Transport Economics Knowledge Hub

The Ministry’s Social Impact Assessment Framework

Geoff Parr & Philip Caruana
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Grant Thornton Building, Level 13

Enabling New Zealanders to flourish
Some Acronyms...or Initialisms?

GPS...?
LSF...?
CBA...?
EEM...?
CIA...?
HIA...?
SIA...?
DIA...?
Transport priorities generate transport-related policies

Policies lead to costs & benefits – the impacts

Impacts contribute to outcomes

(Transport Outcomes)

(Wellbeing Outcomes)

(Wellbeing Budget 2019)

(Four Capitals)
GPS 2018 has 4 priorities…
NZTA’s EEM lists several transport impacts

- Environment
  - Financial impacts
  - Health
  - Wider economic impacts
  - Safety
  - National strategic factors
  - Travel time savings
  - Connectivity
  - Accessibility

*Note some of these impacts are only expected during construction phase of road projects*
Transport Outcomes Framework has 5 outcomes

- **Inclusive access**: Enabling all people to participate in society through access to social and economic opportunities, such as work, education, and healthcare.

- **Healthy and safe people**: Protecting people from transport-related injuries and harmful pollution, and making active travel an attractive option.

- **Economic prosperity**: Supporting economic activity via local, regional, and international connections, with efficient movements of people and products.

- **Environmental sustainability**: Transitioning to net zero carbon emissions, and maintaining or improving biodiversity, water quality, and air quality.

- **Resilience and security**: Minimising and managing the risks from natural and human-made hazards, anticipating and adapting to emerging threats, and recovering effectively from disruptive events.
The Living Standards Framework

Wellbeing outcomes: 3 market + 9 non-market
• Relate to current wellbeing / life satisfaction
• Drive investment in the 4 capitals

Four capitals: human, social, natural, physical/financial
• Future / intergenerational wellbeing is measured by the 4 capitals
• Future wellbeing relies on the growth, distribution and sustainability of the 4 capitals
• Foreign inflows / outflows of capitals affect the foreign investment position (BOP)
• The 4 capitals generate wellbeing outcomes via multifactor productivity (MFP)
Intergenerational wellbeing relies on the growth, distribution, and sustainability of the Four Capitals. The Capitals are interdependent and work together to support wellbeing.
New Zealand’s average level of current well-being: Comparative strengths and weaknesses

- Subjective Well-being
  - Feeling safe at night
  - Life satisfaction
- Income and Wealth
  - Household income
  - Household net wealth
- Personal Security
  - Homicides*
- Environmental Quality
  - Air quality
  - Water quality
- Civic Engagement and Governance
  - Voter turnout
  - Having a say in government
- Social Connections
  - Social support
  - Cognitive skills at 15
  - Adult skills
  - Educational attainment
- Education and Skills
  - Basic sanitation
- Health Status
  - Perceived life health expectancy
  - Time off
- Work-life Balance
  - Employment
  - Earnings
  - Labour market insecurity*
  - Job strain*
  - Long-term unemployment*
  - Rooms per person
  - Housing affordability

* indicating additional notes or qualifications.
Treasury’s LSF has 4 capitals…

The Four Capitals

Intergenerational wellbeing relies on the growth, distribution, and sustainability of the Four Capitals. The Capitals are interdependent and work together to support wellbeing.

**Natural Capital**
This refers to all aspects of the natural environment needed to support life and human activity. It includes land, soil, water, plants and animals, as well as minerals and energy resources.

**Human Capital**
This encompasses people’s skills, knowledge and physical and mental health. These are the things which enable people to participate fully in work, study, recreation and in society more broadly.

**Social Capital**
This describes the norms and values that underpin society. It includes things like trust, the rule of law, the Crown-Māori relationship, cultural identity, and the connections between people and communities.

**Financial / Physical Capital**
This includes things like houses, roads, buildings, hospitals, factories, equipment and vehicles. These are the things which make up the country’s physical and financial assets which have a direct role in supporting incomes and material living conditions.
“Social capital has a large and well-evidenced impact on economic performance, democratic functioning, public safety, educational outcomes, labour market outcomes, and individual health and wellbeing.

The particular risk is that government agencies take it for granted because it is rarely measured.

Potentially detrimental effects include increased income inequality, poverty, housing mobility and ownership rates, family and whanau wellbeing, institutional quality, educational outcomes and individual health and wellbeing.”

From a presentation by Tim Ng.
Cost/benefit analysis (CBA)
• Add up all the costs (and discount them to Present Values)
• Add up all the benefits (and discount them too)
• Divide benefits by costs B / C
• Benefit / cost ratio (BCR) = a number

BCR > 1 means yeah
BCR < 1 means nah
BCR = 1 means…?
CBA versus SIA / DIA

CBA is an **aggregate** analysis

But there may be different impacts on different groups of people

Therefore, segment the population to see how the impacts are **distributed**

That’s a Social Impact Assessment (SIA)

Or, at least a Distributional Impact Assessment (DIA)
Segmenting the population

Total Benefits & Costs:
• By region, or by urban / rural, or by meshblock, etc (spatial)
• By income group, age group, ethnicity, gender, disability status, etc

Other ways of slicing the population:
• Family size, single parent, car / non-car owner, number of cars
• Household, whanau, individuals, communities
• Household characteristics

But: disaggregation depends on good data!
SIA versus DIA

DIA = disaggregated CBA

SIA is so much more...as one peer reviewer noted:

“A full SIA seeks to understand the issues; predict, analyse and assess the likely impact pathways; develop and implement strategies; and design and implement evaluation & monitoring programmes.”

SIA also generally involves consulting with those likely to be impacted by a policy or measure
Impacts and outcomes

Impacts of policies correspond to:
• Priorities in the GPS on Land Transport
• Transport outcomes in the Transport Outcomes Framework
• Wellbeing outcomes in the Living Standards Framework

Common ground across these frameworks:
• Access…to work, education, healthcare, recreation, social connections
• Safety…security, resilience, health (accidents)
• Environment…air quality, noise, amenity
• Health…active transport modes, obesity, safety
If one combines the Capabilities Approach of Amartya Sen and the Egalitarian Approach of John Rawls, then transport-related policies and measures can impact on three transport inequalities:

- Inequality of transport-related resources,
- Inequality of observed daily travel behaviour, and
- Inequality of transport accessibility levels.

The Accessibility Standard suggests that it is best to address the third inequality.
Analysis of the distributional effects of transport policies on accessibility should take account of:

- the setting of **minimum standards** of accessibility to key destinations,
- prioritising disadvantaged groups,
- reducing inequalities of opportunities, and
- mitigating transport externalities
The Ministry will mostly do desktop DIAs rather than full-blown SIAs:

- Perform a CBA
- Disaggregate the impacts by segmenting the population
- Identify groups who will be negatively / positively impacted
  - Think about impact pathways
- Are any groups vulnerable? => Equity considerations
- Can the policy be amended so that impacts on vulnerable groups can be more positive or less negative?
- If not, can compensation or mitigation be applied?
Transport Policies

Transport mode choice

Demand

Accessibility to destinations

Demographics

Traffic

Air pollution

Noise

Social isolation

Personal safety

Physical inactivity

Traffic incidents

Greenhouse gas and particulate emissions / climate change

Obesity, overweight, cardio-metabolic risk factors

Road trauma

Respiratory disease

Heat stress

Infectious diseases

Mental illness

Major chronic diseases

LSF wellbeing domains, Māori wellbeing domains, wellbeing capitals, transport outcomes frameworks

Socio-economic position and area level disadvantage
Equity standards

Vertical equity – differential impacts on people with different abilities or needs, e.g. income, ethnicity, disability, gender

Horizontal equity – impacts on people with same ability and need, but in different areas

Equity standards
- Basic needs standard
- Accessibility (capabilities) standard

Remember: health, safety, environmental and affordability impacts
Some equity indicators

• Congestion impacts (depends on measure)
• Vehicle km travelled/passenger km travelled
• Number of trips
• Mobility need (depends on measure)
• Affordability (% of income)
• Availability of alternative travel options (e.g., public transport)
• Mode change (car to PT)
• Route change
• Time change
Define policy option(s)
- Policy designs
- Mitigation potential and options

Define what we mean by transport equity
- Define equity dimensions (e.g., horizontal, vertical or spatial)
- Select equity standards (e.g., proportionality, market-based, etc.)

Determine how to segment the population
- Choose the variables of segmentation (e.g., User type and household income)
- Choose the unit of segmentation (e.g., household versus individuals)

Define what we measure
- Choose equity indicators that measure the costs and benefits of intervention
- Choose equity indicators that measure the travel conditions for different groups

Evaluate the indicators for each unit of segmentation
- High level evaluation based on micro data
- Detailed evaluation based on modelling results (if warranted)

Compare changes in equity indicators to identify winners and losers
- Compare results by population segment
- Compare results by target group

Rank policy options based on equity standards defined

Source: ITF and Bills & Walker (2017)
Examples of policy CBAs/SIAs

Mandating ABS / CBS on motorcycles
(anti-lock / combined braking systems)

**CBA:**
- Costs are (mainly) the extra price of bikes with ABS / CBS
- Benefits are safety-related: the majority of crashes are braking-sensitive

**SIA:**
- Segment the population
- Examine differential impacts on income groups, urban/rural, ethnic, …?
Examples of policy CBAs/SIAs

SuperGold public transport card

CBA:
• Costs are borne by other PT users or taxpayers in general
• Benefits are accessibility for the elderly
  • Especially those with low incomes

SIA:
• Segment the population
• Examine differential impacts on the aged (beneficiaries), and on fare-paying PT users?
Examples of policy CBAs / SIAs

Potential low-emissions policies (re Productivity Commission report)

• Feebates
• Vehicle Fuel Efficiency Standard
• Vehicle Scrappage Scheme for Auckland

CBAs give an idea of the overall viability of these proposed interventions

SIAs examine the distribution of impacts on vulnerable groups, especially in terms of affordability of new costs imposed
Putting into practice
Why Measure Social Impact?

- Transport Policy Interventions may target:
  - Price of the vehicle (e.g. import tax)
  - Use of the vehicle (e.g. fuel tax, WoF)
  - Places the vehicle is driven to/from (e.g. toll charge)
  - Time it takes for the vehicle to be driven to/from a place (e.g. congestion charge)

- SIA sheds light on the impact on specific households and;
- One or more (or all) of the above may impact the same household type -> and to varying degrees.
Data Sources

- **Households:** Census, Household Expenditure Survey, Household Travel Survey (HTS)
- HTS is a continuous personal travel survey run by MoT:
  - 7 day travel diary (2015-2018)
- **Vehicles:** Motor Vehicle Register (MVR), Private Companies (on vehicle prices)
- MVR addresses matched with HTS addresses (with permission)
  - matched vehicle and household info
- MVR data on vehicles and owners

Assessing the Social Impact of Transport Policy
HTS distinguishes between the following household types:

- Single adult living with children
- Person living alone
- Married/de facto couple only
- Family with children
- Family with adults only

SIA requires further disaggregation; e.g., by vulnerable households:

- Person living alone & over 65 years old
- Large families with a low income
- Households with at least 1 Maori (or other ethnicity)
Definitions are Important

Various ways to define **Household income**
- Before tax e.g. HTS
- After tax
- After tax and housing cost/basic needs/living expenses
- Equivalised income:
  - Per Capita
  - Square Root
  - Easton (1973) & (1980)
  - Smith (1989)
  - Michelini (1999)

Different weightings for adults & children
The Problem of Digging Too Deep

Sample size quickly dwindles with greater disaggregation

- Vehicles owned by Persons Living Alone: 994
- Vehicles owned by Elderly Persons Living Alone: 389
- Petrol Vehicles owned by Elderly Persons Living Alone: 354
- High Emissions Petrol Vehicles owned by Elderly Persons Living Alone: 110
## Two Way Output Table

### Assessing the Social Impact of Transport Policy

#### Household by district

<table>
<thead>
<tr>
<th>Household by district</th>
<th>Equalised household income per annum</th>
<th>Basic information – number of households</th>
<th>Equity indicator - estimated increase in travel cost per HH per week and as a % of income</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Under $20,000 ($288 per week)</td>
<td>District A: 50 (1%) 500 (6%) 500 (6%) 200 (3%)</td>
<td>District A: $5 (1.7%) $5 (0.7%) $5 (0.4%) $5 (0.3%)</td>
</tr>
<tr>
<td></td>
<td>$20,001 to $50,000 ($673 per week)</td>
<td>District B: 100 (1%) 500 (6%) 700 (9%) 100 (1%)</td>
<td>District B: $5 (1.7%) $10 (1.5%) $15 (1.2%) $20 (1.0%)</td>
</tr>
<tr>
<td></td>
<td>$50,001 to $75,000 ($1,202 per week)</td>
<td>District C: 400 (5%) 1000 (13%) 2000 (25%) 100 (1%)</td>
<td>District C: $10 (3.5%) $20 (3.0%) $30 (2.5%) $50 (2.6%)</td>
</tr>
<tr>
<td></td>
<td>Over $75,000 ($1,923 per week)</td>
<td>District D: 200 (3%) 1000 (13%) 500 (6%) 50 (1%)</td>
<td>District D: $20 (6.9%) $30 (4.5%) $50 (4.2%) $80 (4.2%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total: 750 (9%) 3000 (38%) 3700 (47%) 450 (6%)</td>
<td>Average: $12 (4.0%) $19 (2.8%) $26 (2.2%) $27 (1.4%)</td>
</tr>
</tbody>
</table>

- **Highest percentage impact:** District C
- **Highest $ impact:** District D
- **22% of the population most impacted:** District D
Some Limitations

- Inherent limitations of surveys
  - Info only as good as people supply
    - *e.g. Decline to give income, ethnicity: Jedi…*
- Data entry errors in the MVR
- Mismatches during the MVR/HTS matching process
- Sample size not representative

Future work
- Increased detail
- Increased sample
Questions
g.parr@transport.govt.nz
p.caruana@transport.govt.nz

Thank you
Upcoming TKH events

Transport Knowledge Conference 2018
• Rydges Hotel, Wellington
• Thursday 15 November
• Registrations open this week

TKH research colloquium
• Wednesday 14 November


knowledgehub@transport.govt.nz