IMPACTS OF TRANSPORT INFRASTRUCTURE POLICIES

Dr. André Dantas, Senior Lecturer in Transportation Engineering.
Dr. Karisa Ribeiro, Transportation Engineer, MWH-Christchurch.
IMPACTS

Infrastructure Policy

80 0 80 160 Kilometers

NZ Coast
IMPACTS

?
IMPACTS OF POLICIES

Transportation system performance
(e.g. Perceived changes in travel times and costs)

Activity system functioning
(e.g. changes in land use and economic activities)
IMPACTS OF POLICIES

DYNAMIC CHANGES OCCURRING OVER TIME!!
IMPACT ASSESSMENT FRAMEWORK

Time ($T$) = 0
(PRESENT)

Infrastructure Policy ($IP^0$)

Transport System ($TS^0$)

Activity System ($AS^0$)

Socioeconomic changes ($SC^0$)

Impacts ($IM^0$)

$T = n - 1$

$IP^{n-1}$

$TS^{n-1}$

$AS^{n-1}$

$SC^{n-1}$

Impacts ($IM^{n-1}$)

$T = n$ (FUTURE)

$IP^n$

$TS^n$

$AS^n$

$SC^n$

IMPACTS ($IM^n$)
IMPACT ASSESSMENT FRAMEWORK

Scope of the analysis
IMPACT ASSESSMENT FRAMEWORK

Scope of the analysis

Spatial-temporal database

TS

AS

database
IMPACT ASSESSMENT FRAMEWORK

Scope of the analysis

Spatial-temporal database

Spatial-temporal changes
IMPACT ASSESSMENT FRAMEWORK

Scope of the analysis

Spatial-temporal database

Spatial-temporal changes

Cross-reference analysis
## IMPACT ASSESSMENT FRAMEWORK

**Scope of the analysis**

- Spatial-temporal database
- Spatial-temporal changes
- Cross-reference analysis
- Short, medium and long term impacts

<table>
<thead>
<tr>
<th>POLICY</th>
<th>IMPACT</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Transport System</em></td>
<td><img src="#" alt="+" /></td>
</tr>
<tr>
<td><em>Economy</em></td>
<td><img src="#" alt="HIGH" /></td>
</tr>
<tr>
<td><em>Society</em></td>
<td><img src="#" alt="MED." /></td>
</tr>
<tr>
<td><em>Environment</em></td>
<td><img src="#" alt="LOW" /></td>
</tr>
<tr>
<td><em>Energy</em></td>
<td><img src="#" alt="LOW" /></td>
</tr>
</tbody>
</table>
CASE STUDY

- 415 Km
- 220,000 vehicles/day
- 1,500 fatalities/year
CASE STUDY

(1970’s) - Policy: State Funded Regular Maintenance

(1980’s) - Policy: State Budgetary Crisis-Minimum Maintenance

(1990’s) – Policy: PPP-Concession-High Standard Maintenance
CASE STUDY
CASE STUDY

Sao Paulo City

Rio de Janeiro City

PDH Toll plaza
Population Changes (%)

-10.32 to 0
0 to 25
25 to 50
50 to 100
100 to 200

Municipalities

0 25 50 75 100 125 km
CASE STUDY

Sao Paulo City

Rio de Janeiro City

DC 1
DC 2
DC 3
DC 4
DG I
DG II
DG III

Toll plaza
ADT Changes (%)

-37.49 to 0
0 to 40
40 to 80
80 to 160
160 to 310

Municipalities

0 25 50 75 100 125 km
# CASE STUDY

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Population</strong></td>
<td>Highest levels of growth near SP and RJ Metropolitan areas</td>
<td>Industrial growth outside SP and RJ metropolitan areas creating a generalized growth tendency</td>
<td>Highest levels of growth near SP and RJ Metropolitan areas</td>
</tr>
<tr>
<td><strong>GDP</strong></td>
<td>Low growth rates elsewhere in the PDH region</td>
<td>Reduction in growth rates due to economic and political crisis</td>
<td>Formation of development centres with similar growth rates</td>
</tr>
<tr>
<td><strong>AADT</strong></td>
<td>Generalized high numbers and growth rates</td>
<td>Considerable reduction due to law enforcement and traffic safety measures, but still high</td>
<td>Sharp reduction combined with soaring numbers in different road segments</td>
</tr>
<tr>
<td><strong>Accidents</strong></td>
<td>Suburbanization in SP and RJ metropolitan areas converting rural into residential and industrial land use</td>
<td>General increased in suburbanization levels</td>
<td>Localized changes at slightly slow growth rates</td>
</tr>
<tr>
<td><strong>Land use</strong></td>
<td>Industrial land use dominating outside the metropolitan areas</td>
<td>Densification of urban and industrial land use in the development centres</td>
<td></td>
</tr>
</tbody>
</table>
CASE STUDY

SHORT TERM

RJ and SP benefit from massive investments in infrastructure. Unlimited progress in most part of the PDH region

MEDIUM TERM

Development modified from a general growth tendency to localized increments in economic activities

LONG TERM

Introduction of pricing (PPP-concession) has impacted massively on the development dynamics
Current tolling system may create negative impacts in terms of limitations to development due to the increase in direct (user perceived) transport costs; and

The charging system may also result in saturation (land use and transportation) of those areas in between toll plazas.

Changes and complex AS-TS interrelationships only detected because a multidimensional time-series database was created for the PDH region.
And

in New Zealand....?
IMPACTS: NZ CONTEXT

- Land Transport Act and Land Transport Strategy: need for assessment frameworks that holistically incorporate impacts.

- Proposed framework: information on land use-transport interactions.

- Implications on the Project Evaluation Manual and/or Planning process???
IMPACTS OF TRANSPORT INFRASTRUCTURE POLICIES

Dr. André Dantas, Senior Lecturer in Transportation Engineering.
Dr. Karisa Ribeiro, Transportation Engineer, MWH-Christchurch.