, facilities and the environment, but to a hidden system of identity, values, aspirations and expectations. Affective design uses the three distinct criteria phases of *desirability*, *experience* and *appreciation,* as explained in section 1.1.

The affective design methodology also focuses on aspiration. Cycling campaigners have often dwelled on the objections to cycling and attempted to overcome these barriers. The learning from successful product design is to understand these barriers and attempt to minimise them, and to ensure the product is desirable enough to make the barriers seem less important. If a bicycle trip is fun and stimulating, providing the rider with increased self-worth and social standing, then who cares about a little helmet hair?

The originally proposed research question wanted to discover who the 'next 1%' of cyclists would be, and consider how specific products and services could be designed to suit. The research offered a deeper understanding of the problem, and the assertion that there is not a particular 'next 1%' group with common characteristics – there are potentially many different 'next 1%' groups. Maybe the only thing in common is a readiness to try a bicycle ride in place of another travel mode. Why this readiness exists does not matter, only that it does exist and can be exploited. There are two psycho-social models, presented in section 2.4, that assist in understanding this and they are diffusion of innovations and contemplation of change.

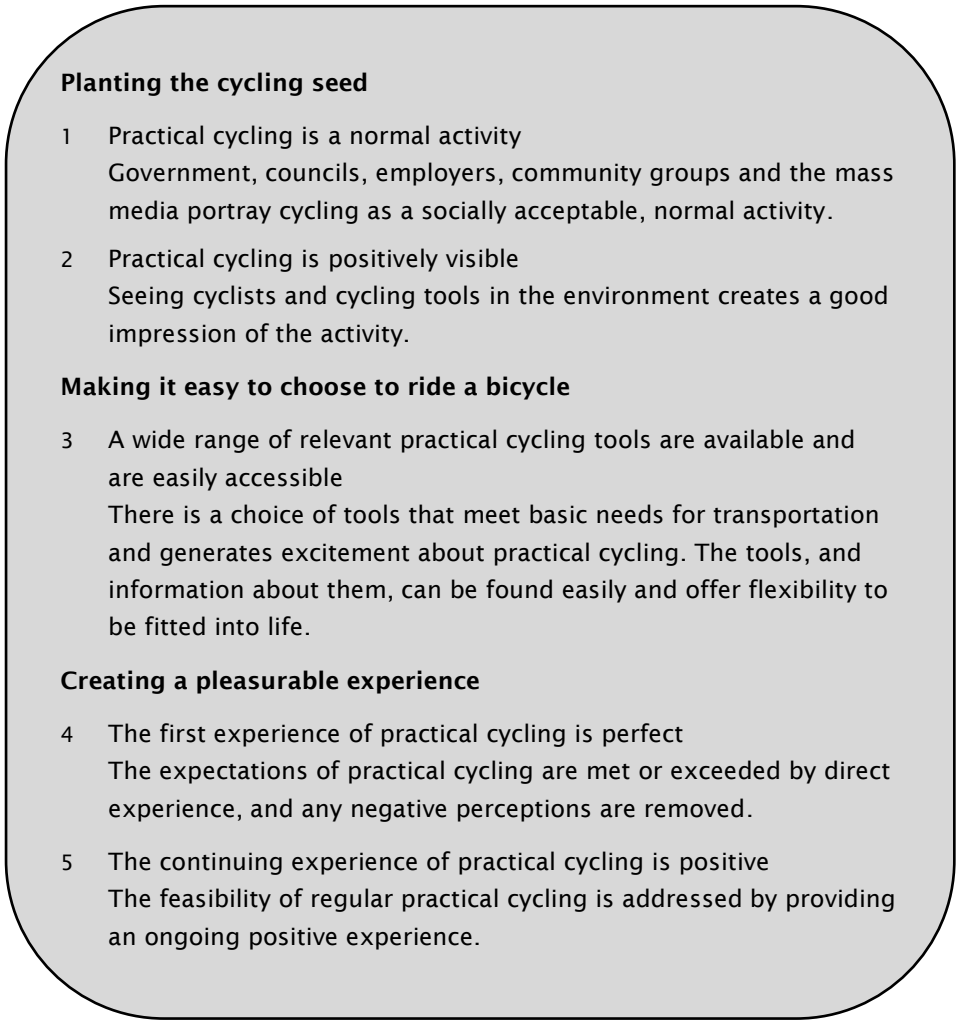
Diffusion of innovations refers to the speed and completeness of uptake of an innovation within a population. Practical cycling, clearly an existing idea, can be considered innovative within New Zealand, where the uptake has been less than 10% for nearly a generation of Kiwis and now stands at less than 2.5% of all trips. The focus of the model, in the early stages of diffusion, is on the innovators and early adopters. These groups usually account for around 2% and 13.5% of the population respectively. The key group for the diffusion of practical cycling is the early adopters. These are the Jones' – the trend setters. They tend to be socially aware and have a strong self image, acting as leaders amongst their peers. These will be the next people to take up practical cycling, if it is to expand in New Zealand, and they expect an aspirational 'product' with a high perceived superiority compared with existing practice, and a compatibility with their existing social system. Note: the innovators, although the first to adopt an innovation, are usually seen as removed from mainstream society, venturesome and experimental. They are less likely to act as peer leaders.

This leads into the contemplation of change model, which asserts that an individual passes through several discrete stages of contemplation when making fundamental changes away from personal norms. The key stages for practical cycling are those of contemplation, readiness for action, and action. These describe the movement from the readiness to consider another travel mode through to the aftermath of the initial cycling experience, which is a cyclical, rather than a linear, process. The model suggests that a series of targeted actions are required to move a person through these stages, and a focus on actions within one of the stages will not be successful.

Based on the research presented, a multi-level design model aimed at encouraging practical cycling in New Zealand is proposed. The model contains a number of criteria that must be balanced in any system-wide attempt to encourage cycling, and any single solution implemented within the wider system should be measured against these criteria. If the suite of solutions contained within the system only satisfies one or two of the criteria, there is a lower chance of encouraging more long-term practical cycling.

6.2 Practical cycling system model

Figure 6.1 Summary of the practical cycling system model



6.2.1 Planting the cycling seed

These criteria consider the awareness and positive impression of cycling, aiming to make practical cycling a viable choice of transport for normal people for short trips. They relate to the desirability criteria of the affective design methodology and link to the longer-term appreciation of cycling, the appeal of cycling to the early adopters of an innovation, and the movement of people to the contemplation stage of change for practical cycling.

6.2.1.1 Criteria 1. Practical cycling is a normal activity

Practical cycling is a minority activity within cycling and transportation in New Zealand, and is therefore not widely visible. It is considered not to have a high social status, to be risky, and not convenient as car use.

To encourage practical cycling, it must be positioned as a desirable transport option and seen as a potential choice for normal people. Within New Zealand, practical cycling promotion usually attempts to 'sell' cycling by dispelling quoted barriers or by promoting its fundamental benefits, such as financial savings. This approach does not address the reasons why people choose to drive, and does not explore

the deeper aspirations of potential cyclists. The language and approach taken to promote cycling can be detrimental and reinforce the opinion that cycling is strange. The overwhelming response to cycling by non-cyclists is that it is not safe. This is hardly surprising given the focus on safety by many whose goal is cycling promotion (figure 6.2).

Figure 6.2 Example of safety-focused cycling promotion in New Zealand

The promotion of practical cycling must aim to create a positive background awareness of cycling. The underlying attitude to cycling can be influenced by communications from government, councils, community organisations, businesses/employers, product and service providers, and the mass media. In this respect, these organisations must develop awareness that practical bicycling is part of normal life, offering strong psychological benefits and an aspirational social status. This *positive and normal* message relates to government and council policies and communications, either directly related to cycling or indirectly (such as transportation and urban design), the behaviour and language of cycling advocates and community groups, and the portrayal of cycling in mass media channels. Some of these aspects can be directly controlled by some stakeholders (for example policy, and advocate and product/service provider behaviour), while others must be understood and indirectly influenced (for example community group behaviour and mass media). The critical element is to recognise that impersonal mass communication can positively affect the underlying awareness of and attitude towards cycling, which is an essential first step in the decision-making process.

6.2.1.2 Criteria 2. Practical cycling is positively visible

Members of a community usually have an impersonal relationship with council policy and mass media and promotions, whereas most people living and working in an urban area see cyclists and cycling facilities on most days. When asked, people can nearly always recall seeing cyclists and are likely to form an opinion

based on their observations. Given the personal nature of the decision-making process, it is reasonable to expect that direct visibility of cycling will have a powerful effect on an individual's attitude towards cycling. While it is impossible to understand how different people might perceive cycling and interpret their observations, we can attempt to create a net positive visibility of cycling, where as many directly observable aspects of practical cycling as possible are easy to view positively.

For a non-cyclist, the decision to use a bicycle on a short trip is made with little or no recent experience of cycling to refer to. Perceptions of cycling will be based primarily on observation and indirect experience. The individual must perceive cycling as being somewhat more attractive than their current behaviour (ie driving). If not, there is no reason to change.

The observation of cycling and cyclists must confirm that the activity can fit into the person's current lifestyle (ie essential functional needs are met), that it is linked positively to aspirations (would align to an individual's personal identity, cultural and social values), and that it offers strong self-representation to peers and wider society.

The direct visible experience of cycling includes the image and behaviour of cyclists. This is difficult to affect directly, but positive behaviour of cyclists may be encouraged (through, for example, urban design that understands and prioritises cycling). More controllable aspects are the visibility of practical bicycle equipment (such as public or workplace bicycles) and the positioning and type of services and facilities available (for example visible, secure and conveniently sited bicycle stands).

6.2.2 Making it easy to choose to ride a bicycle

This relates to the ability of a person to gain direct experience of cycling. The criteria specifically consider the range of practical cycling tools available and how they are accessed, rather than the actual experience of using them: they are pre-cursors to the direct experience. They relate to the desirability criteria of the affective design methodology and link to the longer-term appreciation of cycling, the appeal of cycling to the early adopters of an innovation, and the contemplation of change stage where a potential cyclist may be researching how to make the step into cycling experience. The two areas are fundamentally linked: choice of practical cycling tools is only useful if they are readily accessible.

6.2.2.1 Criteria 3. A wide range of relevant practical cycling tools are available and are easily accessible

The potential cyclist contemplating a change of travel mode must gather information about their new practical cycling activity. A significant goal is to create confidence that cycling can fit into their current lifestyle. In addition, they will have some perceived barriers developed from societal attitudes and their own observation of the activity. Clearly, cycling must have some appeal to the individual, and this must be relevant to their personality and self-representation.

Cycling needs to present itself as both functional and aspirational. Practical cycling products, services and facilities must be easily available and accessed by a non-rider (which includes access to knowledge about them). Customisation of the tools is essential, both on a large scale to allow the solution to fit into an individual lifestyle, and on a smaller scale to allow the expression of individual personality and values.

Choice

The potential cyclist must be able to create a customised functional solution to match the transport needs they have identified. For example, do they purchase a bicycle or can they rent one, and is there somewhere secure to leave the bicycle at their planned destination? There is no single practical cycling tool that would satisfy the diverse needs of all potential cyclists. However, by offering a wide choice of relevant functional solutions, practical cycling solutions can be created to suit each individual.

The travel mode decision is influenced by how we define ourselves and how we want to be perceived by others. The choice of transport mode itself may be seen as defining. It is important to establish the statement to cycle as positive and aspirational (rather than strange and belittling). The transport mode itself can also be further customised. If we drive, we might choose the colour of our car, make visual modifications and even place a flower in a dashboard-mounted vase. This individualisation allows us to express our individual personality and values. For a practical cyclist the options for customisation could include the type of bicycle, its colour and the accessories used, or the style of clothing worn. Offering a wide variety of choice of cycling tools, aligned to the needs of the market, is essential to allow a potential cyclist to find a functional solution that makes practical cycling attractive to them for short trips. These tools must be customisable to allow the cyclist to personalise their individual cycling environment and control the external image they project of themselves.

Access

A practical cycling tool only becomes a viable option if it is easily accessible to the potential cyclist. Access to practical cycling tools should be convenient, and inclusive for individuals who do not currently ride a bicycle, or who have limited experience of the activity. Accessibility includes not only the physical, but the access to information allowing the individual to increase their knowledge. In New Zealand, with its strong recreational market, the local bicycle store is a logical destination to obtain physical products and services and gain further information about them. The experience of a local bicycle store should be as satisfying for inexperienced practical cyclists as it is for enthusiast recreational cyclists. Alternatively, new retail channels may respond better to the needs of an inexperienced practical cyclist. Access to the wider system of practical cycling, the location and capacity of bicycle parking and their integration with desirable cycle routes might be considered, alongside the channels used to disseminate this information to cyclists.

6.2.3 Creating a pleasurable cycling experience

The final two criteria relate to actually riding a bicycle and cover two distinctly separate experiences. The first experience for a new practical cyclist is the point where the positive perceptions and expectations of cycling become real. This may be a short recreational ride, but in a practical cycling environment. This relates to the experience criteria of the affective design methodology, it is critical to the peer leadership of the early adopters, and it describes the action stage of the contemplation of change model. Provided the initial experience encourages more riding, the ongoing experience is the continuing use of practical cycling. This is equivalent to the maintenance stage of the contemplation of change model.

6.2.3.1 Criteria 4. The first experience of practical cycling is perfect

The first experience of practical cycling might come about after an extended decision-making process, or it might simply be an opportunistic bicycle ride. In either case, the individual will have underlying attitudes, pre-conceived perceptions and aspirations about the ride and practical cycling. The initial experience is the point where perceptions and expectations become real. The first ride must reinforce the positive perceptions and aspirations. A new or inexperienced cyclist is likely to have fragile confidence in the activity. Any negativity could quickly reverse their positive perceptions and prevent them continuing with cycling.

The aim is to create a perfect first ride, ideally using a practical cycling solution customised for the individual rider. However, this is not always possible and there are likely to be some aspects of the experience that do not meet expectations. In this case, the conclusion should be that the negatives can be overcome through different customisation of solutions and that cycling is worth continuing with. This links back to the choice and access of practical cycling tools, and implies a mechanism for feedback to this stage is desirable.

The first ride involves obtaining the selected practical cycling tools, the subjective assessment of the interaction with the tools, and the interaction with the environment during the experience. This will potentially have a significant effect on the individual's attitude to and aspirations for cycling. Many environmental factors are outside of the rider's direct control, such as weather and other traffic. However, these can be controlled to some extent, by designing the initial cycling experience and using tools such as journey planners.

The direct experience of practical cycling tools should be differentiated from *providing* choice and methods of access, which is measured more objectively and is not a function of the actual activity.

6.2.3.2 Criteria 5. The continuing experience of practical cycling is positive

The ongoing experience builds on a successful initial experience and refers to practical cycling forming part of a regular travel mode choice. This may apply to new cyclists who are moving on from their first ride or to more experienced cyclists (who are likely to cycle recreationally) for whom practical cycling has become appealing. It is important to recognise that success is not dependent on a person replacing all car trips with cycling, but is achieved when some short trips are made by bicycle on a regular basis.

Many of the considerations for the continuing experience are the same as for the first experience. Ongoing practical cycling must fit into an individual's lifestyle, match their personality, values and self-representation requirements, and maintain their aspiration to cycle. This requires the ability to customise the experience, but there is additional emphasis on maintaining the quality and durability. The practical cyclists may be exploring the travel mode after their initial ride or they may have once been regular practical cyclists who lapsed due to some part of the activity not meeting their continued expectations (for example their lifestyle may have changed). The longer-term experience requires flexible solutions to allow cycling to adapt to any lifestyle changes (such as family changes, a new job or a house move).

Unlike the initial ride, in which the new cyclist is highly sensitive to negative elements, the more experienced cyclist may be more tolerant. In fact, this must be expected as it is impossible to control all aspects of the cycling environment over an extended time period. There are, however, parts of the experience that can be influenced to a greater or lesser extent. It is essential that the tools available are suitable for longer-term use, and that the individual can easily include the opportunity to cycle within their daily activities (for example this could be a choice between bicycle ownership or convenient availability of workplace or public bicycles). There must be provision of services and facilities that make cycling convenient and easy for long-term use. Tools such as secure and covered bicycle parking, changing facilities and repair services may become significant when considering ongoing experience of practical cycling. In addition, there is an element of environmental control, where managing the urban environment and interactions with other transport users becomes important. However, the ongoing experience is also characterised by the cyclist exerting more control and making use of tools such as route planners and cycle training.

7 Conclusion

The practical cycling system model, presented in section 6, is drawn from the reviews of relevant literature and practical cycling solutions, an analysis of survey responses received and consideration of the workshop exercises conducted. The model is a conclusion to the research activity undertaken in this project. The initial research objectives implied that the focus would be on the design of specific products and services for the New Zealand practical cycling market. However, as the design methodology was followed it became clear that a focus on the design of isolated products and services was unlikely to have a significant effect on the goal of encouraging more practical cycling for short trips. As the research unveiled a deeper understanding of practical cycling in New Zealand, it became apparent that the focus needed to be more holistic and describe a complex, multi-layered system. The final discussion, concluding this research and offering opportunity for ongoing study, considers the potential implementation of the model.

7.1.1 System assessment

The practical cycling system model describes a complex multi-level system for the encouragement of practical cycling. This system contains a series of initiatives[11], each of which will affect the participation in practical cycling. The initiatives may relate directly to cycling (for example a public bicycle scheme) but must also include those that affect travel demand in the system, but do not refer directly to cycling (for example increased car parking prices or more infill housing). Each initiative can be assessed against the criteria, to determine which areas of the system are impacted, and each will have a unique set of strengths. However, it is the cumulative effect of all initiatives within the system that matters. While a picture of the system-wide impact can be built by summing the effect of each individual initiative, this overlooks the complex interactions between the initiatives. To understand the complete picture, an assessment that considers both the strengths of an individual initiative and the impact of the initiative on those already existing within the system is required.

One such approach to measuring system performance is the bicycle account. This is used in Copenhagen[12] and Melbourne[13] to measure the performance of the cycling system and progress towards the city cycling plans. The accounts usually form a cycling census of cyclist activity over a particular time period. Data is collected annually or biannually. Measurement includes surveys of cyclists, assessment of cycling infrastructure (such as total length of off-road cycleways) and data collected from cycle counts. The accounts are produced to be accessible to the public, and data presented is easy to understand and accompanied by promotional images. The bicycle account documents present relevant data and demonstrate cycling as an aspirational activity. Figures 7.1 and 7.2 show sample pages from the 2008 Copenhagen Bicycle Account document.

[11] These may be products, services, facilities, infrastructure, policies or social marketing activities that have potential to impact on the level of practical cycling in New Zealand. The effect on practical cycling may be either direct (such as a new type of bicycle or accessory available to the market, a workplace bicycle scheme or a legal requirement to wear a helmet) or indirect (such as a reduction in urban speed limits, policy for increased infill housing or apartment buildings, or the introduction of a public transport system).

[12] See www.kk.dk/sitecore/content/Subsites/CityOfCopenhagen/SubsiteFrontpage/CitizenInformation/CityAndTraffic/CityOfCyclists/Publications.aspx for more information

[13] See www.melbourne.vic.gov.au/ParksandActivities/WalkingCyclingandSkating/Pages/MelbourneBicycleAccount.aspx for more information

Figure 7.1 Sample page from the 2008 Copenhagen Bicycle Account showing cyclist perceptions

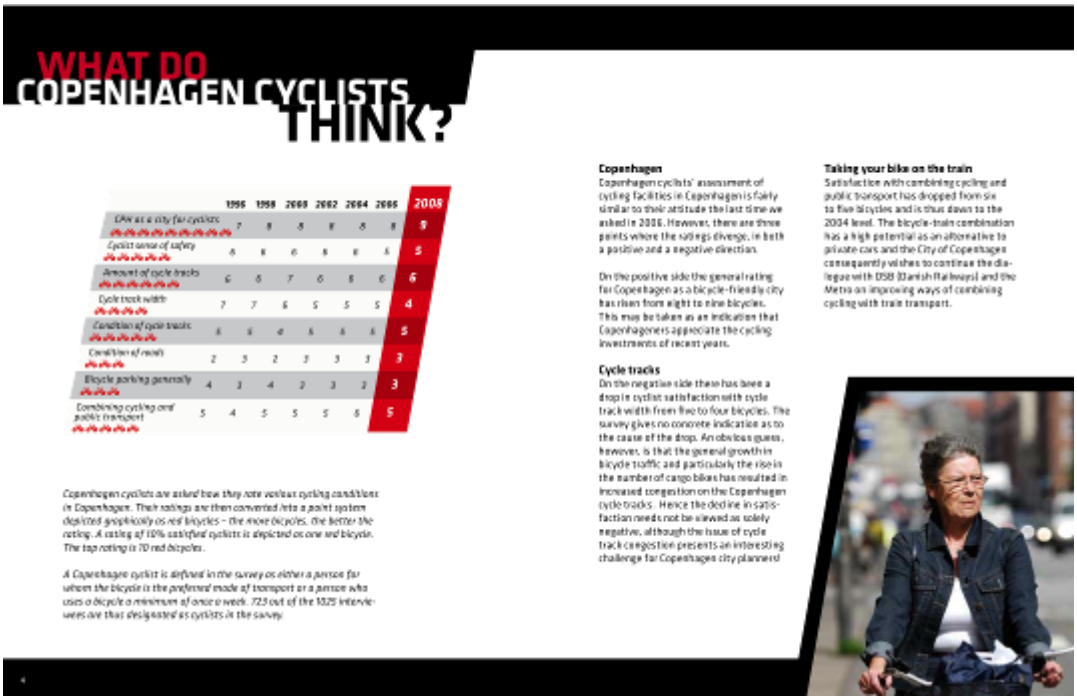


Figure 7.2 Sample page from the 2008 Copenhagen Bicycle Account showing safety data

This bicycle account approach is useful when measurement of individual initiatives is impossible due to budget limitations and meaningless due to complex system interactions. The practical cycling system model could use an adapted version of the bicycle account to measure the system performance. In order to describe the complete system performance, the measurement would refer to each of the five model criteria, extend to the perceptions of potential practical cyclists (such as current recreational cyclists, or workplace travel plan respondents), and describe the performance of selected individual initiatives.

Comparison between accounts can be related back to changes made to initiatives within the system between 'account' dates.

7.1.2 System goals

The initial goal for the model might be to create a balanced system where all criteria are equally served by initiatives. This would ensure there are no areas of weakness present and offer an opportunity for a self-supporting system of practical cycling to develop. However, the goal for the system could be biased to relate to the dynamics of the targeted environment.

The model has been developed with the New Zealand environment in mind. Practical cycling in New Zealand is not widespread: transportation is dominated by private car use. This observation might require the system goals to be biased:

There will be a number of people within the existing New Zealand environment who are ready to change transport mode. This implies an immediate bias to criteria 3 and 4 (choice of and access to practical cycling tools and manufacturing a perfect first experience). In the medium-term, there is a requirement to develop more people to be ready to change mode to take advantage of the practical cycling tools and experiences available, requiring the bias to shift to criteria 1 and 2 (planting the cycling seed). As the number of practical cyclists increases, a continued emphasis on the experience criteria (4 and 5) is preferred. The normality and visibility of cycling naturally improves as it becomes more common and the increased market demands better choice and access to solutions. The system becomes self-supporting.

The additional observation that cycling in New Zealand is primarily recreational offers a further opportunity to bias goals within each criterion. The goals may be shifted to focus initiatives, for example, on encouraging existing recreational cyclists to use a bicycle for transport, or to ensure the initiatives offered balance the existing recreational market (which may be alienating many potential practical cyclists).

An additional effect of the model would be to clarify the capabilities of the various agencies and businesses within the system. Application of the criteria would clearly identity the activities of the stakeholders and create a better understanding of how they interact. This might prevent duplication of effort, and encourage complementary activities that have a greater cumulative effect on the system than they would individually. An example from Melbourne is the cumulative effect of Victoria state legislation requiring bicycle parking in offices and apartment buildings (offset by a reduced requirement for car parks); the availability of a cycle parking facility design service from Bicycle Victoria (the local advocacy group); the development of cycle infrastructure local to the office and apartment buildings; and bicycle parking at city centre destinations by Melbourne City Council.

7.1.3 Initiative design

Each initiative must be designed so that its impact can be measured. The impact of practical cycling initiatives in New Zealand is measured poorly, and their success or failure cannot be accurately stated. It tends to be seen as positive just to be doing something to encourage cycling, regardless of whether that something can be proved to be successful. In the content of the system model, a poorly designed or executed initiative may not only perform badly in isolation, but may also have an impact on other initiatives in the system.

An iterative development cycle is good practice for any product or service design and implementation. For practical cycling tools, the following four steps are suggested:

1 **Measure and understand the baseline conditions**: what is the market for this product, service or facility? What is the current situation?

2 **Design and implement:** What is the proposed initiative and how will it be implemented? What are the essential features and benefits? How is success defined and how will it be measured? What are the risks to the practical cycling system?

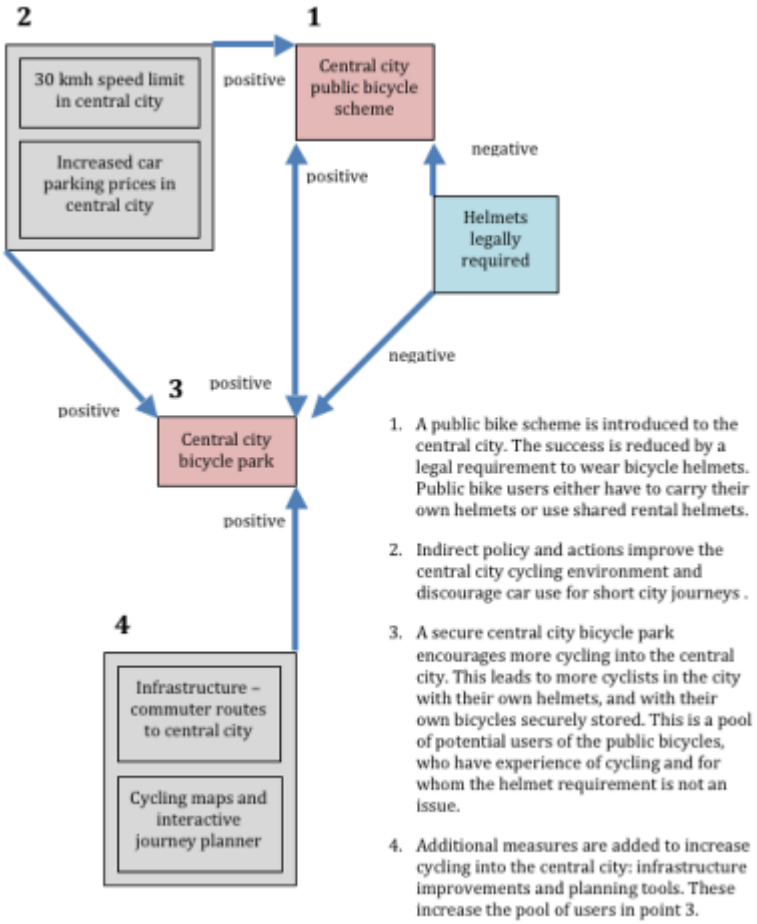
3 **Measure performance**: Based on the proposal, measure the aspects that relate to success (sales, use of services, cycle counts, cyclist satisfaction etc).

4 **Communicate, reflect and improve**: Compare measured performance to the baseline conditions. Communicate the performance to users and stakeholders and listen to feedback. Continuously improve the initiative.

It is essential to remember that practical cycling is a complex system, and each stage of the iterative development cycle shown above must be considered in an overall system context. There are few simple linear relationships and implementing an initiative might have unexpected effects on the effectiveness of other initiatives. The modified bicycle account approach described in section 7.1.1 could be used to provide baseline system measurements and to understand the impact of the initiative on the system. This might be supplemented by direct measurement of the performance of an individual initiative where it is possible to obtain meaningful data (such as sales data for commercial activities, or cycle counts for infrastructure improvements).

A theoretical example of the complex system interaction is shown in figure 7.3. The system demonstrates how two independent initiatives, a public bicycle scheme (to increase cycling within the central city), and a secure central bicycle parking facility (aimed at increasing the number of cycling commuters into the central city), may interact and, depending on other initiatives present, generate net positive interaction effects that further increase the levels of practical cycling. In the example, the combined effects would generate an improved positive visibility of cycling, which would in turn encourage more new practical cyclists. In this case, implementing only one of the two initiatives might have limited success.

Figure 7.3 Example of initiatives interacting in a theoretical practical cycling system



7.1.4 Practicalities of implementing the model

A proposed option for implementation is to create a local coordinator or group, responsible for applying the system model within a particular environment. The model is scalable to each environment. This may be a small, defined group such as a workplace or school, or a larger and more diverse suburb, town or local/regional council area. The criteria used in the model can be developed to reflect the specifications of the environment.

The practical cycling system coordinator monitors and links all of the initiatives in the environment. This might be a single person (such as a local council transportation representative) or a group (such as Bicycle Victoria or a cross-disciplinary team). The primary role is to develop the model to achieve the system goals of more practical cycling. This requires an understanding of the initiatives within the environment and their contributions to the system-wide model, and an ability to encourage new initiatives to fill any gaps identified in the system. It would be essential to consider two types of stakeholder initiative: those that can be directly influenced (for example, creation of new cycle lanes) and those that must be understood and indirectly influenced (for example media coverage of cycling). There will also be many that straddle the two extremes (such as many commercial activities). Tasks for the coordinator would be:

- Establish the practical cycling system model environment specifications and goals.
- Make an initial assessment of the current system against the model criteria.

- Oversee ongoing development of initiatives and actions to fill the gaps in the system and maintain the required balance. Note: this would require liaison with all stakeholders, including local and regional councils, media, community groups, commercial product and service providers, recreational cycling clubs and groups, current and potential practical cyclists.
- Ensure coordinated measurement of overall goals and assessment of impact of system relationships.
- Promote the practical cycling system and best practice design of initiatives.

This proposal for implementation is one potential route, and it does not consider details such as funding, or the authority and responsibility required for the coordinator. A sensible route forward would be to pilot the implementation of the system model within a small and carefully chosen environment.

7.1.5 Examples applied to the model

The two examples below are hypothetical initiatives that might be considered by a workplace or employer wanting to promote cycling amongst employees or assist employees who cycle to work.

7.1.5.1 Air New Zealand workplace bicycles

At the Air New Zealand head office, located on the waterfront in Auckland city, there are four bicycles available for employees to borrow. The bicycles are hybrid style and are equipped with locks and helmets. They are on display next to an external door and outside of the employee café. Bookings are made using a simple sign-out sheet and the bicycles can be taken out during the day, overnight, or for extended periods (such as a week to cover car repairs) with prior agreement from the scheme coordinators. A group of volunteer staff members coordinate and manage the bicycle scheme.

- **Criteria 1. Practical cycling is a normal activity.** *Medium impact.* Cycling is seen to be promoted by the employer as a normal everyday activity suitable for short work trips.
- **Criteria 2. Practical cycling is positively visible.** *Medium impact.* Bicycles are visible and colleagues can be seen riding them. There is potential for workplace conversation about the experiences.
- **Criteria 3. A wide range of relevant practical cycling tools are available and are easily accessible.** *Weak impact.* A particular set of products is available through a non-purchase channel of access.
- **Criteria 4. The first experience of practical cycling is perfect.** *Medium impact.* The bicycles offer an opportunity for a convenient, if uncontrolled, first experience. The location of the office means that there is a traffic free route into the city available (along the foreshore). Experience is limited to the bicycles and helmets provided (although riders can use their own helmet). Bicycle setup and maintenance may not be perfect.
- **Criteria 5. The continuing experience of practical cycling is positive.** *Strong impact.* Offers an opportunity for employees to use the bicycles in the longer term without needing to commit to purchase or regular cycling. Cycling can be fitted into work life, with no impact on other aspects of lifestyle and can be considered whenever conditions (for example weather) suit the user.

7.1.5.2 Massey University workplace showers and changing facilities

At the Massey University in Palmerston North, located 5km–6km outside of the city centre, there are showers and changing facilities available for employee use inside many of the buildings. While not exclusively for the use of cyclists, they are commonly used by cyclists after a morning commute.

- **Criteria 1. Practical cycling is a normal activity.** *No impact.* Car drivers don't need showers after their commute.
- **Criteria 2. Practical cycling is positively visible.** *No impact.* Showers are hidden away from view.

- **Criteria 3. A wide range of relevant practical cycling tools are available and are easily accessible.** *Weak impact*. Showers are a service for cycle commuters.
- **Criteria 4. The first experience of practical cycling is perfect.** *Weak impact*. While requiring a shower is not necessarily part of a perfect cycling experience, the shower may be useful for those undertaking a longer cycle commute or travelling on a warm day.
- **Criteria 5. The continuing experience of practical cycling is positive.** *Medium impact*. Showers offer an opportunity for a longer cycle commute, where the rider might get sweaty and require a change of cycle-specific clothing. It also opens up the possibilities for cycle commuting in bad weather.

There are a few points to note regarding the assessment of initiatives:

- The impact of the initiative on the system is measured here on a simple four-point scale ranging from no impact to strong impact.
- There is no consideration of system-wide implications in the individual assessments.
- Notes accompanying the assessments highlight areas of strength and potential weaknesses of the initiative.
- The assessment aims to be objective, but the assignment of impact might be open to debate.

To consider the system implications of these two initiatives, an assessment of their potential interaction must be made, supposing they were both available to the same group of people. First, taking the two initiatives together, each area of the criteria has at least a medium impact or two weak impacts assigned to it. This raises the question of whether a single stronger impact is preferable to many weaker impact scores. The latter potentially demonstrates a wider range of initiatives, whereas the former shows potential for more influence. The second consideration is whether there are any areas of interaction (either positive or negative). In this case, it might be that the two initiatives offer a more complex opportunity for people to ride to work on a longer commute, potentially using more specific equipment and accessories, then to use the workplace bicycles for less demanding short trips. In addition, the workplace bicycles may be used for longer trips where a shower is required on return. There may also be a more complex interaction where the use of workplace bicycles inspires new practical cyclists to commute into work, which is encouraged by the provision of showers and changing facilities. The two facilities together may add a weak positive impact.

8 Recommendations

Position cycling as an aspirational activity. The focus of many who promote cycling in New Zealand is on cyclist safety, infrastructure for cycling and promotional activities aimed educating road users about cyclist requirements. The design and availability of products, services and facilities suitable for encouraging practical cycling receives little attention from local authorities, cycling advocacy groups, or the cycling industry (which is focused on recreation). As such, there is little development of an aspiration to cycle for transport in New Zealand, and the non-cycling public generally perceive the activity as risky, strange and of a lower status than driving. This can be addressed by stakeholders re-assessing the emphasis they put on the promotion of cycling, which receives relatively little attention, moving away from the existing model which has its main focus on safety and infrastructure, and developing a broader understanding of the potential cyclist needs.

Establish a best practice approach for the design of initiatives to encourage practical cycling. Initiatives and actions in New Zealand to encourage practical cycling tend to be poorly designed and/or implemented. It is common practice in the design of successful products and services to apply an iterative development cycle

understand – design – implement – measure – learn

to achieve a high-quality design relevant to the target market, and to continuously improve through measurement of successes and failures, and response to user and stakeholder feedback. The cycle assumes a strong element of research and the use of learning from other cycling successes, within New Zealand and overseas. Using such a development cycle, and in particular the measurement of success and failure, would improve the use of limited resources available in New Zealand for cycling promotion.

Implement the practical cycling system model as a pilot study. It is clear that practical cycling is a complex multi-layered system, and must be treated as such. Many practical cycling initiatives are designed and implemented in isolation by different stakeholder groups. In order to understand and assess the wider impact of each initiative on practical cycling, a systems approach is required. The model proposed in this study should be implemented as a pilot study in a small and carefully controlled environment, and then used to gather further information about the dynamics of a practical cycling system. This offers an opportunity for further research and will provide data to confirm the theoretical model. One possible opportunity for such a trial is within the walking and cycling model communities of New Plymouth and Hastings.

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