

The Business of Walking: The Relationship between Pedestrian Connectivity and Economic Productivity in Auckland's City Centre



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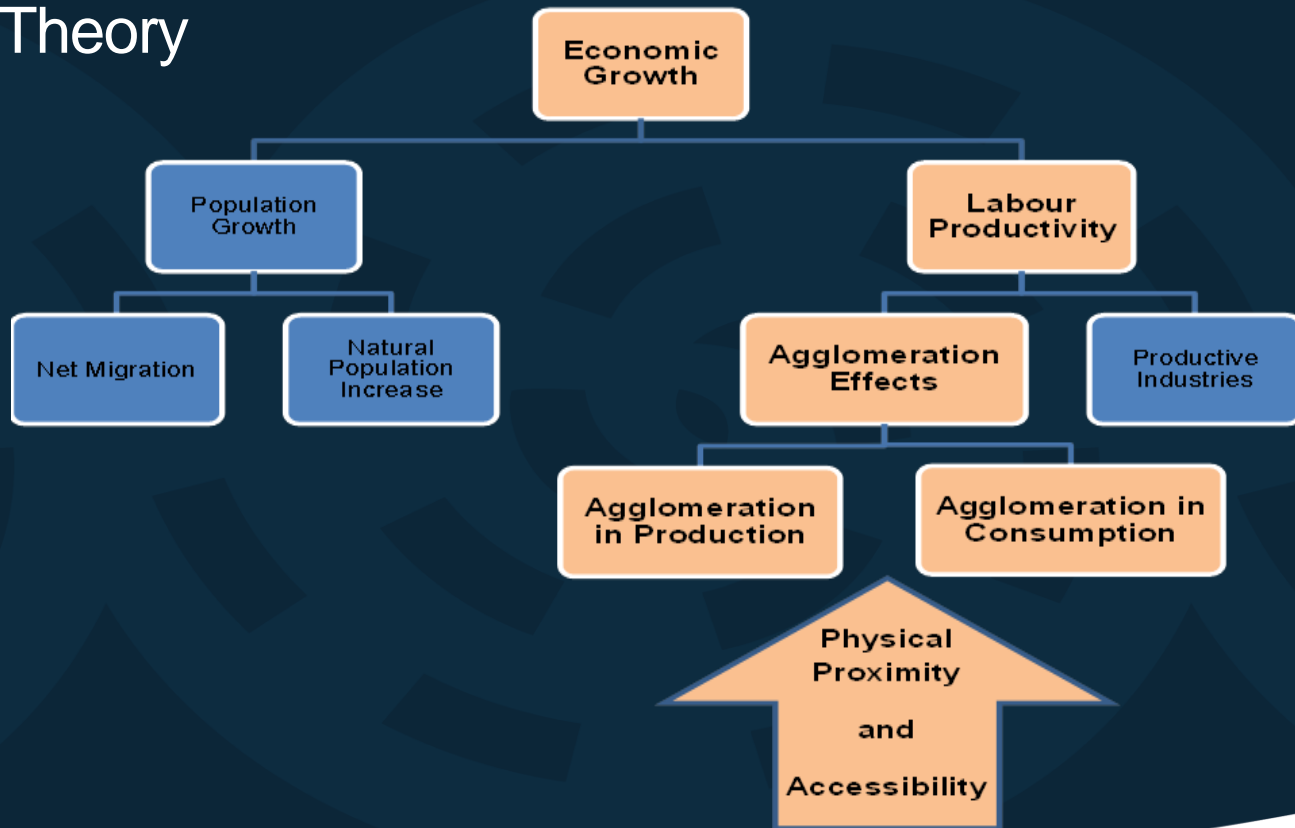
Why this research was carried out?

- The city centre the economic heart of the Auckland region
- One of the several work streams to quantify the economic benefits of walking by Auckland Design Office
- To replicate, SGS (2014) methodology

Strategic directors:

- The Auckland Plan (2012)
- The City Centre Master Plan (2012)

Theory



Analysis Steps

1. Defining the study area and other travel zones
2. Developing a pedestrian network
3. Carrying out a census of businesses
4. Creating pedestrian travel time matrices
5. Measuring agglomeration effects: Effective Job Density (EJD)
6. Estimating labour productivity
7. Examining association between Walking EJD and labour productivity

Study Area



Filling the Data Gaps

- Pedestrian network
- Building entrance points
- Employment by building

Pedestrian Network



Item	Average Speed (Km/h)
Footpath	5
Footway	4
Lane	4
Arcade	4
Steps	2
Shared	4
Lane	4
Controlled Crossings	
▪ Short	3
▪ Medium	2
▪ Long	1
Uncontrolled Crossings	
▪ Designated raised platforms	3
▪ Designated refuge islands	3
▪ Zebra crossings	3
▪ Designated straight crossings	3
▪ Uncontrolled intersections	3

Origins and Destinations

- 304 Buildings
- 408 Building entrances
- 259 Meshblocks centroids

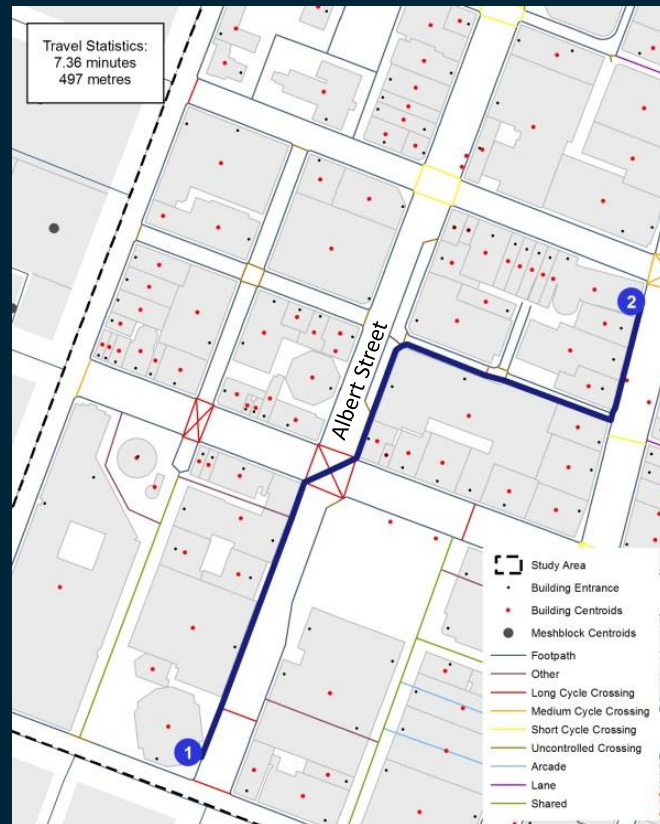


Travel Time Matrices

Building	Building 1	Building 2	Building 3...
Building 1	9.8	0.7	3.7
Building 2	0.0	10.4	7.7
Building 3	10.4	0.0	4.2
Building 4...	7.7	4.2	0.0

MB	411700	411900	412000	412100...
Building 1	28.6	27.4	24.4	24.1
Building 2	19.7	18.5	15.5	15.2
Building 3	28.8	27.7	24.7	24.4
Building 4...	25.2	24.0	21.0	20.7

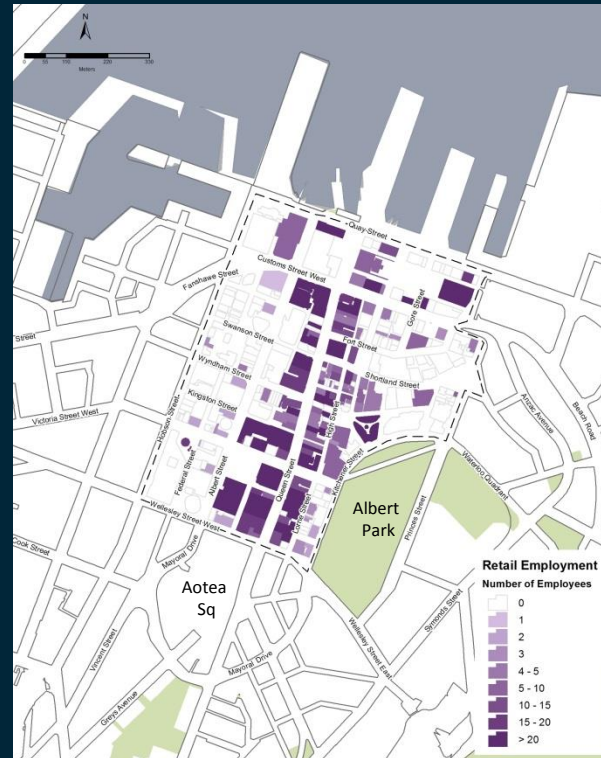
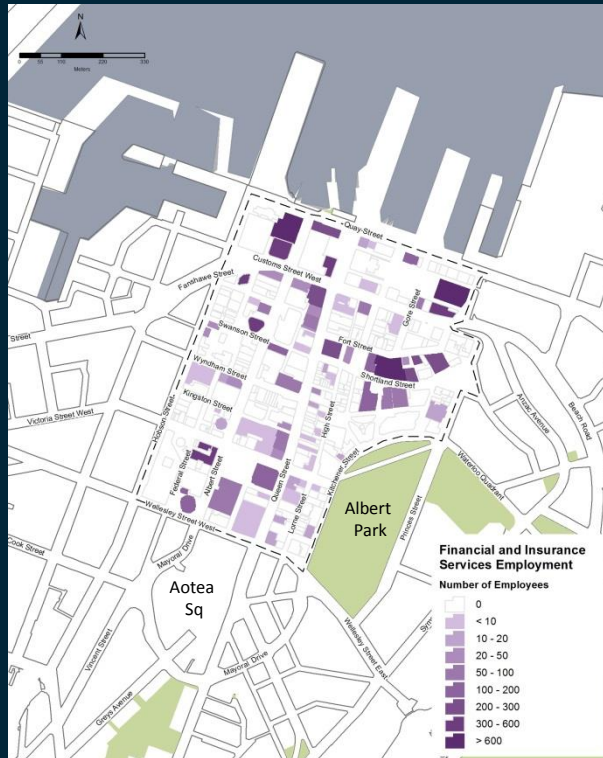
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Business Census



Distribution of Industries



Measure of Agglomeration Economies

$$EJD_i = \frac{E_i}{\left(\sqrt{A_i/\pi}\right)^\alpha} + \sum_j \frac{E_j}{d_{ij}^\alpha}$$

EJD_i = the effective job density of jobs in location i

E_i = employment in location i (origin)

E_j = employment in location j (destinations)

A_i = the land area of area i

$\sqrt{A_i/\pi}$ = an estimate of the average distance between jobs within area i

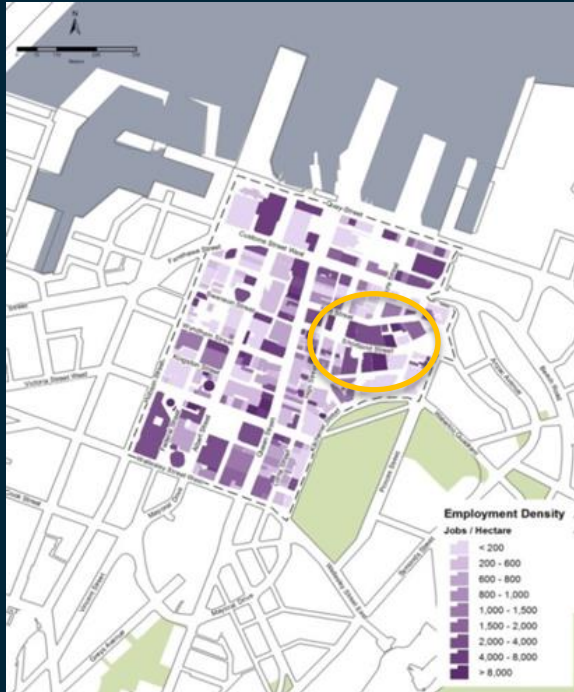
α = distance decay

Walking Effective Job Density

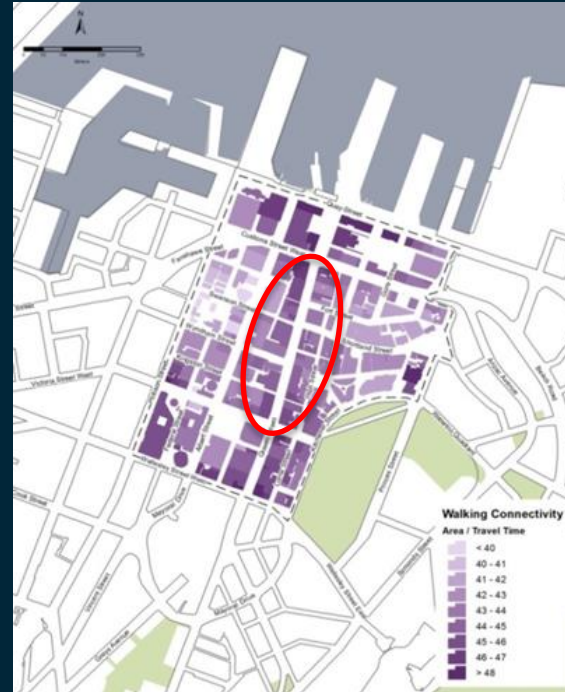
- Relatively higher EJD along Queen St and Shortland St



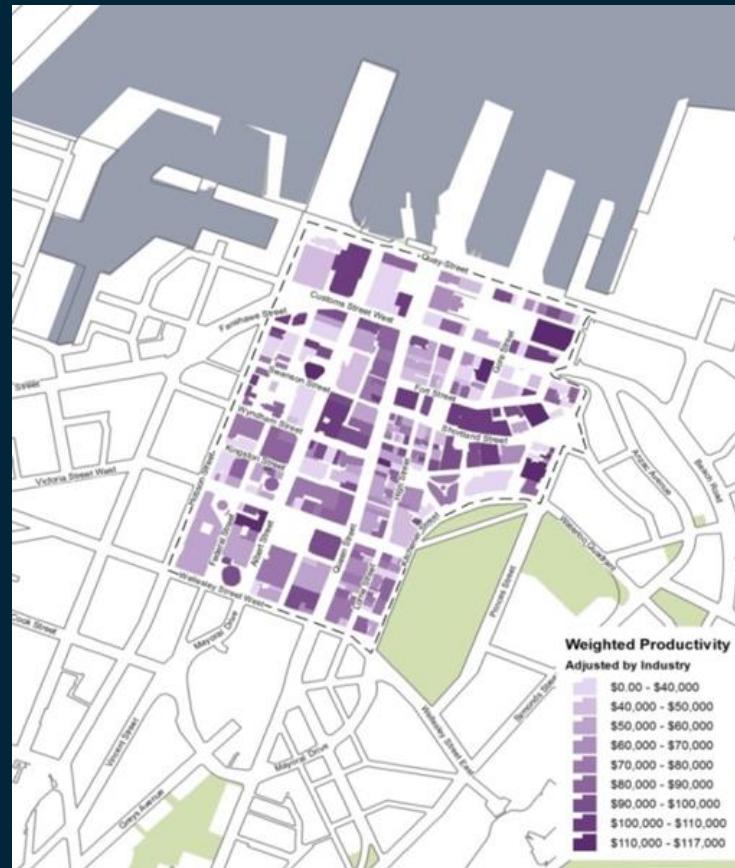
Employment Density



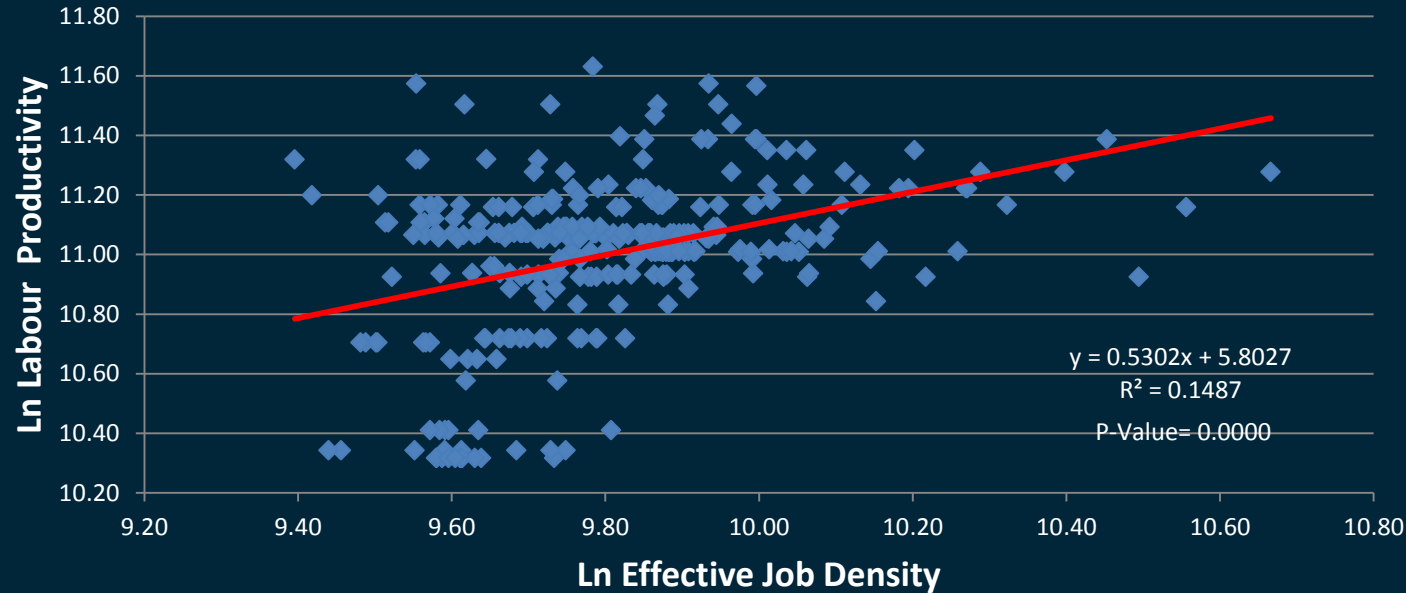
Walking Connectivity



Labour Productivity



Walking Effective Job Density and Productivity



1% increase in connectivity adds \$42m to city centre's economy

Conclusions and Next steps

- **Improved pedestrian connectivity = Improved city centre's economy**
- **Additional outcomes:**
 - Pedestrian network**
 - business profile datasets**
- **The next phase : scenario testing**
- **A New Zealand first**