# Chapter 14
# Creating the Circuit Breakers: An Examination of the Sociotechnical System Factors Which Impede and Enable the Delivery of Safe and Healthy Neighbourhood Street Design in Aotearoa New Zealand

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**Abstract** Taking a socio-technical systems approach, the aim of this chapter is to describe the barriers and enablers to innovative street projects that promote wellbeing. We explore these barriers and enablers through the lens of five proposed, current, or delivered niche street re-design projects or programmes in Aotearoa New Zealand. Through a thematic analysis of project and programme information, the key themes of leadership, funding, policies and procedures, organizational norms, community and delivery tensions, and social environment emerged. These themes were used to analyse the extent to which the projects and programmes succeeded as niches and influenced the wider system. While there was varying success across the projects and programmes in influencing the wider regime and social landscape, the analysis found that niches need to be supported within government planning systems as a way of managing investment risk and testing future scenarios. The lessons provide direction for those seeking to expedite transport system change so that positive health, safety, environmental, and social outcomes can be realised.

**Keywords** Sociotechnical system · Street design · Innovation · Self-explaining roads · Active travel

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## 14.1 Introduction

### *14.1.1 The Contemporary Urban Transport Problem*

Traffic congestion, traffic injuries, decreased active travel, air pollution, and transport-related greenhouse gas emissions are undermining population wellbeing in many countries around the world [1]. With the highest rate of car ownership in the OECD and over 90% of distances travelled by car, Aotearoa New Zealand (hereafter Aotearoa)[1] is particularly affected by these issues [2]. For example, Aotearoa has high levels of road transport emissions and traffic injuries compared to other developed countries [2, 3]. Obesity-related disease costs the country approximately $1 billion per annum [4], and in Auckland (Tamaki Makaurau), the largest city in Aotearoa, traffic congestion and its associated costs are high and rising [5].

The negative impacts of automobility tend to disproportionately affect marginalised populations—contributing to greater health and social inequities [1]. This is apparent in the higher rates of traffic injuries as well as physical inactivity-related diseases experienced particularly by low socioeconomic, Māori, and Pasifika populations in Aotearoa [6, 7]. As a result, transport systems that prioritise private car use over-active and public transport modes are increasingly seen as undermining public health, environmental, and social equity goals [1, 8], and are incompatible with sustainable approaches to urban planning, or to achieving the targets of the Sustainable Development Goals [9].

An enormous effort is required within the transport sector to respond to the negative externalities it generates, and the systems and ways of working that reinforce this current paradigm are heavily entrenched. Streets have historically been designed to maximise traffic flow, and, while this is changing in some urban centres, the majority of suburban and peri-urban streets remain overwhelmingly car-oriented [10]. These suburban street designs increase people's reliance on private motor vehicles [11, 12] and make the use of active modes unsafe and uncomfortable [13].

### *14.1.2 Designing Neighbourhood Streets for Community Health and Wellbeing, Cohesion, and Equity*

Redesigning streets to improve the uptake and safety of physical modes can contribute to the ecological and social health of cities [14, 15]. Neighbourhood streets in suburbs that are safe and easy for walking and cycling, allow easy access to public transport, and are safe and intuitive to drive around are associated with significant health, social, economic, and environmental benefits [16–18]. New approaches to neighbourhood

[1] The authors have elected to use the Māori name for New Zealand throughout this chapter. Aotearoa is the indigenous name for New Zealand and is gradually becoming accepted as a bilingual name for the country.

street design, such as Complete Streets (USA and Canada) and 20MPH zones (UK), make it feasible to retrofit existing streets and routes in a cost-effective manner [19–21]. In jurisdictions unfamiliar with such innovations they can be seen as costly, but economic evaluations have indicated the societal, health, and environmental benefits can significantly outweigh the costs [22, 23]. Conversely, for large-scale motorway projects that can cost billions, the benefits often struggle to outweigh the costs [24].

Re-design techniques for active, sustainable streets generally have a strong focus on community co-design, placemaking, reducing vehicle speed and/or access, and testing and trialing innovative designs [25–28]. Streets that support all modes for commuting, recreation, and social interaction, can promote stronger and healthier communities and sustain environmentally sustainable travel [29]. For low-income communities in particular, healthy neighbourhood street designs may contribute to injury reduction, health, social, economic, and environmental benefits [30, 31]. Less traffic congestion also has productivity benefits [32, 33].

In Aotearoa, significant road safety benefits from neighbourhood street re-designs have already been demonstrated. In the five years following the Point England Liveable Streets project in Auckland [34], the social cost of crashes reduced by 48% [35], although performance has slipped in recent years through treatments not being maintained Similar safety benefits are now emerging from the Te Ara Mua—Future Streets project in Māngere, Auckland [36]. Wider health benefits in terms of disability adjusted life years (DALYs), have been estimated from the earlier Model Communities Programme [23].

### *14.1.3 System Solution—Innovation and the Sociotechnical Systems Approach*

Despite the potential of new ways of conceptualizing streets, change is difficult. Sociotechnical Systems (STS) Theory contests dominant understandings of service delivery and technological change as purely technical, neutral, and apolitical [37, 38]. Rather, it recognises technical and social aspects are co-constitutive of decision-making and outcomes [39].

STS theory emphasises the causal relationships between different hierarchical levels in complex systems. For example, Rasmussen's work on risk management in workplace settings describes a system hierarchy made up of six levels: government, regulators/associations, company, management, staff, work [40]. This approach highlights how the relationships between decisions, actions, and failures at different system levels lead to particular outcomes, rather than individual people or isolated errors [40].

An STS approach has also been used to understand how innovation or system change is brought about or thwarted. Geels, a seminal contributor to the field, has

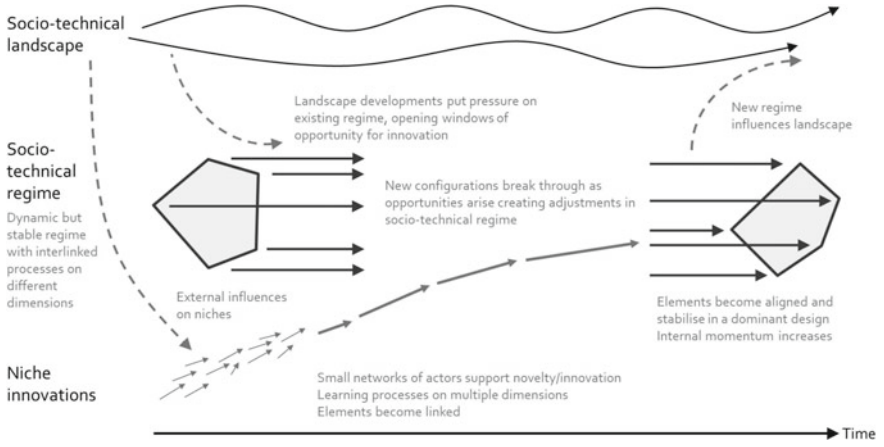


**Fig. 14.1** Socio-technical transitions. Adapted from Geels [42]

applied STS theory to investigate the way co-evolution and multi-dimensional interactions between industry, technology, markets, policy, culture, and civil society determine system states [41–43]. Geels posits three analytical levels through which transitions occur: niches, which provide the focal point for emerging innovations; regimes, which bring together established practices and rules that reinforce or stabilise existing systems; and the landscape, the broad demographic and socioeconomic environment influencing niches and regimes (Fig. 14.1) [42, 43]. Coalitions of innovative actors working in niche sociotechnical spaces can activate change by challenging dominant sociotechnical regimes [44]. Changes at the landscape level (e.g. increasing concern over climate change) can also generate pressure on dominant regimes, thereby destabilising them and creating windows of opportunity for niche innovations to take hold [43]. Within this, many different system components and actors impede or allow change to happen [44].

In the transport system, niches may include demonstrations of new ideas by transport personnel external and internal to government agencies who seek to drive change. The regime includes the dominant organisations, rules, and structures that maintain and deliver the transport system, and the landscape is represented by everyday people and the socio-economic context in which they live.

In Aotearoa, the dominant transport landscape and regime of automobility is firmly entrenched [45, 46] and the transport system continues to prioritise the delivery of roading infrastructure catering primarily to private vehicles. This is maintained through a hierarchy of funding programmes from individual councils who create Regional Land Transport Plans (RLTP), which feed into the National Land Transport Programme (NLTP), a system which allocates funding to different 'activity classes'. Within these programmes, infrastructural and system support for active travel are poor and rates of walking, cycling and scooting are generally low. In many (sub)urban neighbourhoods, particularly on the city fringe active travel is not a feasible mode choice [47, 48]. Likewise, variable access to frequent public transport services limits

its utility in many outer city locations [49]. As a result, 'business as usual' streets prevail, thereby perpetuating poor outcomes at a society level.

Referencing Geels' model of socio-technical transitions (Fig. 14.1), niche projects can nudge innovation and challenge system inertia. However, demonstration projects are difficult to initiate and implement, and even successful innovations can face substantial obstacles to translation into everyday practice. When increasing active travel is a desired outcome of niche innovations the complex reasons why automobility remains entrenched are also confronted. In this context, transport policy and decision-makers comprise only one part of a wider transport assemblage within which they have become increasingly constrained by their relationships with other actors [50], including industry, consumers, and civil society [43]. Nonetheless an STS approach provides a way to examine and disentangle existing system attributes that generate, maintain, and (re)produce particular pathways and logics.

In this chapter, an STS analysis approach is used to examine how safe and healthy neighbourhood street innovation in diverse communities in Aotearoa is impeded or facilitated by the current transport system, through the lens of proposed, current, or delivered projects acting as niches. By doing so, this research identifies barriers and solutions to the wider adoption of healthy neighbourhood street design.

## 14.2 Methods

Five niches are examined. Three proposed or delivered Aotearoa-based projects (or niches) which mostly emerged outside of the regime of the transport delivery system are firstly examined. Through an STS lens we examine the interactions, influences, and effect of each 'safe and healthy neighbourhood street' niche project on the regime and landscape. The projects are then compared with two successfully delivered Aotearoa niche programmes which were generated within the regime of the transport delivery system (by government) to assess the importance of the genesis of niche projects.

The three niche projects which arose outside of the transport delivery system and which are explored throughout this chapter are:

1. **Te Ara Mua—Future Streets (Future Streets)**: A neighbourhood-scale suburban retrofit project in Māngere Central, South Auckland [51].
2. **Safe and Healthy Streets South Auckland (SHSSA)**: A broad multi-suburb initiative in South Auckland, building on the momentum of Future Streets and other projects, to implement safe and healthy streets principles in a way that prioritises community needs and voices.
3. **Aranui Connections**: A scoping exercise to understand the need for, and feasibility of investment in safe and healthy neighbourhood street upgrades in the suburb of Aranui, Christchurch (Ōtautahi), following the establishment of the new Haeata Community Campus.

The background and approach to these projects, and the varying levels of success achieved in the delivery of safe and healthy neighbourhood street innovation are described in Sects. 14.3.1.1–14.3.1.3 below.

In Sect. 14.3.3 the three externally driven niche projects are compared with the two programmes which had a genesis from within the transport delivery system:

4. **Model Communities Programme (MCP)**: Held in two towns in Aotearoa, the programme was designed to improve the safety of walking and cycling by providing fully integrated transport networks for those mode types.
5. **Urban Cycleways Programme (UCP)**: To provide better cycling networks in urban centres in Aotearoa and to improve the rate of urban cycling through the delivery of cycling infrastructure on a national level.

For each of the initial three case study projects, the interactions with the regime, the outcomes from those interactions, and their overall success as niche projects were recorded. This was achieved through project documentation, project reports, and minutes from meetings where the authors chronicled their experiences of participating in each of the projects. Documents from all of these sources were thematically analysed [52].

Initially, six themes for the interactions of each project within the regime were identified. These themes were subsequently used as a framework for assessing each project where a description of the successful (or unsuccessful) characteristics of each project was produced (Table 14.1).

Taking a strengths-based approach, success factors for niches were then identified. This was achieved by reviewing documentation from the two previously successful government driven niche programmes in Aotearoa—The Model Communities Programme (MCP) and the Urban Cycleways Programme (UCP)—and comparing characteristics of these programmes with the three case study projects.

The final step in the analysis was to identify the key factors that are likely to make demonstration projects succeed as niches within the STS, learning from both success and failure.

## 14.3 Results

### *14.3.1 Development and Outcomes of 'Safe and Healthy Neighbourhood Street' Innovation Niche Projects*

#### 14.3.1.1 Te Ara Mua—Future Streets

Te Ara Mua—Future Streets (Future Streets) is a controlled intervention study in Māngere, a low socioeconomic neighbourhood in a predominantly Pasifika community in South Auckland, Aotearoa [53]. A neighbourhood-scale suburban retrofit was

designed and implemented in Māngere Central [51] with an adjacent neighbourhood, Māngere East, serving as a control area.[2]

Future Streets employed a community participatory design approach with the aim of making it safer and easier for people to get around the neighbourhood, especially by walking or cycling. The infrastructure re-design was paired with a research project to understand the effect of the street changes on traffic behaviour, pedestrian and cyclist usability, traffic crashes, mode use, levels of physical activity, and community perceptions of safety and social connection [54]. Future Streets encountered several obstacles in the design and delivery of the intervention including funding uncertainties, conflicts around project governance, regulatory barriers, and rigid project management processes which resulted in delays to implementation [48, 51]. Ultimately, the infrastructure was delivered between 2016 and 2017.

Despite problems in delivering Future Streets, it nevertheless succeeded as a niche project. It was eventually delivered, and outcomes are being monitored and disseminated thanks to a well-funded research programme [54]. Future Streets has influenced other projects/programmes by helping to focus active travel investment to wider Māngere; providing a project design and engagement approach for other area-wide community active travel and safety projects; and influencing policy, such as 'Road to Zero', the national government's Road Safety Strategy 2020–2030 [55].

Future Streets also provided an opportunity for formal reflection on the enablers and barriers to innovation trials. Following the difficulties of delivering Future Streets and other related projects around Auckland, a *'Making Trials Easy'* workshop was held, instigated by the research team. The workshop comprised stakeholders from the city's transport agency, the national transport agency, transport consultancies, and universities. This provided reflection on system barriers and enablers to planning, trialling, and delivering new street designs in Auckland, further informing this analysis.

#### 14.3.1.2 Safe and Healthy Streets South Auckland (SHSSA)

SHSSA is a region-wide initiative at an early scoping stage (as of February 2020). Its aim is to implement safe and healthy street principles in a way that prioritises community needs and voices. Building on the momentum of Future Streets and other neighbourhood-scale projects such as Auckland Transport's Safer Communities [56], it seeks to bring together community, delivery, and political champions to develop and demonstrate new approaches to transport investment, including strong community partnerships, cross-agency collaboration, and innovative solutions. The early project scope included reducing crash deaths and injuries, increasing active transport, and improving access to economic opportunities in South Auckland.

In July 2018, a government-instigated workshop, *'Increasing Safe and Healthy Travel in South Auckland',* was facilitated by the Future Streets research team. It was

[2]More information about the Te Ara Mua—Future Streets project can be found at https://www.futurestreets.org.nz/

held to gauge support for expanding the Future Streets concept across South Auckland and discuss how stakeholders could work together to make tangible progress in the subsequent two years. Participants from local and national government agencies, community groups, universities, advocacy groups, and health organisations attended, as did local and national politicians [57].

Despite the workshop demonstrating enthusiasm and broad support for the initiative, as well as a need for speedy delivery, for a long period SHSSA failed to move beyond early planning into implementation. Based on the evaluation of SHSSA to date, the project has not yet translated into a successful niche, although some of the concepts and issues that have been identified have been useful for agencies. However, from late 2019 renewed agency-led effort has emerged to deliver on the project's goals. This suggests that there may still be potential for it to have a positive influence on 'business as usual' practices. Note that the analysis carried out here does not cover this most recent period of renewed effort.

#### 14.3.1.3 Aranui Connections

Aranui is a suburb in East Christchurch, Aotearoa which was badly damaged by the earthquakes of 2010 and 2011. Residents in Aranui experience high levels of social deprivation which is compounded by the earthquake-damaged roading network and limited public transport options connecting Aranui to other parts of the city [58].

In 2017 the Haeata Community Campus—a large school complex, catering to all ages—was established in the west of Aranui. It replaced four schools which were closed after the earthquakes. Though the campus is modern, the surrounding local streets do not serve school students well with travel options, particularly active travel [58].

To understand the need for, and feasibility of investment in safe and healthy neighbourhood street upgrades in Aranui, including to and from Haeata Campus, a scoping exercise was conducted. The exercise was led by the national government and delivered by some authors of this chapter. The scoping exercise involved a programme of engagement, coordination with other projects, and primary data collection to triangulate the issues and opportunities for local active travel.

The scoping exercise concluded with a community workshop, *'Future Streets Aranui'*, attended by participants from Haeata Community Campus, local community groups, local and national government agencies, police, health boards, and universities (highlighting the level of local interest). The workshop included group discussions of current transport problems, future scenarios, and possible solutions.

Stakeholders at the workshop confirmed their support for advancing a project to improve streets and transport connections in Aranui. However, although both the community and local government have jointly acknowledged the need for investment in Aranui, progress stalled, with a lack of priority and funding under the regional land transport plan. This is not to say that a project will not happen at some point, and ultimately influence established practices, but as of February 2020, there has

been insufficient uptake for the project to be delivered and hence the concepts are not able to have any tangible impact on regime practices.

### *14.3.2 System Interactions for the Three Potential Niche Projects*

Analyses of project documentation revealed six key themes that impeded or enabled progress in the three case study projects (Table 14.1). Section 14.3.3 then compares the outcomes from these projects with the two government-generated niche programmes in Aotearoa, the MCP, and the UCP.

### *14.3.3 Comparison with Two Previously Successful Government Generated Niches in Aotearoa*

The three niche projects described above are now compared with the previously delivered, and local/national government driven, Model Communities Programme (MCP) and Urban Cycleways Programme (UCP). We examine the relative importance of the genesis of a niche project/programme to their success. The MCP and UCP programmes are introduced below followed by Table 14.2, which highlights the major themes including successes and barriers for each.

#### 14.3.3.1 The Model Communities Programme

Following on from the National Walking and Cycling Strategy in 2005 [59], The MCP was included in the National Land Transport Plan (NLTP) in 2009 and again in 2012. The MCP was designed to improve the safety of urban environments for walking and cycling by providing fully integrated transport networks for those mode types. The MCP aimed to encourage 'novice users' to walk or cycle to school or to work as their main modal choice [23, 60].

Of the 22 cities who bid to be part of the programme, two provincial towns won: New Plymouth (Ngāmotu) and Hastings (Heretaunga). Both towns reportedly had existing walking and cycling programmes and whole-town buy-in from the community to local government level [61].

A total of NZ$13.1 million (NZ$1 ~ USD 0.66 at time of writing) was spread across the two towns with funding provided by the national government and matched by the district councils. Infrastructure changes focussed on the development of direct and practical commuting routes to workplaces, schools, and shops through new shared

**Table 14.1** Major themes drawn from each project

| Leadership | Funding | Policies and procedures | Organisational Norms | Community and delivery tensions | Social environment |
|---|---|---|---|---|---|
| *Te Ara Mua—future streets* | | | | | |
| • Strong support from science and innovation sector, and Local Board<br>• Committed and passionate project research and delivery individuals determined to see project to completion<br>• Strong researcher-led mandate to improve safety, public health, environmental sustainability, and social equity<br>• Culture of risk aversion, reluctant participation, and reluctant champions from delivery agencies<br>• Incomplete stakeholder leadership | • Insufficient initial infrastructure funding and personnel commitment, as project was 'unplanned'—not accounted for in national funding priorities<br>• Insufficient investment in communication (especially with community)<br>• Local board funding showed community commitment | • No initial 'home' for project—not planned into the system<br>• Innovation in designs and design process stifled by current policies<br>• Lack of clarity around trial/innovation processes preventing unique solutions from being tested<br>• Innovation beyond the usual set of Traffic Control Devices stifled by laws and Road User Rules<br>• Linear project planning process unresponsive to iteration, testing, and early community engagement<br>• Strong research focus | • Unclear project governance exacerbated by unique transport delivery/researcher partnership<br>• Institutions poor at engaging with politicians, and with community needs/aspirations<br>• Different cultures and attitudes towards engagement, design, iteration, and testing new ideas<br>• Locked into 'business as usual' designs<br>• Siloed teams and competing interests (e.g. bus amenity vs raised pedestrian crossings)<br>• Project seen as risky, as opposed to testing future scenarios (risk management) | • Strong initial engagement, but less as project progressed<br>• Mixed local perceptions—some focussing on loss of vehicle amenity, while others advocate for cycling and safe streets | • General reliance on automobility, so some design ideas seen with scepticism<br>• Mixed media narratives—generally positive in published media, but some negative social media<br>• Environmental and urban density issues increasingly reducing viability of automobility |

(continued)

**Table 14.1** (continued)

| Leadership | Funding | Policies and procedures | Organisational Norms | Community and delivery tensions | Social environment |
|---|---|---|---|---|---|
| *Safe and healthy streets South Auckland* | | | | | |
| • Strong national government and local stakeholder support<br>• Strong political leadership but inconsistent institutional champions<br>• Mixed support by transport and related agencies<br>• Strong support from individuals within agencies, but insufficient to unlock project | • Lack of funding to start the project and build business case to obtain more significant funding, despite common underspend within transport delivery agencies and high strategic need<br>• Rigid funding mechanisms, lack of flexibility in pre-programmed investment | • National and regional funding rules and mechanisms do not allow short-notice innovative projects<br>• No 'home' for the project—planning and delivery system unable to accommodate it despite significant political and local demand<br>• Regulatory barriers—unable to progress project without business case | • Agency workplans locked in and difficult to respond to need<br>• Slow response by agencies despite clear identified need<br>• Siloed systems and piecemeal projects with no master plan for infrastructure connectivity (e.g. housing developments not well connected with wider street network projects) | • Communities have limited capacity to participate. A value offering is needed, included social procurement, but no mechanism for this<br>• Strong acknowledgement but a lack of project alignment with community priorities/identities. Institutions focused on individual behavior and project delivery. Communities focused on systemic/socioeconomic change, with authentic engagement | • General reliance on automobility. Not yet a strong enough political agenda to accommodate project, hence seen as relatively unimportant<br>• Insufficient media narratives to inform case for the needed change<br>• Environmental and urban density issues increasingly reducing viability of automobility, but the pace is slow |

(continued)

**Table 14.1** (continued)

| Leadership | Funding | Policies and procedures | Organisational Norms | Community and delivery tensions | Social environment |
|---|---|---|---|---|---|
| *Aranui connections* | | | | | |
| • Lack of leadership on all levels despite agreement about need | • Rigid funding mechanisms<br>• No funding available due to higher council priorities or lack of unallocated funding | • Infrastructure investment based on injury rates, not other metrics e.g. walkability, social cohesion, access to opportunity<br>• Evidence needs to inform design/consent | • Moving away from 'business as usual' difficult<br>• Existing projects are piecemeal, no Master Plan for connectivity<br>• Not well positioned to respond to externally driven project | • Communities have limited capacity<br>• Low institutional capability in engaging with community needs or with politicians<br>• Partnerships and shared control difficult to establish | • Reliance on automobility<br>• Media narratives critical of related work (e.g. cycle lanes)<br>• Environmental and urban density issues increasingly reducing viability of automobility |

**Table 14.2** Major themes from MCP and UCP [63–65]

| Leadership | Funding | Policies and procedures | Organisational norms | Community and delivery tensions | Social environment |
|---|---|---|---|---|---|
| *Model communities programme* | | | | | |
| • Significant local government ownership and initiative in both towns<br>• Key national government personnel worked to make the programmes happen and guided councils through the ingrained rules of their operating system<br>• Strong local leadership in the face of some public backlash (e.g. over loss of parking and delays in infrastructure delivery) | • Some of the biggest contributions to the programme were from infrastructure programmes not part of MCP, but which aligned well with planned routes (e.g. safety, reseals, new roads). In some cases, these programmes/projects were integrated to maximise the benefits of investment. However, due to the set-up of the 2 + 3 year programme it was not always possible to leverage this<br>• Significant national government funding to support existing local work | • Pushed by the national government. Space made for the programme from within the NLTP<br>• The first time a programme of projects was approved by the Transport Agency rather than assessing on a project by project basis<br>• Strong local branding<br>• Little publicly reported independent monitoring and evaluation | • Innovation was in-built in the infrastructure and activation stages<br>• Lack of council readiness for the MCP including working to the national government's programme time frames<br>• The risk averse nature of councils meant that non-traditional changes (i.e. walking and cycling infrastructure) needed to be continually promoted amongst all teams<br>• The culture of each programme continues today, thanks to ongoing council commitment | • The parameters of the programme integrated well with existing local council work<br>• There was very little time between the MCP proposal, being awarded it, and the delivery. Some implications of this included having limited time to plan and resource things properly. Additionally, there was pressure to get quick results, sometimes at the expense of longer-term achievements | • At the programme's commencement in 2009, the social and political acceptance of the value and contribution of walking and cycling to society was less than today<br>• There was an initial underestimation regarding how difficult it would be to encourage adults to walk or cycle rather than drive<br>• Poor public reaction to loss of parking |

(continued)

**Table 14.2** (continued)

| Leadership | Funding | Policies and procedures | Organisational norms | Community and delivery tensions | Social environment |
|---|---|---|---|---|---|
| *Urban cycleways programme* | | | | | |
| • Emerged from National Cycle Trails which was championed by Prime Minister who garnered buy-in from each Region<br>• Also emerged from the MCP<br>• Strong national government leadership | • Complex, untested funding arrangement: Co-funded between the Crown, local government, and NZTA<br>• Some regions found it difficult to access funding due to regulatory barriers and paperwork which led to project delays<br>• Other regions secured funding through the normal mechanisms | • Pushed by the national government but there was no strong national agenda or behaviour change plan behind it<br>• Programme evaluation, but no outcomes or impact evaluation | • A mixed response from councils, some very proactive and ready, others risk averse and slower to come on board | • Capacity and capability at local levels were an issue in some places especially in smaller towns, need to develop a community of practice<br>• Focused on easy wins but not necessarily the most strategic or areas of greatest need. Trips to work and town centres favoured over suburbs and schools<br>• An underlying delivery focus on making progress in building infrastructure to enable the community to choose to bike or walk | • Engagement issues and high-profile problems undermined some efforts<br>• Although the programme was well supported, a degree of national legitimacy was missing |

paths, improved links to existing paths, and new cycle lanes [61]. Associated education and promotion was also funded [62]. An evaluation of the outcomes of the programme calculated a benefit–cost ratio of 11:1 [23].

#### 14.3.3.2 The Urban Cycleways Programme

In August 2014, the New Zealand Transport Agency (NZTA) initiated the National Cycling Programme, a multi-faceted programme of work to make urban cycling an easy, safe, and attractive choice [63]. The programme combined the development of urban cycleways with complementary initiatives in legislation, communication, research, and behaviour change. The National Cycling Programme complimented and leveraged change for the UCP—a $333 million infrastructure programme. Under the four-year UCP, changes that focused on cycling infrastructure and shared paths were made in 16 towns and cities across 54 projects. The focus of the national government was on funding and delivery and the programme utilised existing concepts for projects from local government.

For Aotearoa, the UCP represented a significant step-change in the national government's support for cycling. Within the UCP, cycling is viewed as a part of the transport system, building on a growing realisation that there are potentially a range of congestion, health, and environmental benefits to be gained from enabling cycling to flourish. At the time of writing, of the original 54 UCP projects, 17 are still underway, with the whole programme expected to be completed by 2021 [64].

### *14.3.4 How Do the Five Projects and Programmes Compare?*

Both the MCP and UCP were concepts developed by the national government, building on demonstrated readiness or existing progress by councils. This meant that there was strong support and drive for these programmes at the outset, even if expectations between local and the national government were not entirely aligned. Nevertheless, joined up thinking by various aspects of government was sufficient to ensure funding and on-going delivery of each programme.

Meanwhile, the three externally driven projects examined earlier all found it hard to get a foothold in the system and obtain stakeholder buy-in and prioritisation. There was no 'home' for projects emerging from outside the normal planning procedures of the regime, first through council and RLTP and then via the NLTP. Hence it appears that the delivery system was self-reinforcing, with only limited opportunities for innovation by those who planned the NLTP at key points in time.

All projects and programmes—be they government-led or external—struggled to navigate a fast planning and delivery process. Unique programmes that deviated from the norm were difficult to deliver when people (locally or nationally) who represented critical elements of the System, were not active in the project. Rules, regulations, norms, and entrenched ways of working impeded the progress of all niche projects and

**Table 14.3** Comparison of regime and externally generated niche projects and programmes

| Internally generated | Externally generated |
|---|---|
| Strongly supported by regime | Sometimes no place in regime |
| Conceptualised and planned from within | Externally conceptualised and planned |
| Take longer to develop | Seem to just 'turn up' |
| Planned into system, therefore fits regime's goals | Struggle to get a 'foothold' in system |
| Planned into system's existing frameworks | Can chip away at problems with the system |
| Better funding mechanisms | Struggle for funding |
| Effective delivery difficult | Effective delivery difficult |
| Strategy-driven | Challenge a wider range of social issues |
| Challenges and failures and their associated lessons are more likely to be held internally | More likely to publicly report challenges, failures, and limitations |

programmes. This suggests that if innovative projects and programmes are to succeed and avoid floundering through 'business as usual' processes, enabling structures are needed.

While all of the projects and programmes have had elements of design and innovation, externally-driven projects have sometimes identified areas of evidence-based need that are not currently government priorities. For example, Future Streets focused on focused on low socio-economic and Māori/Pasifika needs for safe and active travel, which was not a national government transport focus at the time the project commenced. Thus, more difficult questions may be asked through external projects because they come with the flexibility of being outside of the system.

While all projects and programmes had elements of innovation and risk taking, external projects are more likely to publicly report challenges, failures, and limitations (e.g. within the context of published research papers) and this has the potential to challenge norms. However, government-generated projects and programmes could have a higher chance of success, as they can be planned into the various funding and delivery systems more easily and have the potential to be driven by leadership inside the system. Then again, they may lack innovation as they are generated from within the regime, and therefore reflect the entrenched 'ways of working' within delivery agencies (Table 14.3).

## 14.4 Discussion

STS Theory offers insights into the role of niches in changing the nature and outcomes of regimes. The five niche projects and programmes presented, all focused on creating opportunities for safer and easier community walking and cycling. Using STS Theory highlights the challenges that these niche projects and programmes typically have

in being adopted, delivered, and ultimately in influencing everyday practice. Experiments, demonstrations, or niches to test new ideas must ultimately influence the wider regime—the deep structure of rules, processes, and ideas that reinforce and sustain existing ways of working. These niche projects and programmes may challenge what is considered 'normal' in regimes and help drive system changes [41]. Within this, many different system components, actors, and inter-relationships impede or allow this to happen [44]. Some of the key themes, as experienced by these niches, are discussed below.

### *14.4.1 Conceptual Acceptance and Leadership*

A starting point for all niche projects is that there is some change needed or problem to be addressed. In the cases reported, the need was for new infrastructure to enable a mode shift to safe active travel. Conceptually this problem definition needs to be accepted by those with the power to allow (or disallow) niche demonstrations of safe and healthy streets to occur, and to provide leadership support.

For some time in Aotearoa transport strategies have pointed to the need for safer roads and improved walking and cycling provision, and there was no evidence of overt strategic denial of this need in any of the niches described. However, conceptual denial of the need for niches to demonstrate concepts of safe and healthy streets may be more subtle and there is some evidence across the projects of system actors not buying into the concept, including negative media narratives, resistant organisational (and individual) norms, and risk aversion. Although left unstated in these projects, it may also be that some key actors (individuals or organisations) fundamentally did not believe that these projects were worthy of investment despite a national mandate—resulting in their delivery being undermined in subtle ways. It is difficult to ascertain whether this was the case, or whether individuals agreed with the projects but simply did not see a way to deliver them within system constraints.

The niches described, (with the exception of some of the UCP's higher-profile city centre focussed cycleways), were all community based active travel safety projects and programmes. Within the regime, these appeared to have lower status compared with large infrastructure projects such as new rail systems or motorways. Strong leadership for community transport was harder to develop. An 'A-Team/B-Team' status for projects in organisations can develop, with the A-Team being large budget, high profile, often politically important projects that attract significant resources and are fast-tracked to ensure effective delivery. On the other hand, B-Team projects struggle through the complex planning system, often without strong senior level support, with a high risk of not being delivered. Although the MCP and UCP programmes enjoyed nationwide support, some of the regional projects within these umbrellas, and the three other externally driven projects described all showed evidence of 'B-Team' status. It is clear that safe neighbourhood walking and cycling were not seen as important as other priorities at all levels. One effective way to get buy-in for projects and programmes across all system levels is to highlight the project need in terms

of its direct benefit for people—how it can make their daily lives better. This was demonstrated by the Future Streets project, which only succeeded once the potential human-scale benefits to the local community became apparent to the delivery agency and political leaders [66].

Delivery of the UCP and MCP programmes suggest niches have a better chance of being implemented if they are nested within the regime with a level of cross-system buy-in from the outset. Conversely, we have presented examples of potentially very important niche projects, which, due to their lack of cross government support, have, or are still struggling to emerge in any tangible form.

Champions were critical to all projects and programmes described, ranging from proactive delivery officers to the highest levels of government. Yet in some ways these individuals acted to paper the cracks when cross-system leadership was lacking. Champions tended to be passionate individuals who go above and beyond their job descriptions to make things happen—often at personal risk. They need better support from senior organisational leadership.

Although it is difficult to make a definitive link between the underlying social environment and the success of the projects and programmes as niches, it is likely that at a landscape level, social norms have a political influence on the emergence, delivery, and ultimately the impact of the projects and programmes. Certainly, resistance to loss of parking from cycle lanes, and preferences for automobile provision are evident from all projects and programmes.

Overall, the analysis suggests that mostly these projects and programmes were accepted by system actors, but variable levels of leadership across government have challenged the delivery of some of the niches. The greatest challenges related to the regime's structure—the existing planning and delivery mechanisms.

### *14.4.2 System Delivery*

In this section, the planning and delivery issues which were key to the outcomes of the niches are described.

#### 14.4.2.1 Policies, Procedures, and Ways of Working

The policies, processes, and procedures that are established within transport delivery systems, are (for good reason) in place to ensure quality, accountability, consistency, and safety. However, there is little room in this system for experimentation, innovation, and testing disruptive ideas, which is crucial if change is to happen. This paradoxically suggests that the transport delivery regime has confidence that current policies and procedures are fit for purpose, and yet outcomes for many city transport systems are far from optimal and in dire need of change. For Future Streets in particular, there were conflicts between the intention to be innovative and nimble, and the delivery system's requirement for consistency and repeatability. There was also a

lack of clarity about the trial system [48], and innovative techniques such as using temporary measures were therefore not possible within the delivery expectations of the project.

Most projects described have suffered from complicated, inconsistent, or onerous business cases, funding applications, or planning approvals. These requirements, designed to make funding processes robust also created delay and uncertainty, and frustrated relationships with the communities awaiting delivery. The extent to which the system itself is configured to enable innovation to flourish (or not) is generally ignored in the general acceptance of 'how things are'. This points to a need for more sophisticated evaluation of projects—not just on short-term outcomes, but also of the implementation process. Evaluative exercises to better understand the process of delivery and the tensions that exist [48], have proved very useful thus far.

#### 14.4.2.2 Funding

The reality is that there are always more project ideas than money and therefore it is critical to have a strategic planning and prioritisation process in place to determine what to invest in, when, where, and why. However, external niche projects often arise outside of the funding planning process and therefore can get stuck in a vicious planning cycle: not being able to start a project because funding is not in place. However, funding requires a scope of work and a scope of work requires quality stakeholder engagement to define it—especially if it is to respond to community needs and aspirations. Engagement, in turn, is not possible because funding is not in place and conversations might raise community expectations with the risk of non-delivery.

The rigid nature of the NLTP and other funding systems often stymied the occurrence of niche projects as they did not fit within funding cycles and did not necessarily meet strategic priorities (because by definition they are suggesting something new). This is particularly the case for active travel-focussed projects, as funding is still relatively limited in this area, despite strategic signals. For example, Aranui Connections and SHSSA both had strong community, and high-level political support, but funding was not forthcoming. This was due to an apparent lack of mechanisms within the national and local government agencies to expedite projects that fell outside the four-yearly NLTP funding scheme. Many of the projects were delivered within the context of constrained funding, yet it could be argued that the issue was of funding allocation rather than total funding available for transport. Funding allocations given to walking and cycling projects in general (let alone niche walking and cycling projects) never matched the strategic aspiration for more walking and cycling.

#### 14.4.2.3 Community and Delivery Tension

Community engagement and empowerment leads to user-friendly investment, but this effort is hard to justify in linear transport planning systems that prioritise swiftness

in the design and delivery process, ironically to make promises of efficient delivery to communities. Up-front engagement and data collection to effectively understand community needs and aspirations is valuable but can be time consuming. Progress updates during the delivery phase is also desirable.

Landscapes are diverse and some align more closely with regime values than others. For example, the norms, cultures, and ways of doing things in diverse low-income communities are very different from the procedural-focussed methods of transport delivery agencies. Experimenting with temporary measures also does not fit well with accepted project management processes and community expectations. Sometimes 'just getting on with it' is what communities want, but even that can be difficult. There is a need to design delivery systems that are responsive and efficient, yet still account for community voice at key stages to yield maximum benefit.

### *14.4.3 Wider Influence*

The regime of transport planning and delivery is likely to reflect the social landscape in which it serves. In this chapter, it was demonstrated how the theme of automobility influenced all project and programme aspects, from their existence, to the extent to which lessons are adopted by the regime. Change is difficult and existing narratives are strong. Nevertheless, a hint of how the regime and landscape slowly changes over time in response to niches was demonstrated by the MCP. Within this early context, walking and cycling projects were scarce, with few resources available in planning systems, yet the hunger for their uptake—demonstrated by the 22 competing bids—was evident. By contrast in today's planning system, walking and cycling projects are more routine, although they still suffer from under-investment.

Of the three externally driven projects, Future Streets showed some regime impact by creating more focus on low-socio economic communities, Māori and Pasifika, suburban community area-wide interventions, and, where appropriate, prioritising pedestrians and cyclists over vehicles. However, various attempts to operationalise the Future Streets idea more widely are still struggling to be established.

The impact of the MCP and UCP may also point to the scale of intervention and time needed for niches to ultimately influence the regime. The nationwide focus of both programmes, with the multiple projects sitting under them, has clearly influenced ongoing practice, attitudes, and ways of working and many of today's new projects have emerged from earlier UCP effort, even if (as of February 2020) some UCP projects are still to be delivered.

There was no evidence of a systematic approach to continuous improvement and scaling up as part of the implementation of any of the niches. In theory, any level of success should be followed by refinement and continued investment, but this has not occurred. This reflects the siloed nature of funding packages, and to the inherent difficulties in scaling prototypes or pilots in widespread practice.

### *14.4.4 Considerations for Regime and Societal Change*

Local niche innovations are as important for the systemic barriers that they reveal, as they are for their local impacts. Niche projects cumulatively cause disruption in the socio-technical system, but they need an immense effort both in terms of delivering niches, and the scale of change that is needed. Only through the relentless pushing of boundaries, iteration, and scaling of promising concepts, with internal continuous improvement will the regime change in any substantial way. To develop a culture of niche projects at a magnitude of effort that will eventually change existing regimes, they must be built into planning and delivery systems. It would be mistaken to assume that these isolated projects will lead to widespread system change, when the vast majority of transport effort is committed to status quo activities. More work is needed to conceptualise the mechanisms by which widespread or nationwide change could be achieved. This may include more or larger niches, through programmes that facilitate testing, iteration, and scaling up.

There is already increasing recognition at an institutional level that process change is necessary to facilitate a faster rate of progress. For example, NZTA's *Innovating Streets for People* programme responds to this challenge by focussing on system issues to make it faster and easier to transition streets to safer and more liveable spaces. This is an important start to a culture of doing things differently from within the Transport planning system. Whilst the infrastructure changes from this programme have a micro focus (e.g. streets, or sections of a street), eventually the programme may create sufficient system change to operate at a scale that leads to widespread and national level planning and delivery change, and a focus on programmes with a macro approach (e.g. connected networks, suburb-level).

While niche projects are important disruptors of the status quo, the regime is also constantly working from within to continually improve. The change pathways are different (evolution vs disruption), but both are valuable for overall system improvement. However, the ability for agencies to respond and evolve is often hampered by organisational changes, high staff turnover, and loss of institutional memory. External consultants, researchers, and advisors are often the holders of knowledge as they remain when agency staff are continually leaving and arriving. While this may seem slightly peripheral to the success of niches, it is a crucial system issue that needs to be addressed. The reality is that a community of practice exists around most niches with government officials, researchers, consultants, and community stakeholders all working together. The more that these effective multi-agency teams can continue to work together in ongoing programmes, the more likely that niches will succeed, and regimes and landscapes will be altered.

### *14.4.5 Implications for Practice*

The literature suggests that niche projects are important to make change in regimes happen [42]. The analysis carried out in this chapter suggests that there are conditions under which niche projects are more likely to succeed in concept, delivery, and regime impact. These are briefly outlined:

- *Wider system acceptance that things need to change*: Aligning planning and delivery objectives with strategic objectives with processes and ways of working to match.
- *An acceptance that niches can help manage long-term investment risk, rather than represent unnecessary risk to be avoided*: Testing ideas through niches, before substantial nationwide investment is a prudent risk management strategy.
- *A built-in innovation function within national and local government, with niches as accepted practice*: Mechanisms to expedite, fund, manage, and evaluate niches outside of existing planning processes, with a requirement that feedback from lessons learned are formally absorbed into regime processes for continual improvement.
- *Efficient delivery and learning*: Making sure niche projects are delivered quickly so that momentum is maintained, trust in promising concepts is maintained, and evaluation, iteration and scaling up can occur in a timely way.
- *A plan for scaling up and regime influence*: Formal and structured implementation of successful niche outcomes acknowledging that scale, time, and network completeness is needed for full benefits to be realised. A staged approach to implementation may therefore be prudent; single concept test, followed by more demonstrations, and eventually if success is emerging then roll-out and embedding in regime policies and processes. This process has worked well with other road safety projects [67].
- *A community of practice*: More focus is needed on shared learning between city councils and national government agencies, as well as practitioners, policy makers, community stakeholders, and researchers working together, with the goal of innovation and continually improved transport implementation and delivery.

## 14.5 Conclusion

Neighbourhood streets that support all modes for commuting, recreation, the environment, and social interaction are critical for the health, social, and economic well-being of towns and cities. By innovatively redesigning neighbourhood streets, we can promote stronger, healthier, and safer communities, and encourage the uptake of environmentally sustainable travel.

However, automobility, embedded within an STS that buffers against change still structures our daily lives. The social norms, customs, and practices of car use are

held in place by the regime: supportive infrastructure; policy logics; and professional practices, with a grip that can stifle innovation.

The magnitude of change that is needed for transport systems to deliver on today's societal and environmental challenges—including urgent road safety, public health, climate change, and urban liveability—is enormous. Despite promising initiatives, overall there is a theme of an inadequate rate of progress.

Currently, barriers maintained inherently within the system obstruct the fulfilment of street improvements that cater to safe and healthy outcomes for all users. For urban street re-design projects, the issue is often to do with national and regional priorities, funding allocation, co-investment models, and entrenched ways of working, rather than absence of need or community buy-in. A significantly increased programme of internal and external niche projects is needed within built-in innovation functions with appropriate resourcing and empowered senior leadership to challenge the current system and ultimately add greater public value.

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