

PLANNING FOR TOD IN SMART CITIES

Making transit a 'preferred choice', not the
'only choice'!

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People in Focus - Making transit attractive

- Transit becomes attractive only if:
 - It gives dependable service,
 - It is user-friendly – eg. integrated ticketing service,
 - Is safe for commuters,
 - Provides multi-modal integration,
 - Provides access to opportunities and
 - Is easily accessible by users.

People in Focus - Making transit attractive

- People *choose* to use transit if:
 - ▣ Transit is a good quality attractive system,
 - ▣ They are located close to it – within walking distance,
 - ▣ They can access it easily through direct walking/ cycling routes,
 - ▣ Many opportunities are within easy access of a destination stop/ station. This means presence of dense and diverse land uses such as shopping, work, recreation etc.

Transit-Oriented Development (TOD)

- When the development surrounding a transit node has 3Ds - Density, (land uses) Diversity and (urban) Design that encourages walking/ cycling – it is called '**Transit-Oriented Development**'.
- Such a development is inclusive, safe and lively. There is proper provision of footpaths and direct connections to transit within walking distance.
- TOD planning can bring more people to transit.

TOD in Smart cities in India

- The Smart City program for India outlines typical features of a Smart City – including TOD.
- By planning for TOD, Smart cities can ensure
 - ▣ most optimal use of public infrastructure
 - ▣ control sprawl development
 - ▣ Reduce dependence on cars and pollution
 - ▣ make cities liveable

Planning for TOD (1 / 3)

- Typically, any transit-oriented development has:
 - Mixed use development
 - High density
 - Urban design that supports walking and cycling
 - Within walkable distance of a transit node.

- But how does one assess which area needs what? And how much?

Planning for TOD (2/3)

- To make efficient TOD plans, planners must have complete understanding of what is present and what lacks around all transit nodes - **Problem identification leads to focused, result-oriented and efficient solutions.**
- A composite analysis of all the TOD characteristics using measurable indicators can tell us how transit oriented is an area. This is represented using a TOD Index. Areas with lower than expected TOD Index score need TOD planning. Thus, precious public resources are focused on areas that need them and not on all areas.

Planning for TOD (3/3)

- Strengths of such a methodology
 - ▣ Assess TOD of all node areas together in a city (or region).
 - ▣ Allows objective comparison of areas to see which areas are more transit-oriented than others.
 - ▣ Recommends how the transit-orientation can be improved for each node area.

Methodology to plan for TOD

- ▣ **Step 1:** Identify indicators to be measured for assessing TOD
- ▣ **Step 2:** Spatially analyse all indicators for area within walking distance of a transit node.
- ▣ **Step 3:** Comprehensively put them together into an index – a TOD Index. Each node area gets a TOD Index score.
- ▣ **Step 4:** Use TOD Index scores to compare different transit nodes and identify the ones that score less.
- ▣ **Step 5:** Recommend how to improve transit-orientation for those transit nodes.

Step 1 Identification of indicators



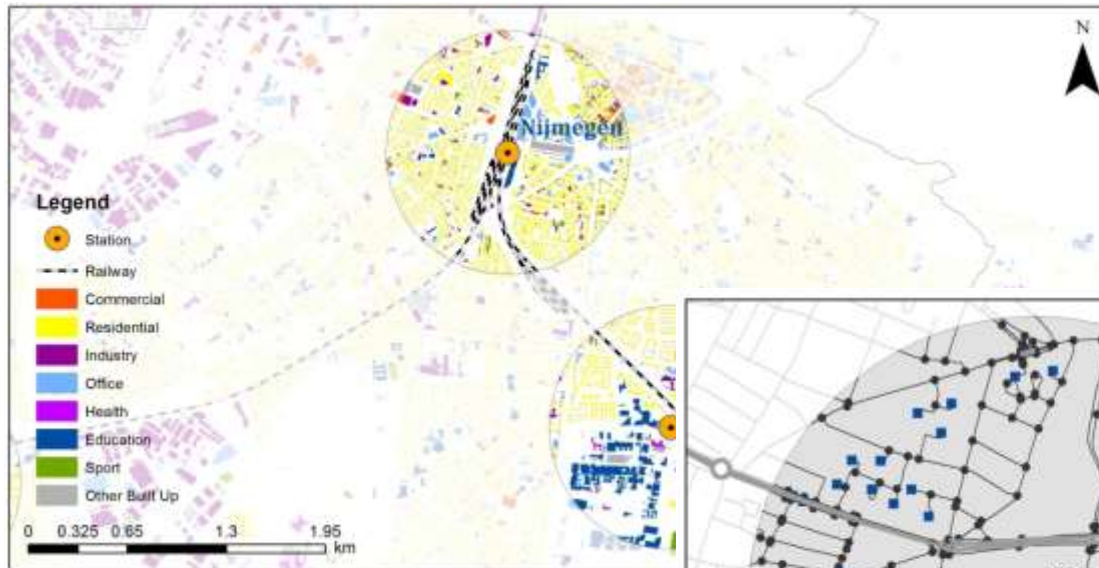
For showcasing this methodology, the case study was 'City region of Arnhem and Nijmegen' in The Netherlands.

TOD was assessed around 21 stations in the City Region.

The study was conducted in 2014.

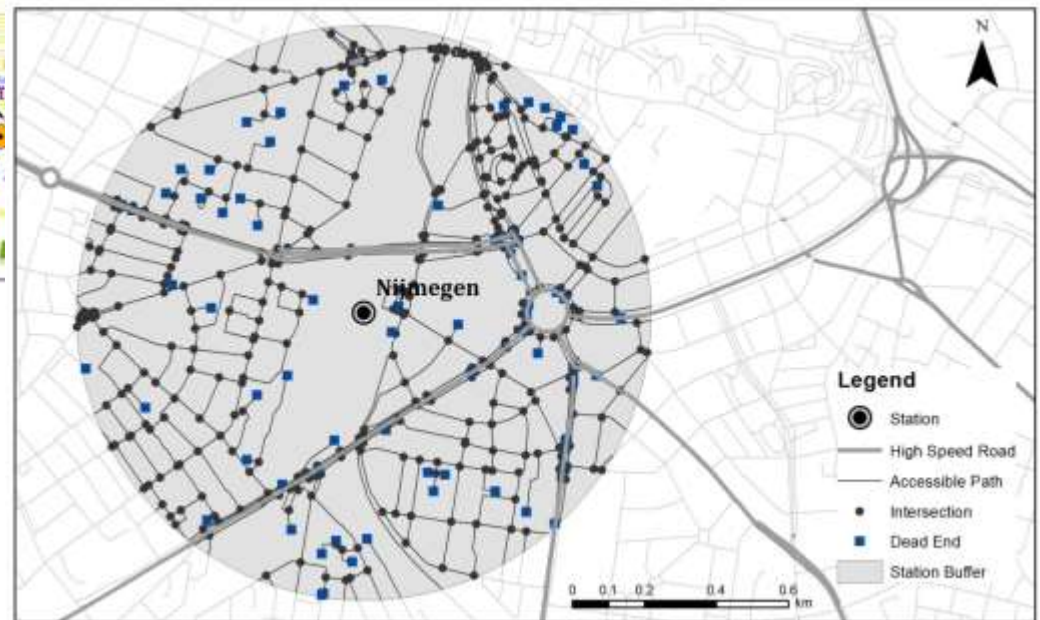
- TOD Criteria
- Measurable indicators under criteria

Step 2: Spatial assessment of indicators

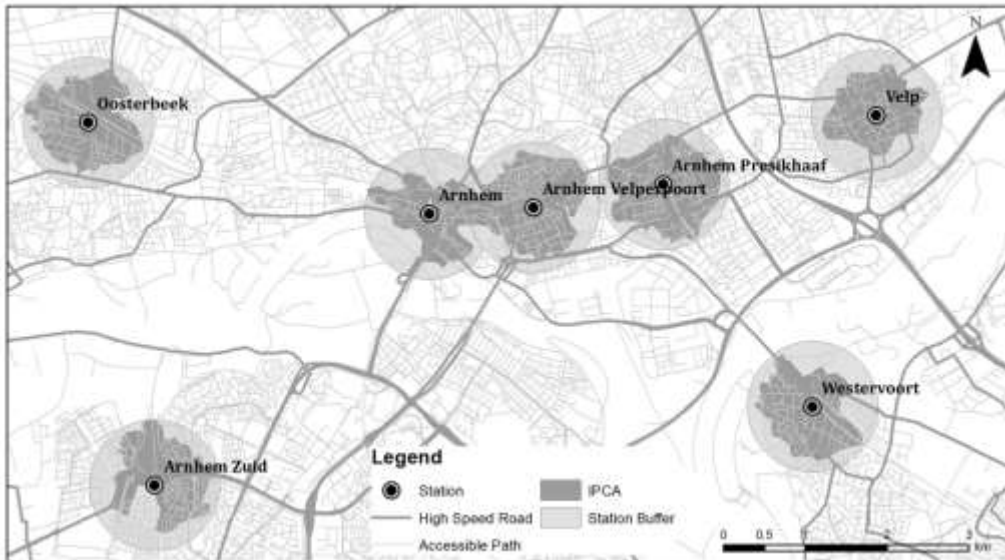


Land use analysis for two station areas in the City Region

Analysing intersection density around one station in the City Region.



Step 2: contd.



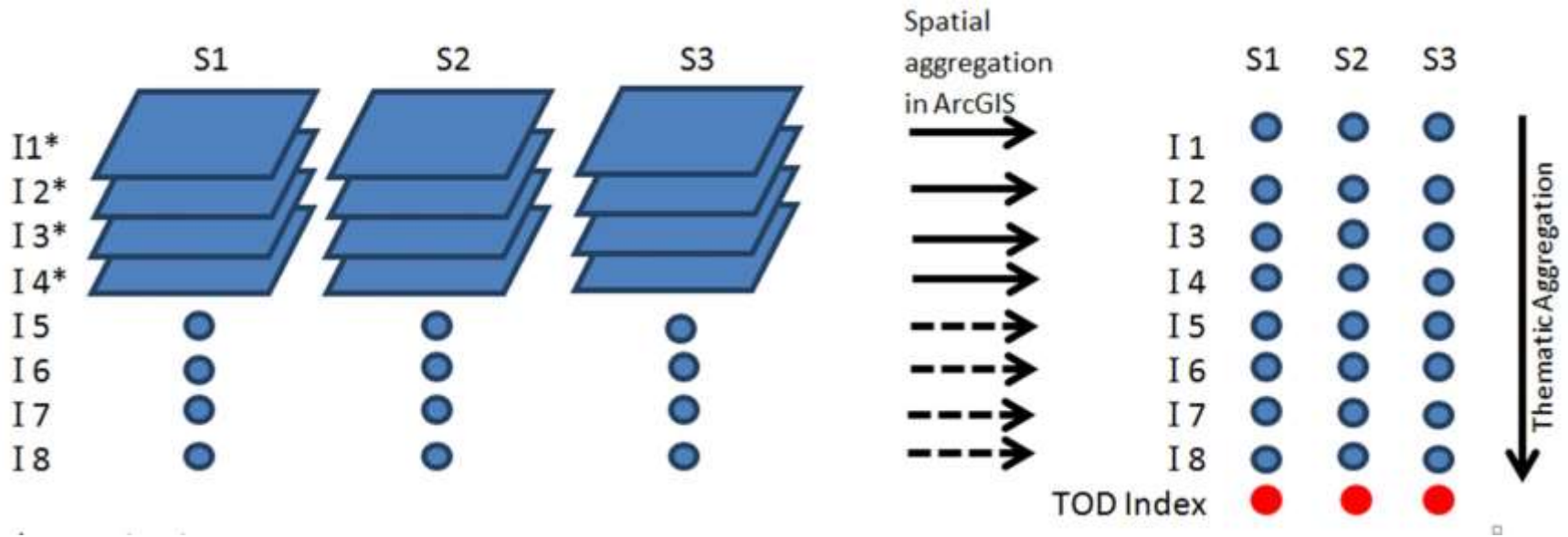
Analysing walkability around stations using IPCA (Impedance Pedestrian Catchment Area) indicator

- These are only a few examples of indicators measured for the case study area. The analysis was done in ArcGIS software.

Step 3: Computing TOD index score

- All indicators have different units of measurement. Some are spatial, some non-spatial.
- Aggregation of these to arrive at TOD index, needs Spatial Multi-Criteria Assessment (SMCA).
- ILWIS software used for SMCA and computing TOD Index score for each station area.

Step 3: Contd.



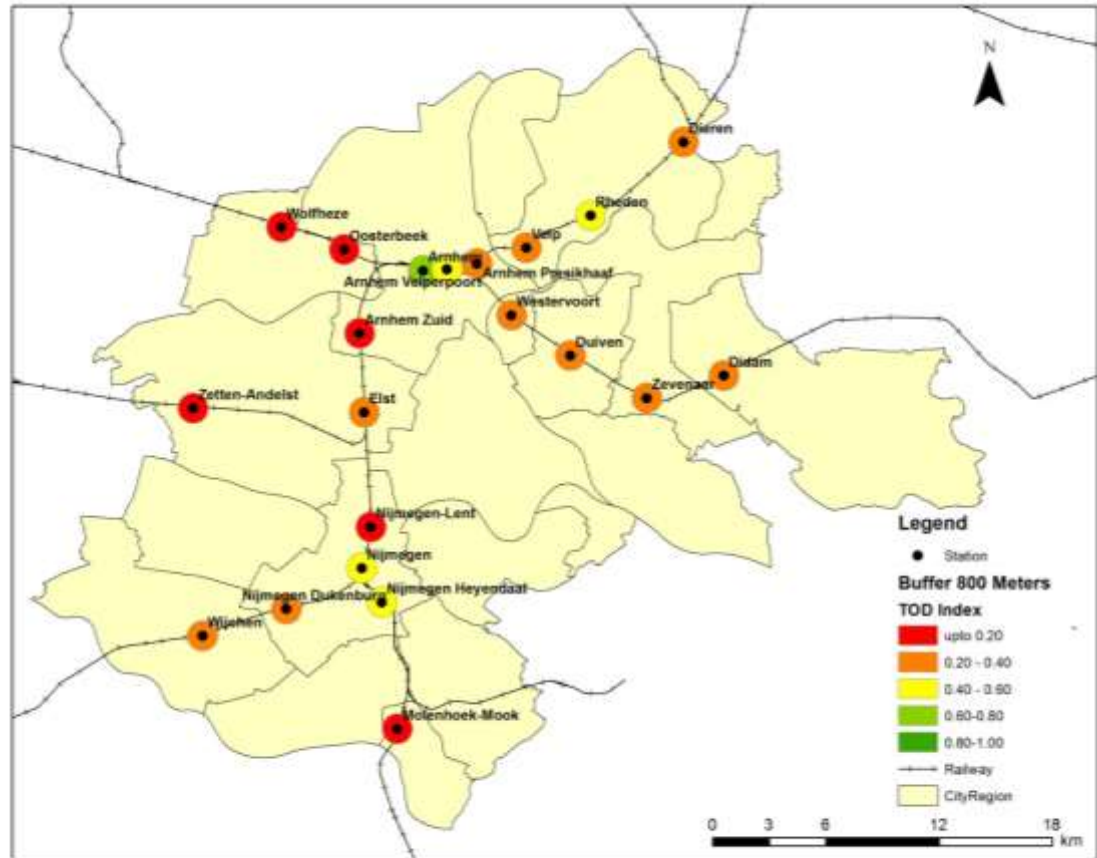
S – Station

I – Indicator

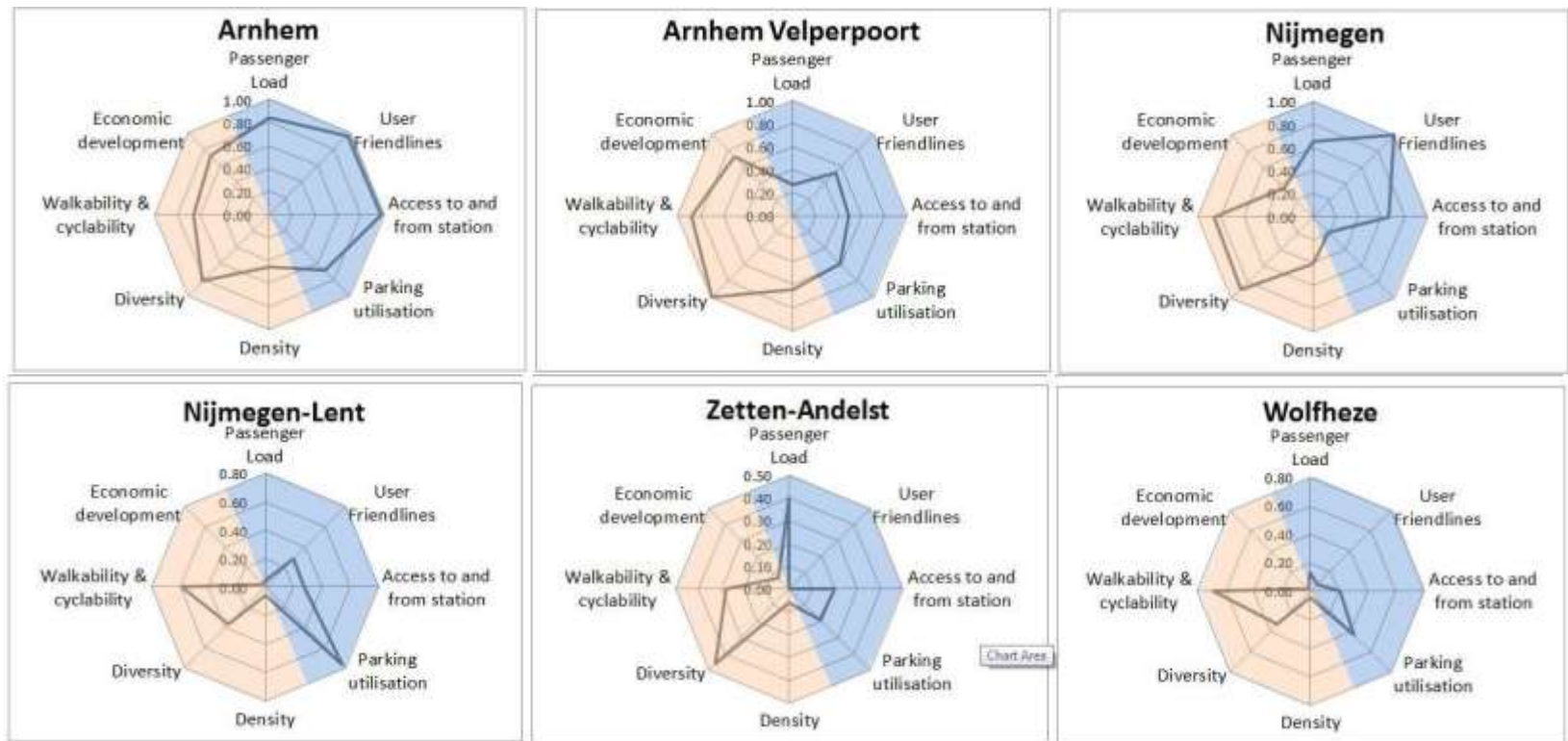
* - Spatial indicators. Others are non-spatial.

Step 4: Identify nodes with low transit-orientation

- TOD Index score ranges from 0-1 as it is a standardised scoring system.
- Lower score means lower transit-orientation of development surrounding transit node.
- Lower scoring stations can be immediately identified.



Step 5: Recommend improvements/ node



- Criteria relating to transit
- Criteria relating to urban development

Step 5: Contd.

- Using the web-diagrams shown in previous slide, those criteria can be identified that score low hence bringing down total TOD Index score for that station.
- These criteria can be recommended for improvement. Unique recommendations for each node area.

Benefits of this methodology

- A complete methodology from assessment to planning
- Scientific, efficient and evidence-based
- Simple yet logical
- No special primary surveys needed, thus saving time and resources.

For more information...

- Y.J. Singh (2015) Measuring transit - oriented development (TOD) at regional and local scales : a planning support tool, ITC Dissertation 277, ISBN 978-90-365-3998-2.
- Y.J. Singh, A. Lukman, P. He, J. Flacke, M.H.P. Zuidgeest & M.F.A.M van Maarseveen (2015) Planning for Transit Oriented Development (TOD) using a TOD Index, Compendium of papers, 94th Annual Meeting of Transport Research Board (TRB), Washington D.C., USA.
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