New Zealanders’ travel patterns: trends in trip chaining and tours

Pinnacle Research & Policy Ltd
Capital Research
Background

• Updated earlier study of New Zealanders’ trip chain and tour travel patterns using the 1997/98 NZHTS with a comparative analysis using the recently compiled 2004–07 Ongoing NZHTS dataset

• Where differences are ‘statistically significant’, we describe them as ‘significant’
New Zealand household travel surveys

- 1997/98 NZHTS was a repeat of an earlier 1989/90 survey
- NZHTS established on a continuous basis in 2003
  - Fairly typical HTS approach: all individuals in randomly selected households interviewed about 2 consecutive days of travel
  - 4 years of data = complete dataset for analysis by region, main urban centres, age, etc
  - Essentially same questions as earlier surveys, some coding differences
  - Major change: collecting data using CAPI
What are we talking about? (1)

- 4 segments
- 2 trip chains
- 1 tour
What are we talking about? (2)

• **Main mode** - the mode used for the greatest distance in the trip chain or tour

• **Main purpose** – hierarchical
  – based on the assumed strength of the activity or purpose to shape the individual’s movement
  – 3 main purposes:
    • Subsistence (work or education)
    • Maintenance (e.g. medical/dental/personal business)
    • Discretionary (social & recreational)
Trends in trip chaining
On a typical day, New Zealanders averaged…

- 4.3 segments (trip legs)
- 2.4 trip chains
- 1.3 tours

- No change between 1997/98 & 2004-07
Males making more trip chains

- Males significantly increased their mean number of trip chains from 4.8 to 5.2 over two days
- Females completed significantly less: 4.6 over two days
- Males more commonly complete 6+ trip chains over two days (37% c/w 32%)
Trip chains were less complex

• Mean number of segments declined significantly from 1.9 to 1.7
• 7 percentage point increase in one-segment chains: 48% to 55%
  – 4% decline in 2-segment chains
  – 3% decline in 3-, 4-, and 5-segment chains
• Big increase in one-segment vehicle driver trip chains: 47% to 58%
• More trip chains used a single mode
Vehicle driver trip chains were more common

- Grew significantly from 48% to 53%
  - Relative increase of 11%
- Walk only trip chains declined from 13% to 11%
  - Relative decrease of 15%
Short trip chains

• Generally accepted in NZ that distances
  – Up to 2 km are ‘walkable’
  – Up to 6 km are ‘cyclable’

• Evidence for these suppositions (2004-07):
  – 72% of walk trip chains were < 2km
  – 82% of cycling trip chains were < 2km

• Short chains are considered targets for travel behaviour change initiatives
Mode use did change for short trip chains…

- 50% of all trip chains were < 6km & 21% were < 2km (no change)
- Walk share of trip chains < 2km fell significantly: 45% to 39%
- Vehicle driver share increased significantly from 30% to 38%
Trends in tours
2 types of tour classification

- 1\textsuperscript{st}: same as chains (hierarchical)
- 2\textsuperscript{nd}: classified by complexity and purpose
  - Included time of day, purpose and structure of tours
  - Multi-part and composite
  - 10 tour types created
## Tour types

<table>
<thead>
<tr>
<th>Tour description</th>
<th>Sequence&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple work</td>
<td>h—w—h</td>
</tr>
<tr>
<td>Multi-part work</td>
<td>h—w—(w)&lt;sup&gt;b&lt;/sup&gt;—w—h</td>
</tr>
<tr>
<td>Composite to work</td>
<td>h—psl/e—(psl/w/e)—w—h</td>
</tr>
<tr>
<td>Composite from work</td>
<td>h—w—(psl/w/e)—psl/e—h</td>
</tr>
<tr>
<td>Composite to and from work</td>
<td>h—psl/e—(psl/w/e)—w—(psl/w/e)—psl/e—h</td>
</tr>
<tr>
<td>Composite at work</td>
<td>h—w—(psl/w/e)—psl/e—(psl/w/e)—w—h</td>
</tr>
<tr>
<td>Simple / multi-part education&lt;sup&gt;c&lt;/sup&gt;</td>
<td>h—e—(e)—h</td>
</tr>
<tr>
<td>Composite education &amp; non-work</td>
<td>h—psl—e—(psl)—h and h—(psl)—e—psl—h</td>
</tr>
<tr>
<td>Simple non-work/non-education</td>
<td>h—psl—h</td>
</tr>
<tr>
<td>Multi-part non-work/non-education</td>
<td>h—psl—psl—(psl)—h</td>
</tr>
</tbody>
</table>

<sup>a</sup> H = home  w = work  e = education  psl = personal business/social/leisure/etc
Basic tour stats unchanged

Means in 1997/98 and 2004-07:

- 1.3 tours per person per day
- 3.1 segments per tour
- 13 - maximum number of tours within two travel days

- Unlike trip chains, no change in male tour-making habits
- Males significantly more likely to make 2-segment tours (58%) than females (54-55%)
Tour mix showed signs of change

<table>
<thead>
<tr>
<th>Tour type</th>
<th>1997/98 (%)</th>
<th>2004–07 (%)</th>
<th>Absolute change (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple non-work/non-education tour</td>
<td>41.3</td>
<td>40.0</td>
<td>-1.3</td>
</tr>
<tr>
<td>Multi-part non-work/non-education tour</td>
<td>24.9</td>
<td>23.9</td>
<td>-1.0</td>
</tr>
<tr>
<td>Simple work tour</td>
<td>10.6</td>
<td>12.7</td>
<td>2.1</td>
</tr>
<tr>
<td>Multi-part work tour</td>
<td>3.2</td>
<td>3.2</td>
<td>0.0</td>
</tr>
<tr>
<td>Composite to work tour</td>
<td>2.0</td>
<td>2.2</td>
<td>0.2</td>
</tr>
<tr>
<td>Composite from work tour</td>
<td>4.0</td>
<td>4.3</td>
<td>0.3</td>
</tr>
<tr>
<td>Composite to and from work tour</td>
<td>1.7</td>
<td>1.9</td>
<td>0.2</td>
</tr>
<tr>
<td>Composite at work tour</td>
<td>2.0</td>
<td>1.8</td>
<td>-0.2</td>
</tr>
<tr>
<td>Simple/multi-part own-education tour</td>
<td>6.8</td>
<td>6.7</td>
<td>-0.1</td>
</tr>
<tr>
<td>Composite own-education &amp; non-work tour</td>
<td>3.6</td>
<td>3.4</td>
<td>-0.2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100.0</strong></td>
<td><strong>100.0</strong></td>
<td>–</td>
</tr>
</tbody>
</table>
Older people’s tour types showed some change…

- 60+ decreased their simple & multi-part non-work/non-education (psl) tours from 91% to 85%
- Corresponding increase in work-related tours from 4% to 8%
- Not quite significant
- Reflects more older people working than previously
…and they were making more tours as vehicle drivers

<table>
<thead>
<tr>
<th>Main mode of tours</th>
<th>Age 60+</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1997/98</td>
</tr>
<tr>
<td>Tours (unweighted count)</td>
<td>N=4709</td>
</tr>
<tr>
<td>Vehicle driver</td>
<td>59.9%</td>
</tr>
<tr>
<td>Vehicle passenger</td>
<td>18.9%</td>
</tr>
<tr>
<td>Walk</td>
<td>17.8%</td>
</tr>
<tr>
<td>Cycle</td>
<td>1.6%</td>
</tr>
<tr>
<td>Passenger transport</td>
<td>1.3%</td>
</tr>
<tr>
<td>Not defined</td>
<td>0.5%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>

While not quite significant, these changes are in line with other results, such as increased driver licence-holding rates.
Vehicle driver tours were more common

- Vehicle driver only tours significantly increased: 47% to 50%
- Vehicle driver the ‘mode of choice’ for all types of work tours (77-81% of these)
- Less common for non-work/non-education tours (50-54%)
Men and women’s share as driver & passenger unchanged

- Men more likely than women to be vehicle drivers (54% c/w 46% for all tour types)
- Women more likely to be passengers (59% c/w 41%)
Other findings re: trends

• Tour lengths were unchanged
  – About 26-27% were < 4km long
  – 52-53% were < 10 km long
• ‘Metro NZ’ (Auckland, Wellington, Christchurch) significantly increased their simple work tours from 9% to 11.5% of all tours
• Vehicle driver tours were constant at 50-51% in Metro NZ
  – Contrasted with New Zealand as a whole: vehicle driver tours increased from 51% to 54% of all tours
## Shopping: a modern pastime

<table>
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<tr>
<th>Tour description</th>
<th>Sequence&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple work/education tour</td>
<td>h—w/e—h</td>
</tr>
<tr>
<td>Complex work/education tour (including composite &amp; multi-part work/education tours)</td>
<td>h—w/e—(w/e)&lt;sup&gt;b&lt;/sup&gt;—w/e—h or h—pl—(pl/w/e)—w/e—h or h—pl—(pl/w/e)—w—(pl/w/e)—pl—h</td>
</tr>
<tr>
<td>Shopping combined with work/education tour</td>
<td>h—s—w/e—h or h—w/e—s—h or h—s—w/e—s—(s)—h or h—w/e—s—(s)—w/e—h</td>
</tr>
<tr>
<td>Simple personal business/leisure tour</td>
<td>h—pl—h</td>
</tr>
<tr>
<td>Multi-part personal business/leisure tour</td>
<td>h—pl—pl—(pl)—h</td>
</tr>
<tr>
<td>Simple shopping tour</td>
<td>h—s—h</td>
</tr>
<tr>
<td>Complex shopping tour (including multi-part shopping tours &amp; shopping tours with non-work/non-education components)</td>
<td>h—s—s—(s)—h or h—s—s/pl—(s/pl)—h</td>
</tr>
</tbody>
</table>

<sup>a</sup> H = home w=work e=education s= shopping pl=personal business/social/leisure

<sup>b</sup> For multi-part tours, the sequence can be repeated multiple times.
Shopping analysis (2004-07)

- Simple and complex shopping tours formed 22% of all tours
- 26% of all tours have $\geq 1$ shopping segment
- About 61% completed as vehicle driver/vehicle driver & walk
- Simple shopping tours more likely to be short (54% were $< 6$km) c/w complex shopping tours (86% were $> 6$km)
- Not much difference between men and women’s shopping tours as share of all tours (17% c/w 22%)
Discussion

• Effect of NZ Govt investment to increase public transport use & to encourage walking and cycling not readily apparent
  – Share of driving trip chains & tours increasing, particularly shorter ones
  – In Metro NZ, evidence that vehicle driver tours haven’t increased in share is positive

• More older *drivers* are on the roads
  – Forming a larger portion of driver trip chains & tours
  – Implications for safety and for overall travel patterns