Transport Disadvantage & Car Dependency in Rural Ireland

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Introduction

- 3 out of 4 journeys outside Dublin were made by car (CSO, 2017)

- Car dependency tends to be even more exacerbated when there is a need to travel over longer distances within rural areas

- A rise in car ownership within this context may not necessarily be caused by economic growth. It could be a sign of deprivation, necessity and a lack of other travel alternatives.

- **Transport disadvantage:** result of a range of intersecting factors including poor public transport infrastructure & service coverage, a higher proportion of low-income households and the need to travel further distances in order to get to places of employment, services and activities.

- **Transport poverty:** difficulties associated with maintaining private transport (e.g. financial stress related to initial cost of purchase, as well ongoing costs such as fuel, insurance, car purchase and maintenance & repairs)

- **Forced car ownership:** those who may find themselves in circumstances with **low transport accessibility** and **low income**, which is intensified by the need to *economically participate* in society for financial gain

- Quality of life/Well being from a transport perspective = access to work, education, healthcare, food shops, social, cultural, recreational activities.

- Problems in the transport system as a result of:
  - Availability and physical accessibility of transport
  - Costs
  - Services and activities in inaccessible places
  - Safety and security
  - Decline in bus use and growth in car use

- Those most likely to experience transport disadvantage are those on **low incomes, women, the elderly, disabled people and children, ethnic minorities**

Research Objectives

- Delineate the *complexity* of transport disadvantage & identify *barriers* to achieving an acceptable solution in areas experiencing poor public transport accessibility

- Analyse correlation between car dependence and transport disadvantage in rural Ireland via deprivation index utilising geospatial and statistical tools

- Identify hotspots or areas that have high potential for increased rates of *forced car ownership* and transport disadvantage.

- Evaluate the performance of measures currently in place to tackle such issues.
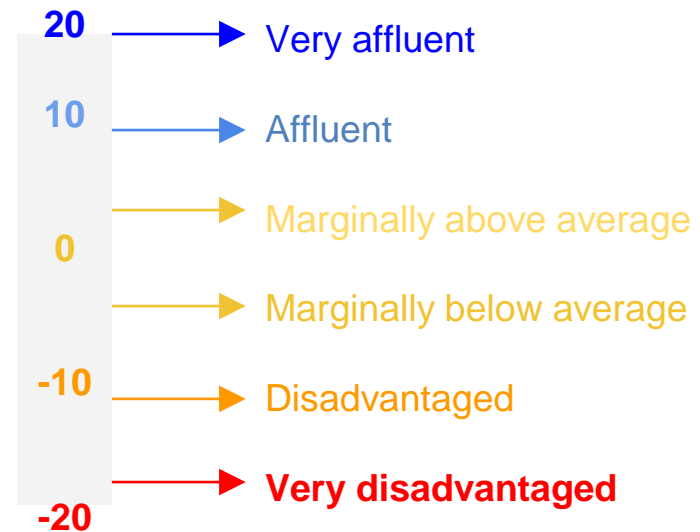
Methodology
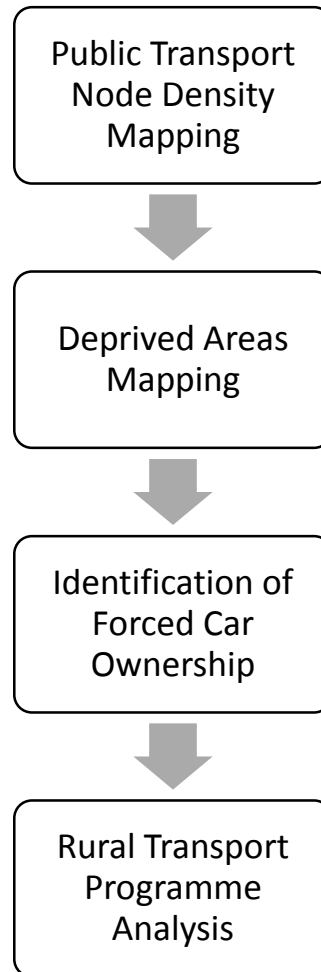
Methodology Flowchart

1. Deprivation

# HP (Haase and Pratschke) index - A proxy for deprivation

- Method of measuring the relative affluence or disadvantage of a geographic area, composed using the following factors:

1. Age dependency rate

2. Population change

3. Education level

4. Persons per household/room

5. Professional/socio economic status & classes

6. Semi- and Unskilled classes

7. Lone parents

8. Unemployment rate

20 → Very affluent

10 → Affluent

→ Marginally above average

0

→ Marginally below average

-10 → Disadvantaged

→ **Very disadvantaged**

-20

Hotspots of deprived areas

- Red areas represent areas experiencing high levels of deprivation.

- These areas are ED clusters with **low scores on HP index surrounded by other ED's with low scores (LL).**

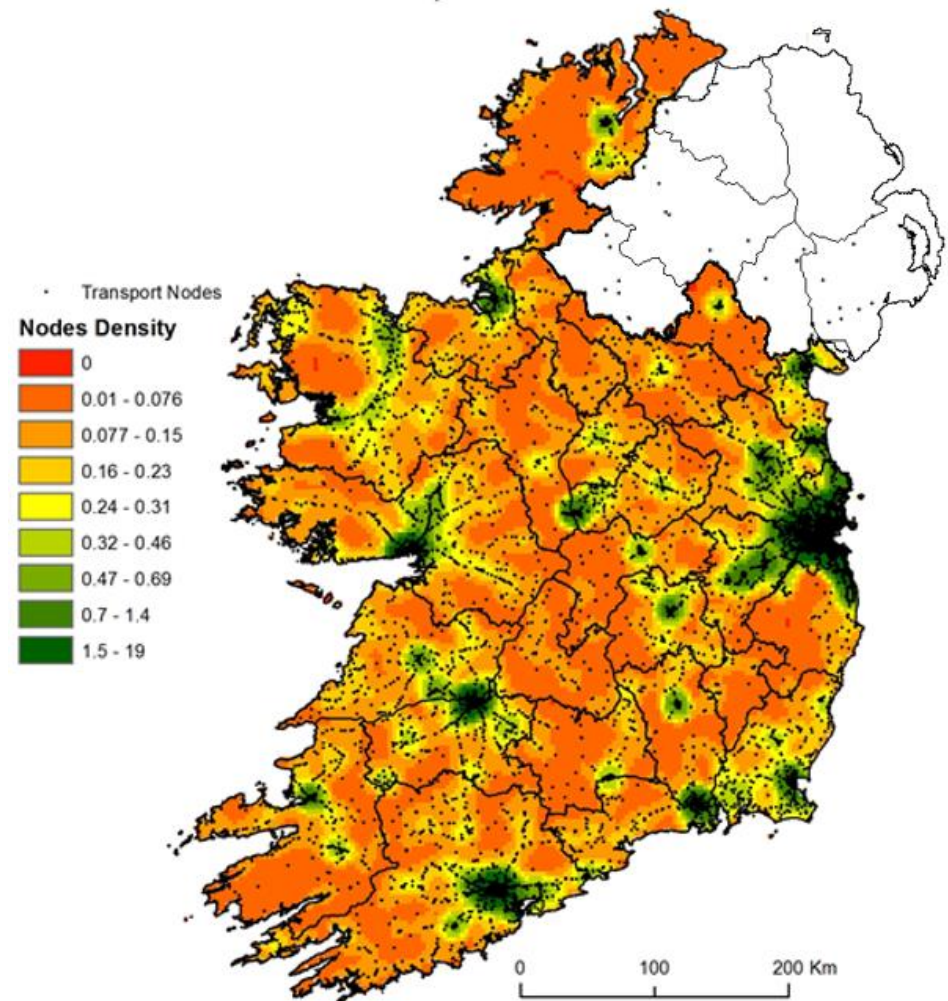- Green areas are clusters of the most affluent ED's.

Cluster types

- Not Significant
- HH
- HL
- LH
- LL

0   100   200 Km
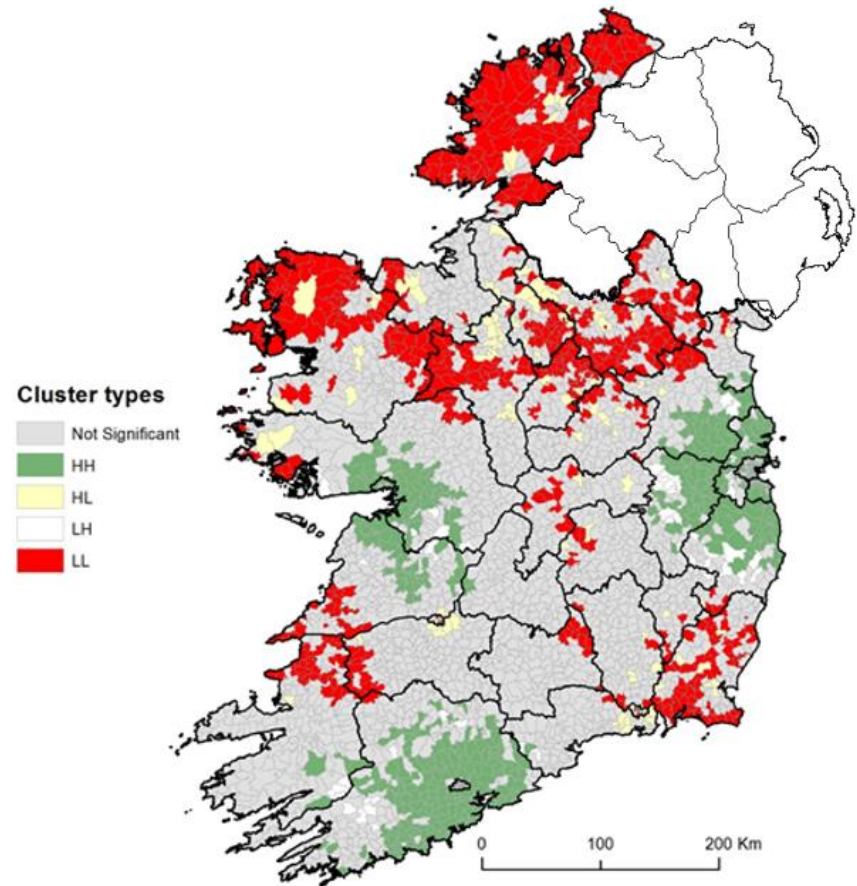
2. Transport Disadvantage

Transport Nodes

This map illustrates the location of public transport

nodes plotted on a density map (National Public
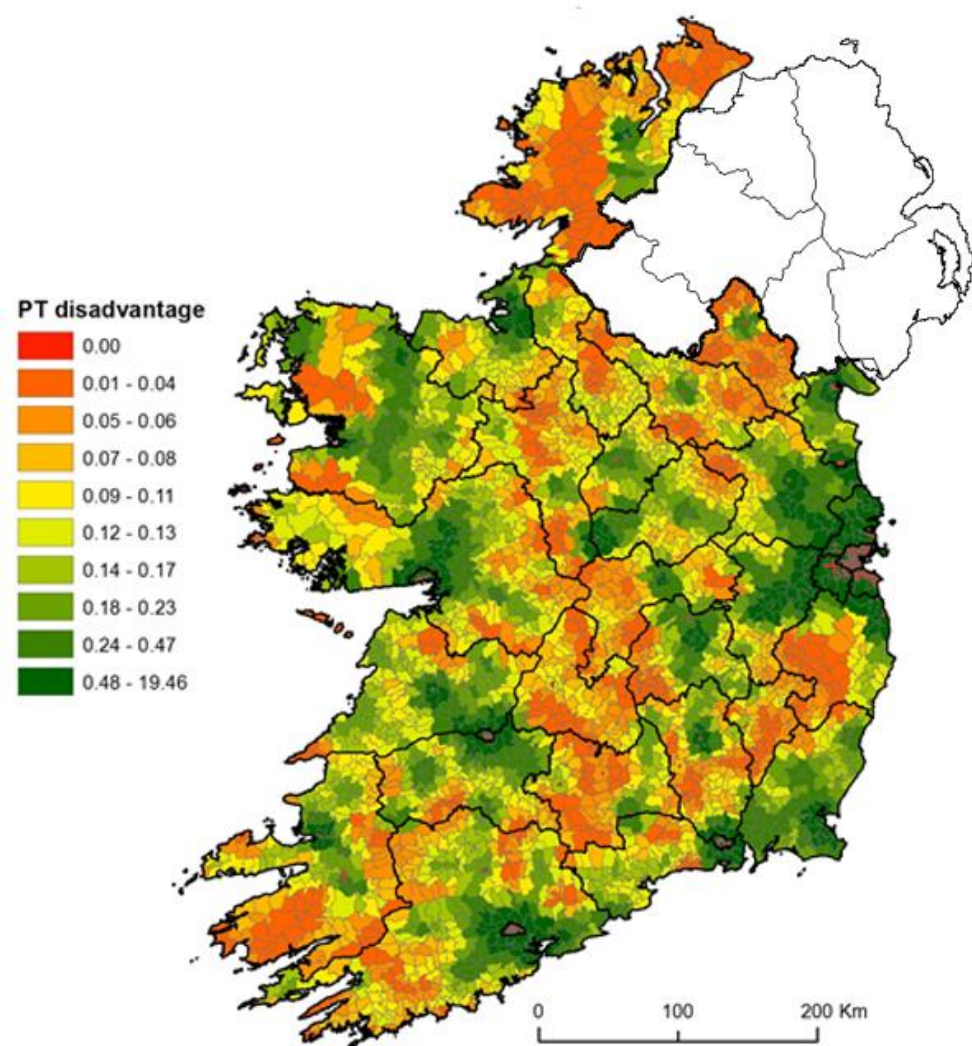
Transport Access Node database)
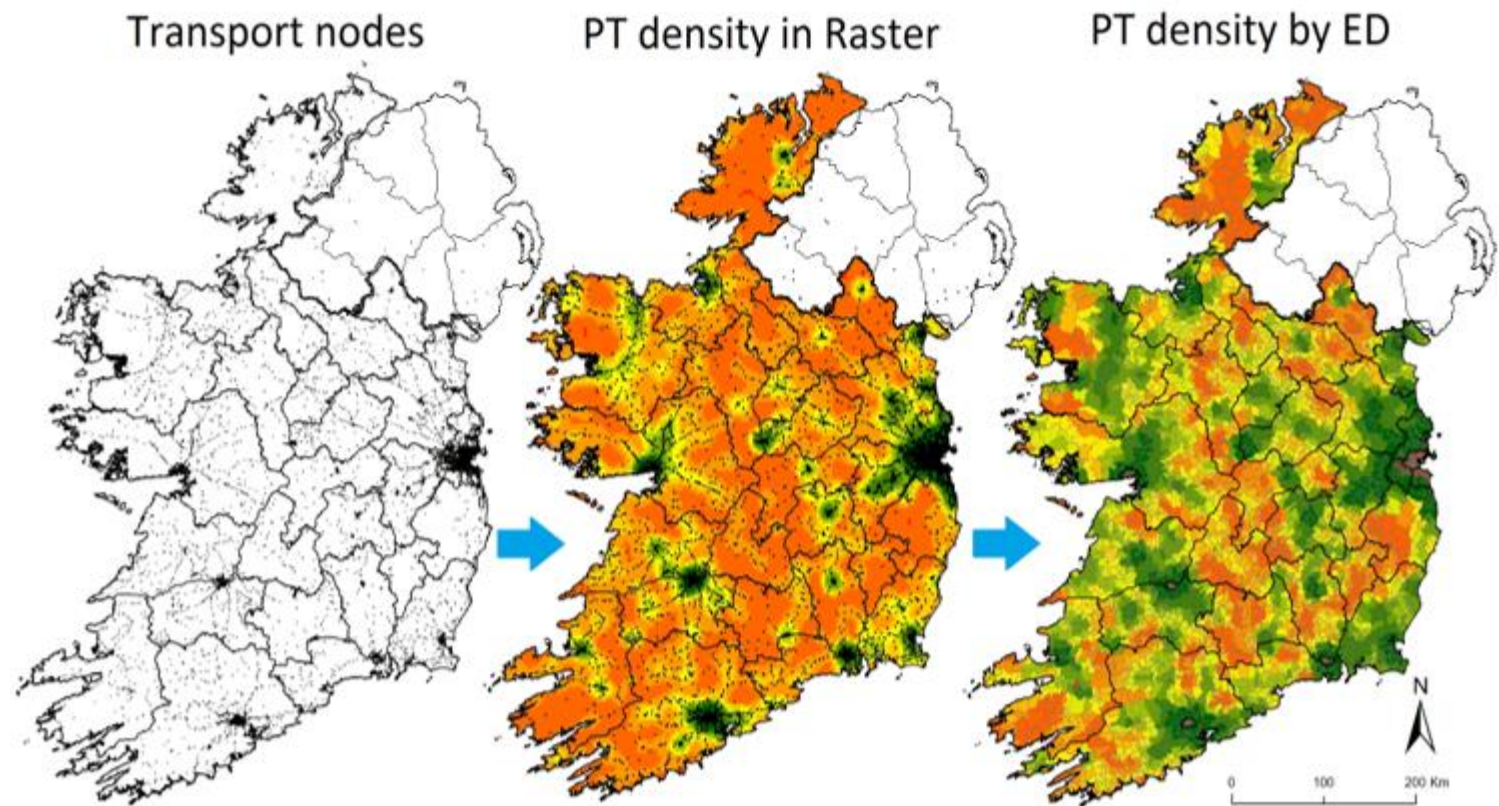
These points include:

- Bus stops

- Rail stations

- Taxis stands

- Ferries ports

Transport Nodes

Nodes Density

- 0
- 0.01 - 0.076
- 0.077 - 0.15
- 0.16 - 0.23
- 0.24 - 0.31
- 0.32 - 0.46
- 0.47 - 0.69
- 0.7 - 1.4
- 1.5 - 19

0   100   200 Km
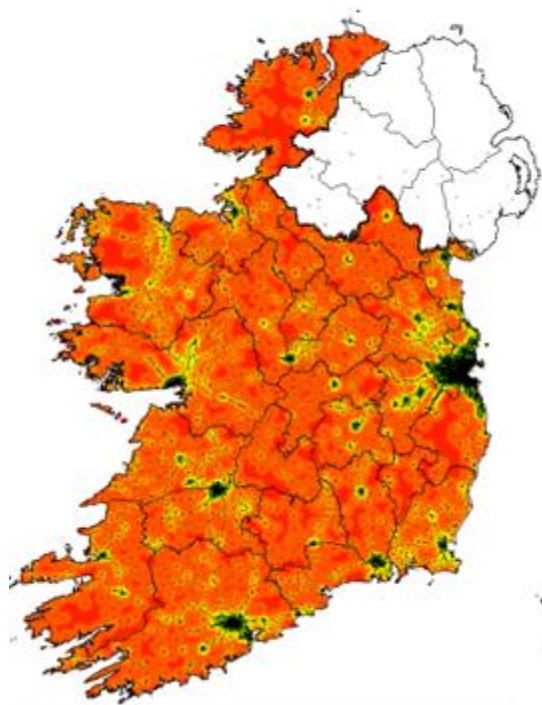
Transport Disadvantage

- The density of PT nodes in each ED were used as a proxy for public transport disadvantage.

- The orange/red areas represent the most transport disadvantaged EDs.

PT disadvantage
	0.00
	0.01 - 0.04
	0.05 - 0.06
	0.07 - 0.08
	0.09 - 0.11
	0.12 - 0.13
	0.14 - 0.17
	0.18 - 0.23
	0.24 - 0.47
	0.48 - 19.46

Transport nodes — PT density in Raster — PT density by ED
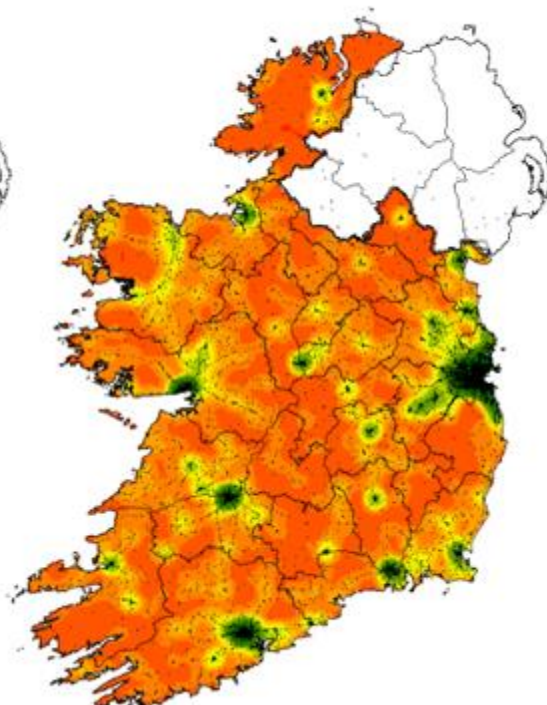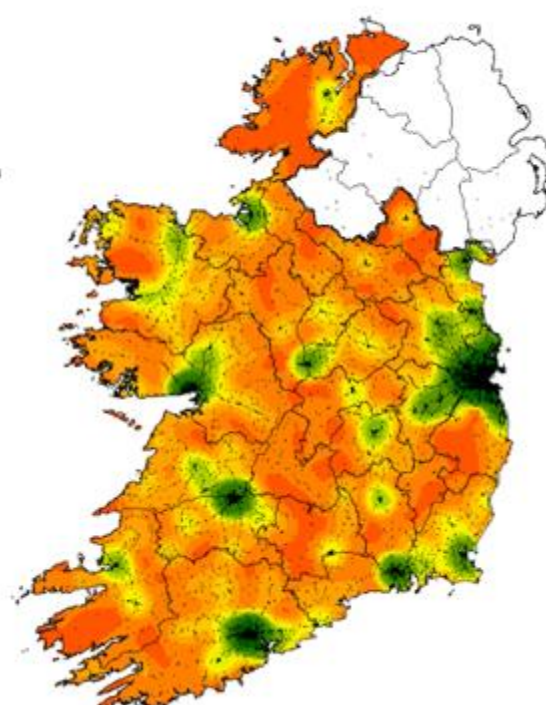
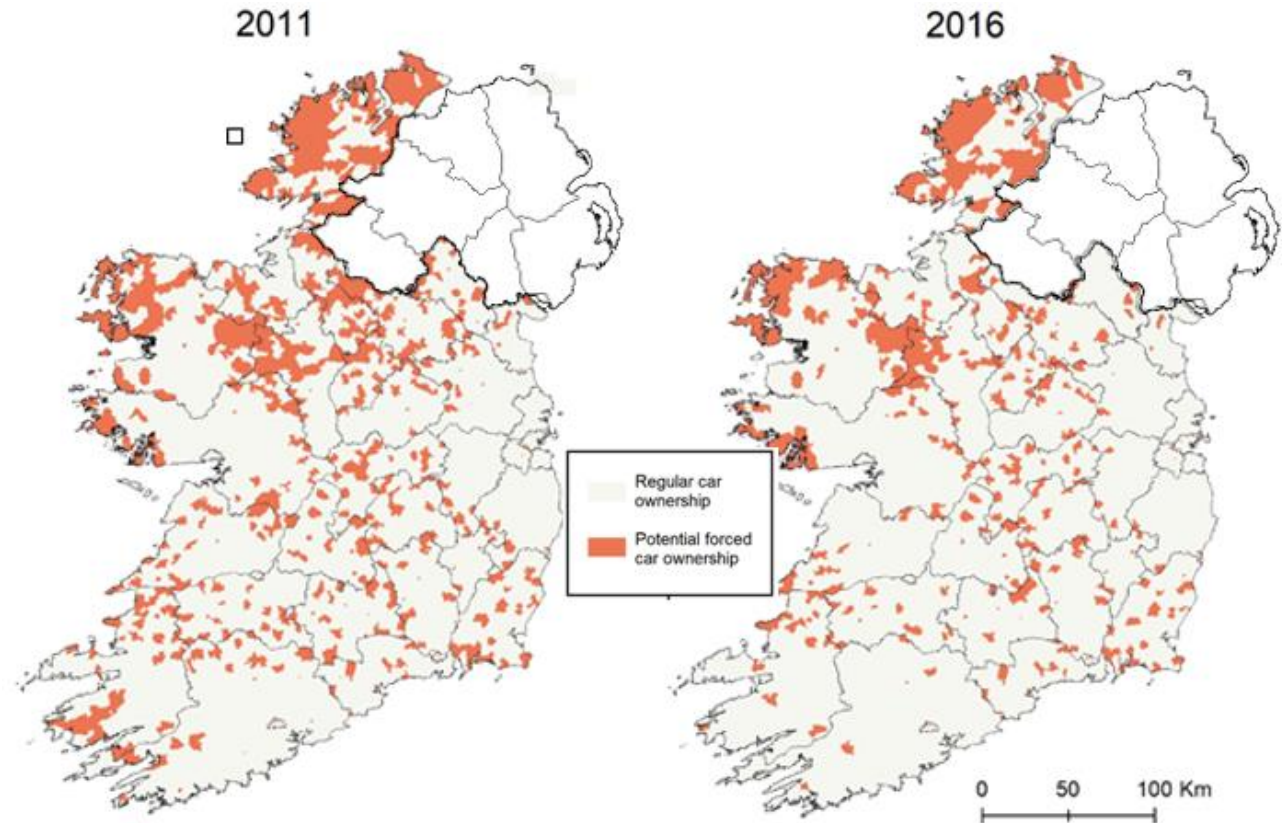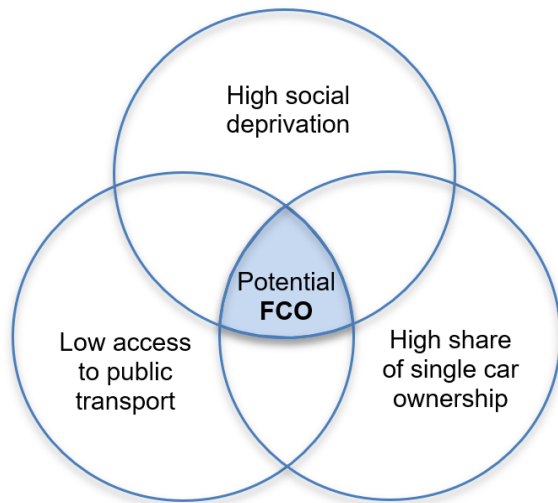Access to Public Transport

5km   10km   15km

Forced Car Ownership

In order to be considered as being potentially affected by FCO, the Electoral Districts were selected based on three simultaneous conditions that are described below:

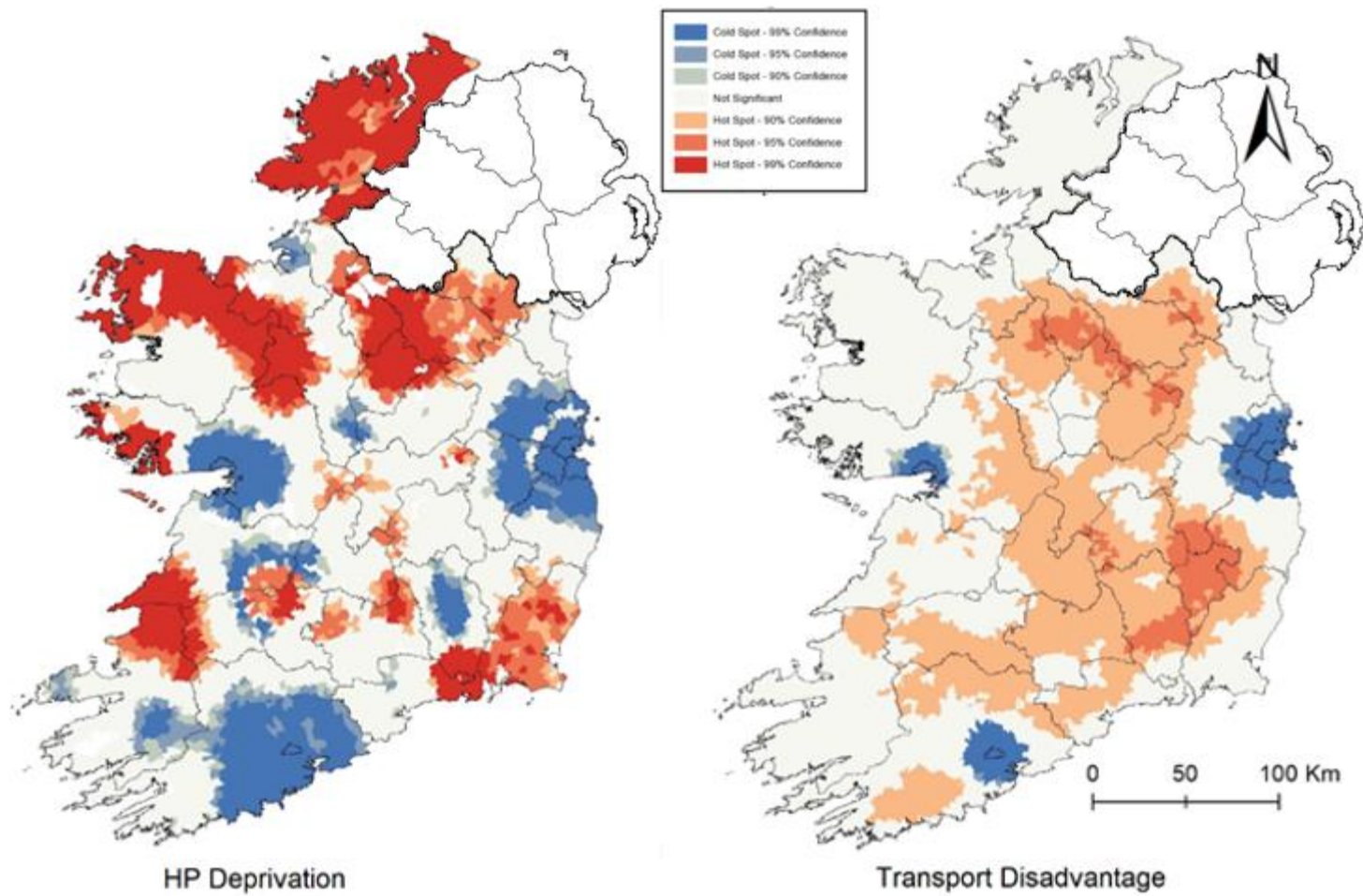- High social deprivation

- Transport Disadvantage

- High share of single car ownership

Forced Car Ownership

High social
deprivation

Potential
FCO

Low access
to public
transport

High share
of single car
ownership

2011

2016

Regular car
ownership

Potential forced
car ownership

0   50   100 Km

Variations of potential FCO at Electoral District level in Ireland between 2011 and 2016

Legend:
- Cold Spot - 99% Confidence
- Cold Spot - 95% Confidence
- Cold Spot - 90% Confidence
- Not Significant
- Hot Spot - 90% Confidence
- Hot Spot - 95% Confidence
- Hot Spot - 99% Confidence

HP Deprivation

Transport Disadvantage

Hotspot analysis of social (left) and transport (right) disadvantage

Percentage improvement in transport disadvantage risk after the implementation of RTP

Transport Disadvantage and Deprivation

A linear regression shows a clear trend in how lower levels of transport disadvantage are associated with lower levels of deprivation.

The analysis found that there is a correlation in 20 out of the 26 counties.

Many counties in the West of Ireland showed strong and statistically significant regression coefficients = strong correlation between the transport disadvantage risk and deprivation variables

Relationship between the number of jobs accessible in this region and the indicator of transport disadvantage was analysed

	10km		
County	X coeff.	R-Square	Spearman's Sig
Carlow	28.147**	0.075	0.029
Cavan	32.919***	0.218	0.000
Clare	16.414***	0.173	0.000
Cork	10.084***	0.121	0.000
Donegal	16.857***	0.118	0.005
Galway	15.128***	0.200	0.000
Kerry	7.842**	0.055	0.027
Kildare	9.565***	0.216	0.001
Kilkenny	5.174*	0.028	0.268
Laois	3.647	0.023	0.044
Leitrim	36.57**	0.117	0.007
Limerick	6.25**	0.030	0.042
Longford	17.023***	0.093	0.007
Louth	5.133***	0.100	0.003
Mayo	14.267***	0.117	0.000
Meath	13.642***	0.379	0.000
Monaghan	24.715***	0.212	0.000
Offaly	13.041**	0.106	0.062
Roscommon	10.098**	0.068	0.302
Sligo	14.481***	0.381	0.000
Tipperary	-1.537	0.000	0.671
Waterford	6.004**	0.069	0.002
Westmeath	15.541***	0.188	0.000
Wexford	4.495**	0.049	0.187
Wicklow	14.684***	0.156	0.008

* Significant at 90% confidence, ** Significant at 95% confidence, *** Significant at 99% confidence

- Journey times between EDs taken from the West Regional Model (WRM) of the NTA regional modelling system

- Census employment data (i.e. number of jobs in each ED) used to determine the **total number of jobs accessible from each ED in the west region in 45 and 30 mins when travelling by car and by bus** in both the *with RTP* and *without RTP* scenarios.

- RTP nodes serviced by Local Link services used

- **17% more jobs** in total could be accessed by **bus** services than by private car in *45 mins*

- **18% more** by **bus** in *30 mins* with the provision of the RTP.

- Indication that RTP & other public transport services led to improvement in job accessibility.

- These figures were then used to determine the relationship between number of jobs accessible by these modes and the values of transport disadvantage for each ED

- EDs with high number of jobs accessible also had lower transport disadvantage risk score

- Suggests that the number of *cumulative opportunities* accessible is a key indicator in identifying disadvantage & these measures are inextricably linked and influence each other

Implications for future transport policy

- Policy is moving in the right direction
  - Demand responsive PT
  - Tailored & personalised transport services (dial-a-ride)
  - Investment in active mode infrastructure

- Future challenges will include:
  - Ageing population living in isolated areas
  - Risk of poverty (plus transport/ fuel poverty) among certain groups

- Accessibility planning
  - Accessibility audit, resources audit, action plan

- Working from home
  - Reducing the need to travel (for some not all journey types)

Implications for future transport policy

- Extension of demand responsive transport into the main stream
  - Increased co-ordination of school transport, community transport and socially necessary subsidised services
  - Intelligent reservation – real time match between vehicle fleets and travel needs of socially excluded

- Greater integration of walking and cycling infrastructure with public transport

Implications for future transport policy

- Growing need to fill gaps in high frequency services, such as feeder services to corridors (e.g. Bus Connects design)

- Can be provided by:
  - Car schemes or car clubs (private or public sector)
  - Demand responsive services (dial –a –ride)
  - Provision of service routes where a high value is placed on door to door travel

Thank you!

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