

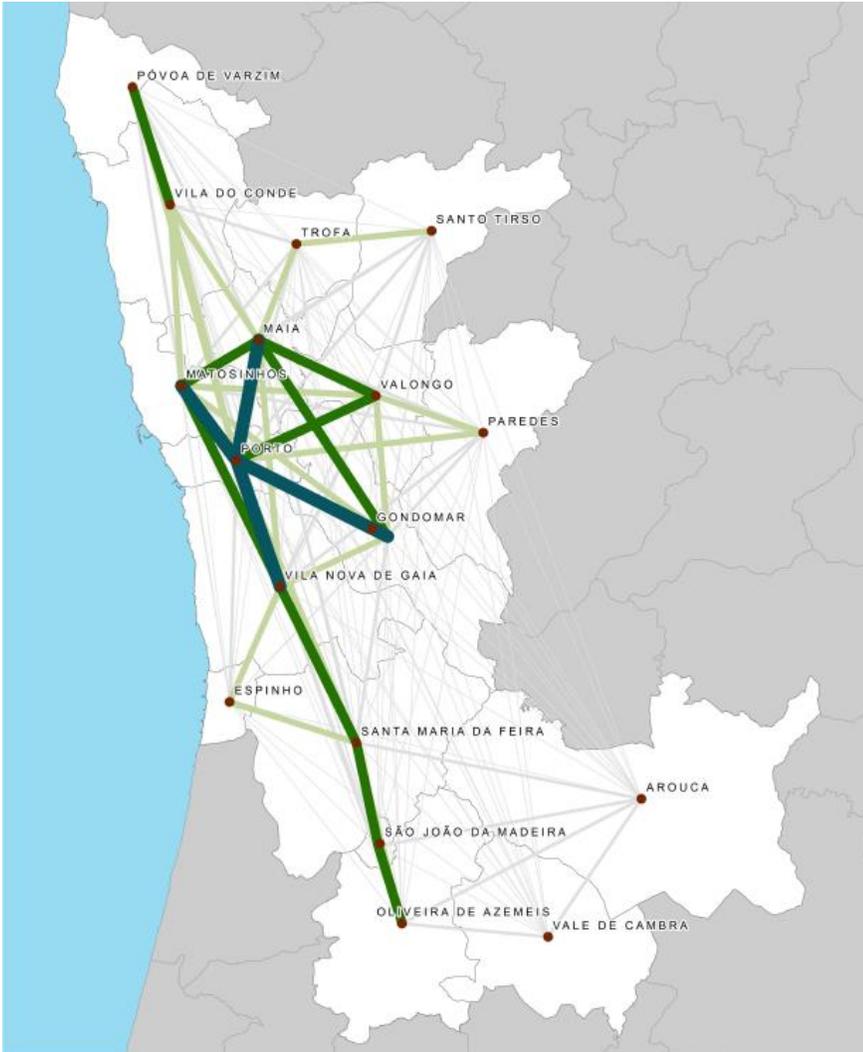


The Structural Accessibility Layer

**Some examples of a comparable
accessibility measures in Planning
Practice**

Miguel Pimentel

Research Center for Territory, Transport and
the Environment (CITTA- FEUP)
Porto University



A Little about Porto (its Porto, not Oporto!)

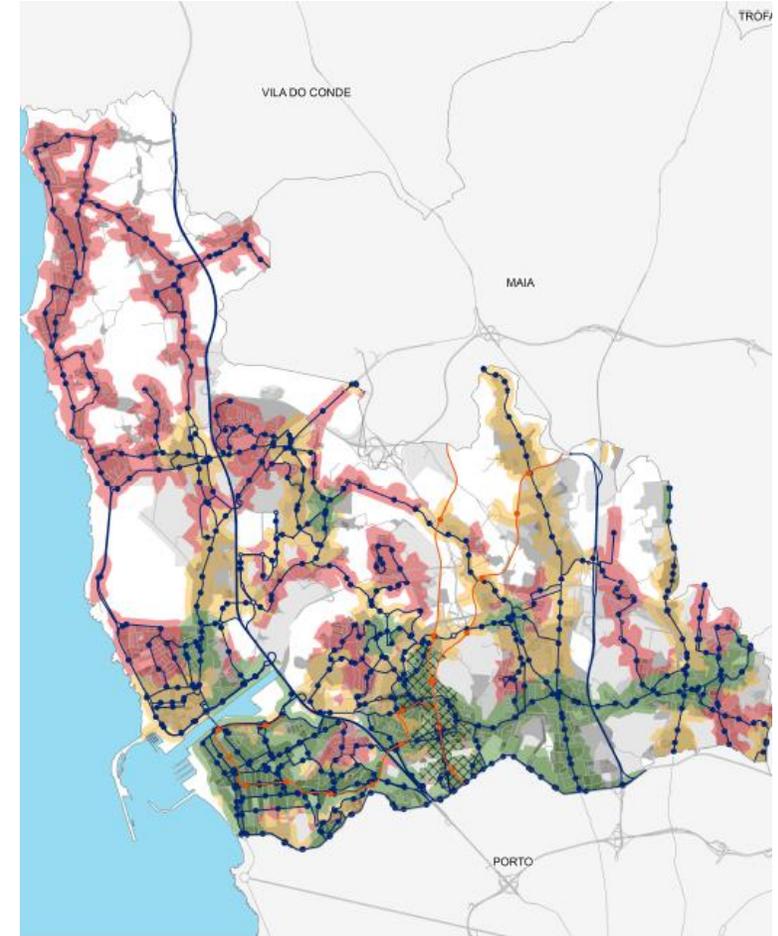
- Population: 230.000 hab. (city) 1.2 million the Metropolitan Area;
- Metro System with 72 km and 81 stops in 6 lines;
- Public Bus Transport Company with 56 lines;
- Mode Share: 68% Car; 19% Walking; 8% Public Transport
- Tendencies: Huge touristic pressure in the city center; great increase in house pricing; changes in transport pricing; populations decline;
- Relevant topics in the next few year: New metro line in the city center and the organizations of all public transport network concerning the new European directive of public transport competitive tendering.

CITTA Research Tendencies in Mobility and Accessibility

- Post Carbon Cities
- Planning for urban shrinkage
- Planning with increasingly uncertainty
- Improving PSS and how to improve its relevance
- COST Action: Accessibility Instruments for Planning Practice



Academic Research



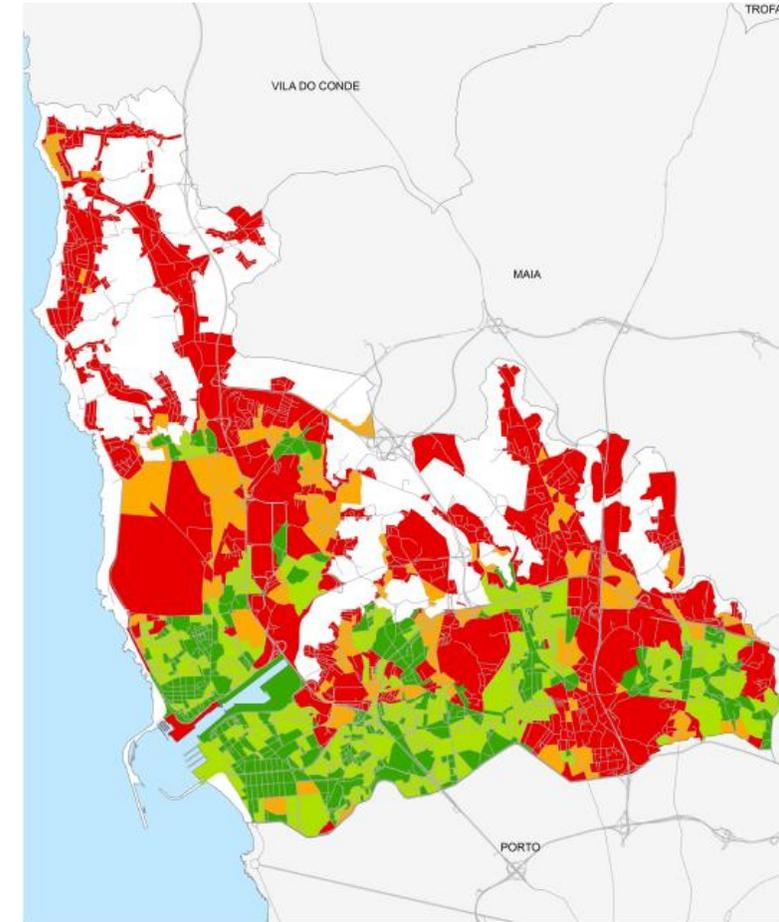
Matosinhos Municipality SUMP (2018)

Real World Practice

- Developing accessibility instruments to be applied locally (local authorities);
- Developing specific courses for decision makers in the public sector;
- Full development of Matosinhos Sustainable Urban Mobility Plan (SUMP) contemplating Land Use and Transport topics. (First ever in Portugal).



Applied Academic Research



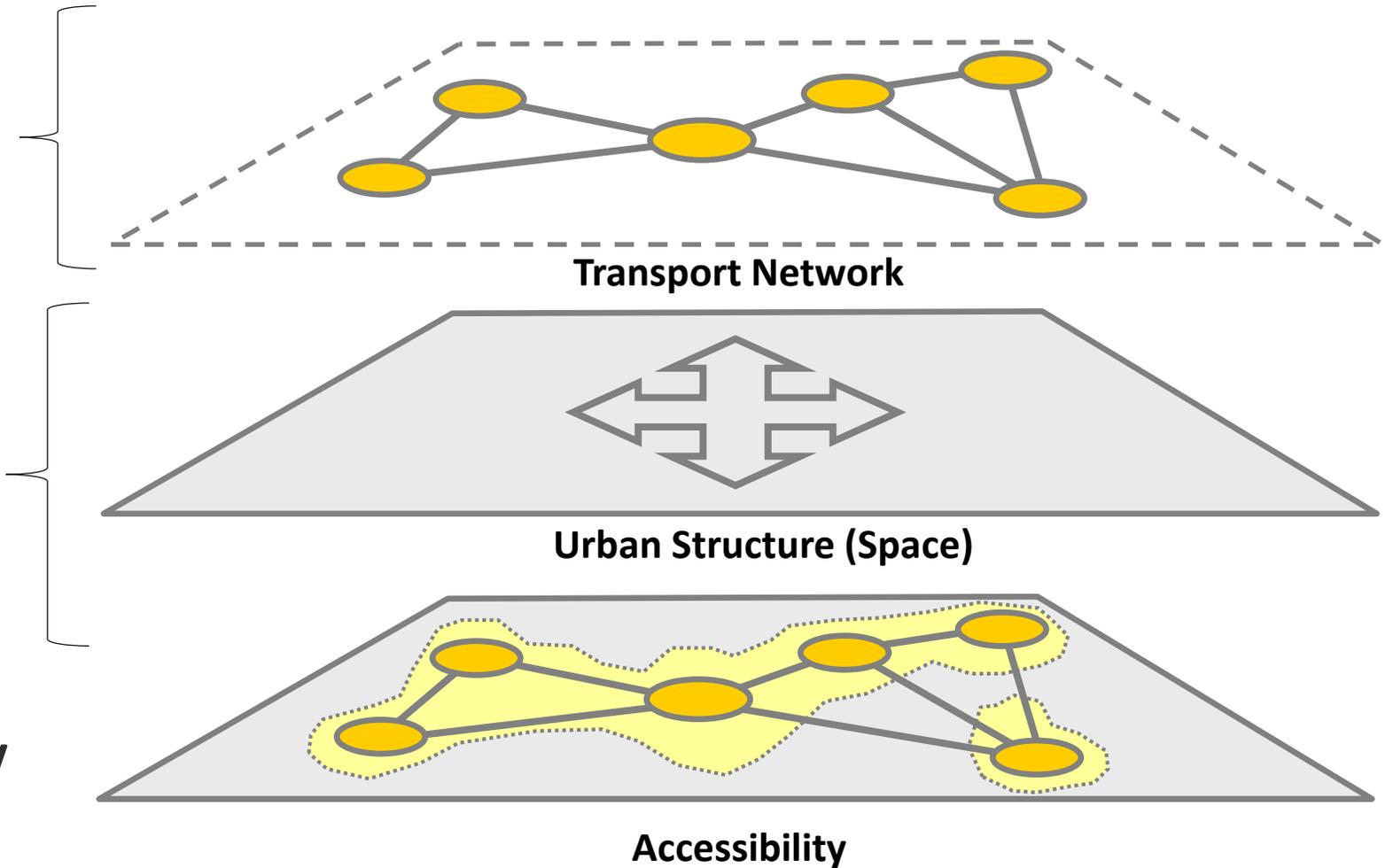
Matosinhos Municipality SUMP (2018)

Transport Planners

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Urban Planners

Transport Planners +
Urban Planners = Accessibility
Instruments?



Scope for
developing
accessibility
instruments

Integrating LUT Policies

Design Support Tools (PSS)

Accessibility Base Tools



What Is the Structural Accessibility Layer (SAL)

- The Structural Accessibility Layer (SAL) is a geographical representation of comparative accessibility levels by types of transport modes to different types of opportunities;
- It is based on the concept of Accessibility defined as the extent to which the land use and transport system enable individuals to reach different types of opportunities;
- More specifically, the SAL proposes the concept of Structural Accessibility assessing how urban structure constraints travel choices.

What Is the Structural Accessibility Layer (SAL)

Diverse Activity Index measures the accessibility level by each transport mode, counting the number of the most relevant travel generating activity types that one can reach from a given origin.



Comparative Accessibility Cluster

uses the results of the previous index to develop the comparative analysis of accessibilities by transport modes, identifying the mode choices made available to inhabitants by local land use and transport conditions.

- Values are normalized between 0 (no accessible activities) to 1 (all activities are accessible).
- Using contour measure based on the 'dissimilarity index' of Cervero and Kockelman (1997)

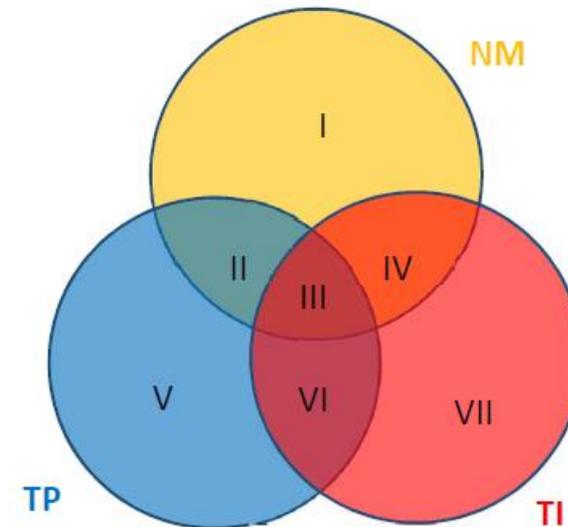
Operational Aspects

- SAL compares the variety of travel generating activity types reachable by different transport modes within a given travel time and travel price limit.
- Activity types considered should at least include, employment, schools, leisure, shopping, healthcare and other activities, but ideally with higher levels of disaggregation across these activity types.
- The results of the diversity of activity index are then used to develop the comparative analysis of accessibilities by transport modes, identifying the mode choices made available to inhabitants by local land use and transport conditions.

Operational Aspects

The different combinations of accessibility levels by transport modes are grouped into 7 accessibility clusters according to the mode (or modes) choice which is considered to be favoured by land use and transport conditions:

- Cluster I - NM modes;
- Cluster II - NM modes and PT;
- Cluster III - all modes;
- Cluster IV - NM modes and car;
- Cluster V - PT;
- Cluster VI - PT and car;
- Cluster VII - car.



Practical Example

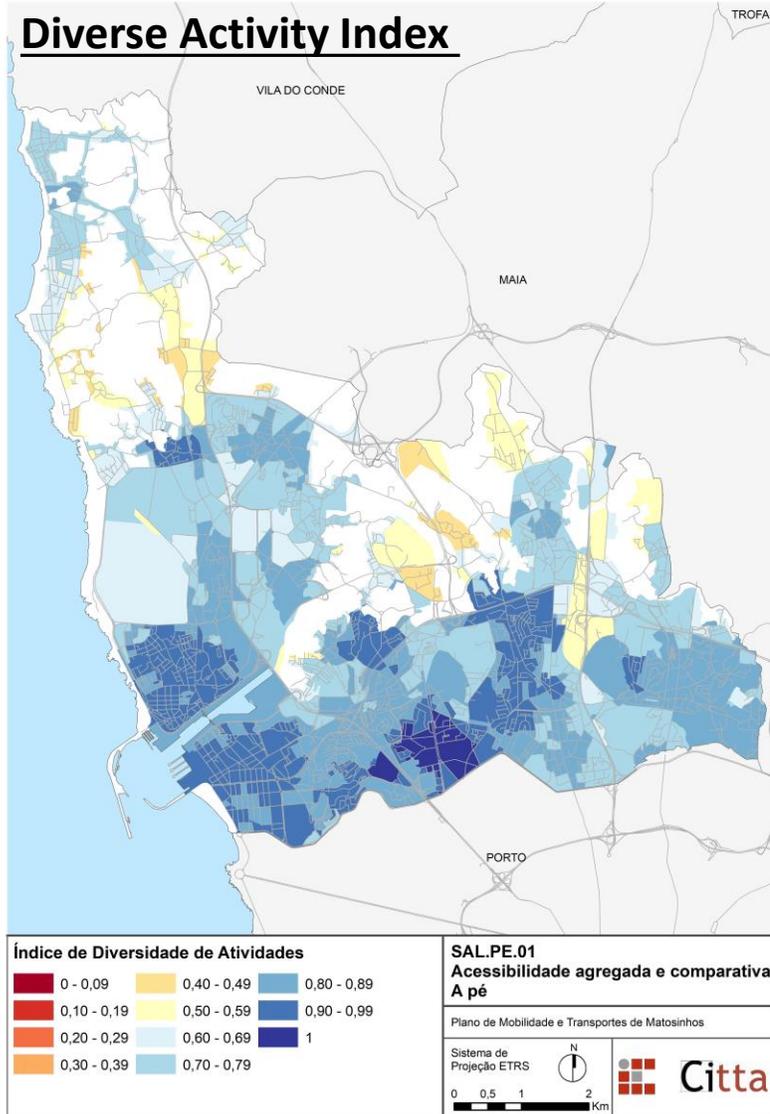
- CITTA as ben developing same real life practical examples and as enrolled in the Sustainable Urban Mobility Plan (SUMP) for the Matosinhos Municipality in the north of Porto;
- The scale of the plan was to the entire municipality that in fact contains 4 cities;
- Great study case concerning all major transport equipment's that this territory as: Metro, Regional Trains, Urban Public Transport, Main Arbor and Airport;
- One of the major employment centers in the region with over 150.000 inhabitants;

Practical Examples

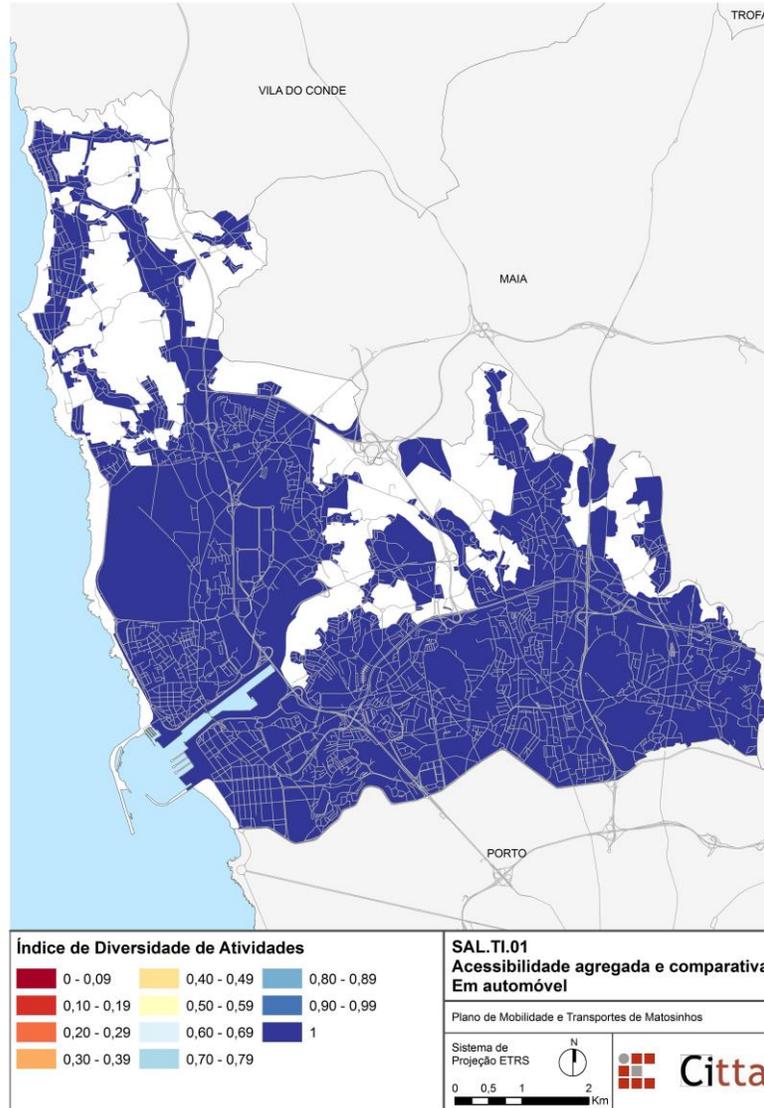
To calculate the Diverse Activity Index we have selected 18 activities and gave specific weights and cut off time goals.

Atividade	Peso (p _i)	Tipo de atividade	Tempo de viagem (min)		
			A pé	Em automóvel	Em TP
1. Jardins de Infância e Escolas EB1	4	Local	10	15	20
2. Escolas EB2/3 e Secundárias	5	Supralocal	20	30	40
3. Universidades	3	Supralocal	20	30	40
4. Parques, Jardins Públicos e Praças	8	Local	10	15	20
5. Restaurantes	2	Supralocal	20	30	40
6. Cinemas	2	Supralocal	20	30	40
7. Salas de Espetáculo/ Teatro	1	Supralocal	20	30	40
8. Equipamentos Desportivos	8	Local	10	15	20
9. Museus/ Bibliotecas/ outras ativ. lazer	1	Supralocal	20	30	40
10. Comércio Alimentar	8	Local	10	15	20
11. Comércio de Retalho	2	Supralocal	20	30	40
12. Farmácias	2	Local	10	15	20
13. Hospitais e Clínicas	2	Supralocal	20	30	40
14. Administração Pública	2	Supralocal	20	30	40
15. Correios	2	Supralocal	20	30	40
16. Bancos	5	Supralocal	20	30	40
17. Prestação de serviços	2	Supralocal	20	30	40
18. Emprego	41	Supralocal	20	30	40

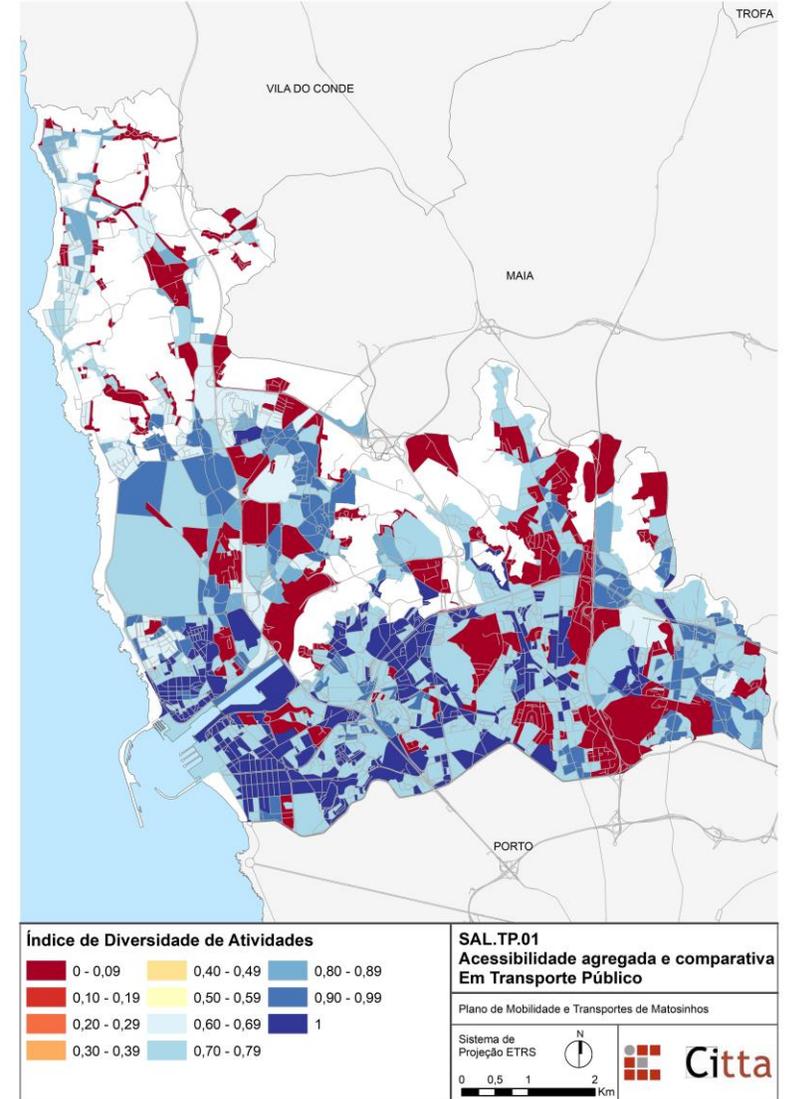
Practical Examples (SUMP Diagnosis)



Walking Accessibility

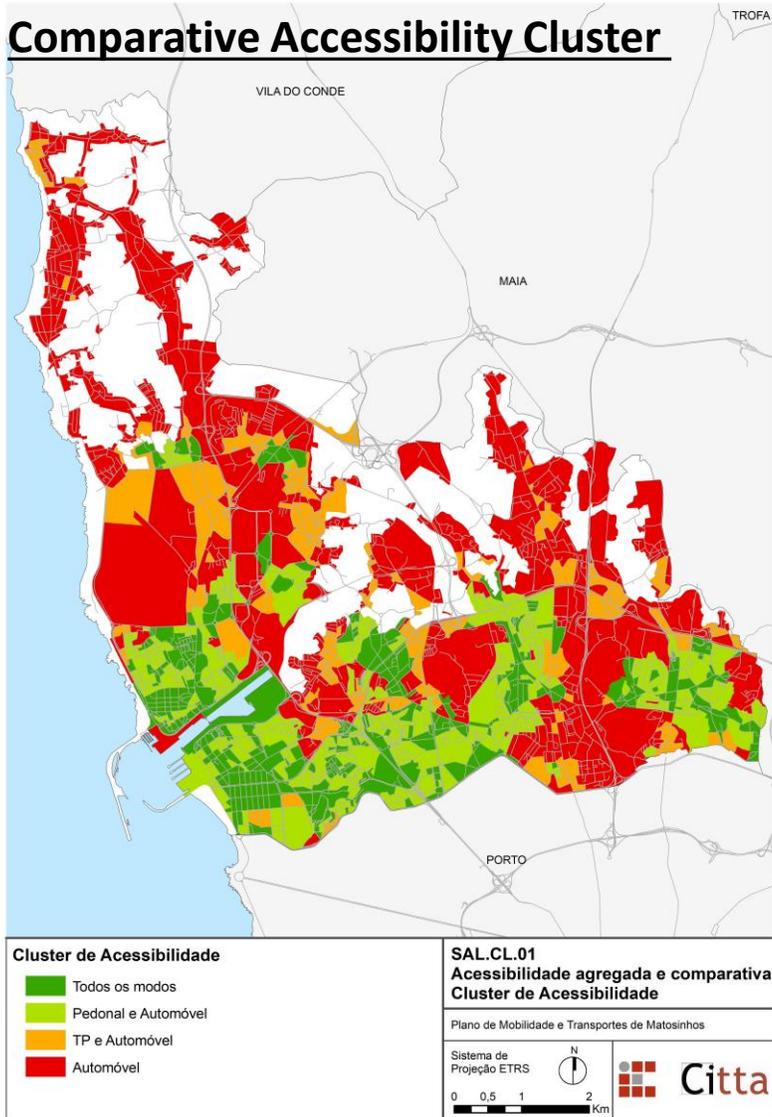


Car Accessibility

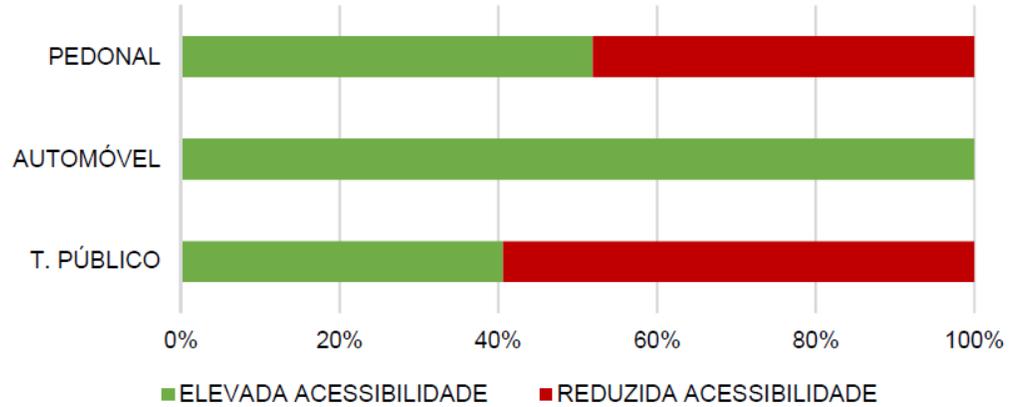


Public Transport Accessibility

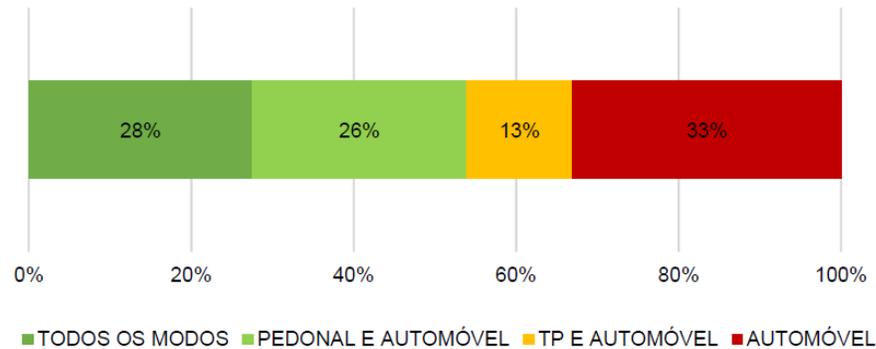
Practical Examples (SUMP Diagnosis)



Accessibility Clusters



Populations distributions according to the Diverse Activity Index



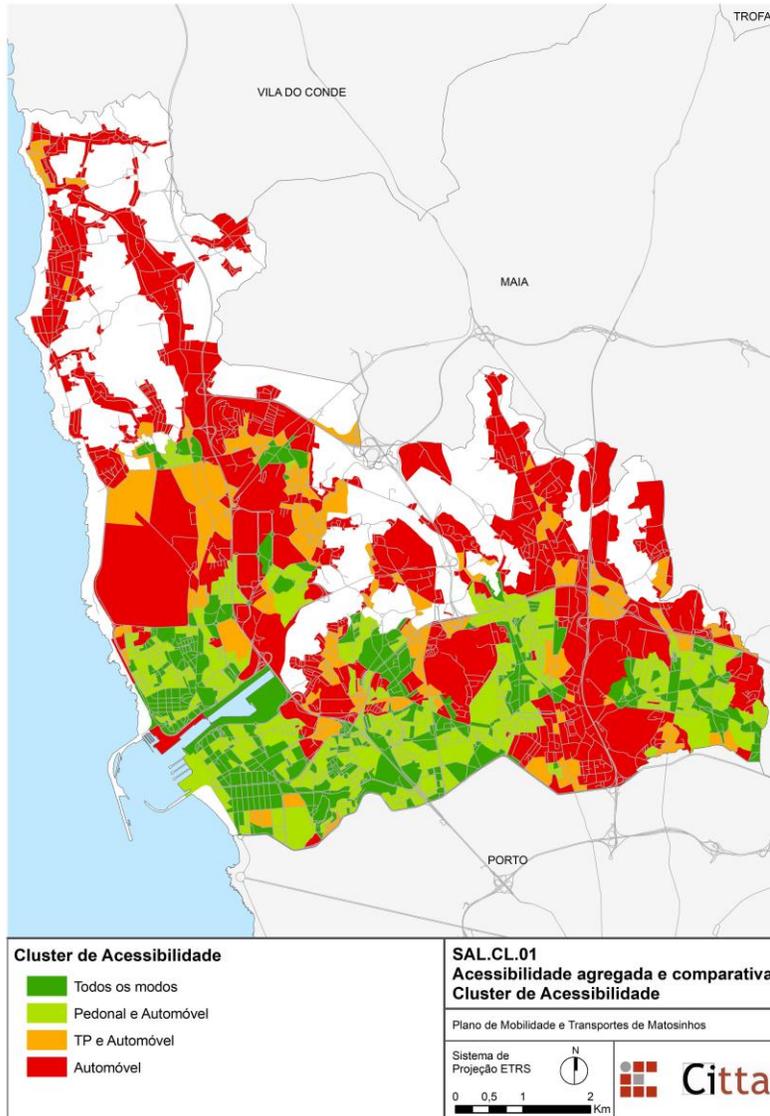
Populations distributions according to the Accessibility Cluster



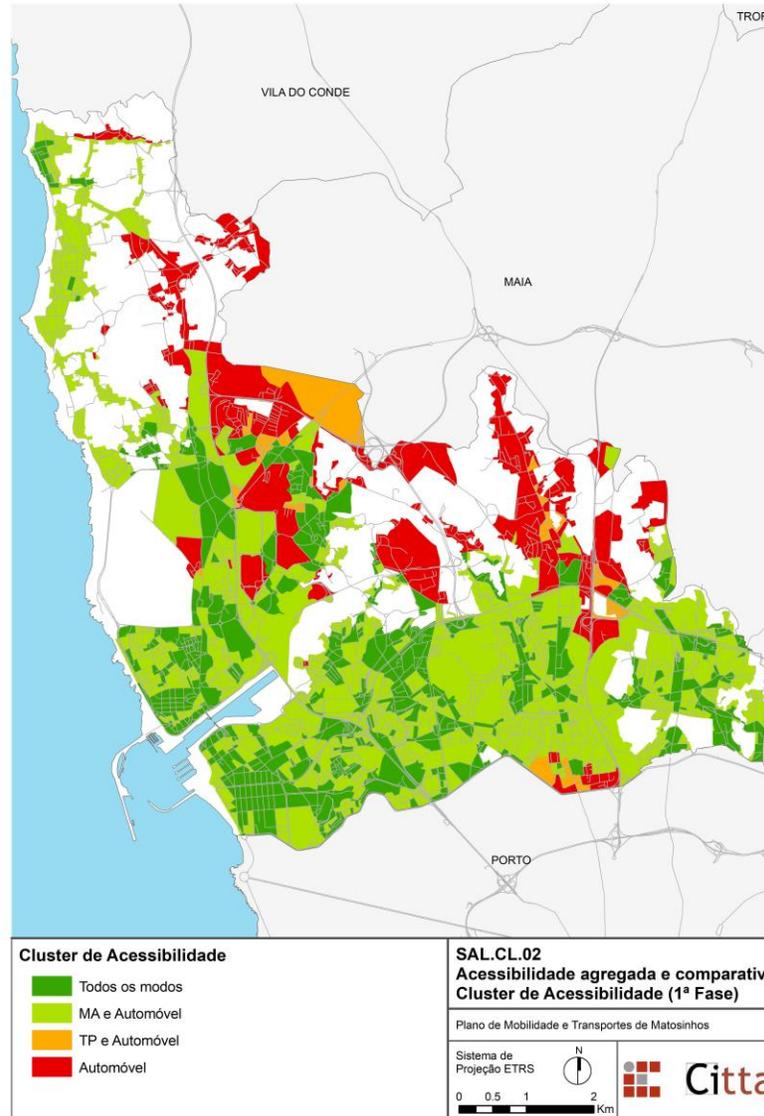
All modes
 Pedestrian and Car
 Public Transport and Car
 Car

This means that 1/3 of the population as high levels of accessibility only by car

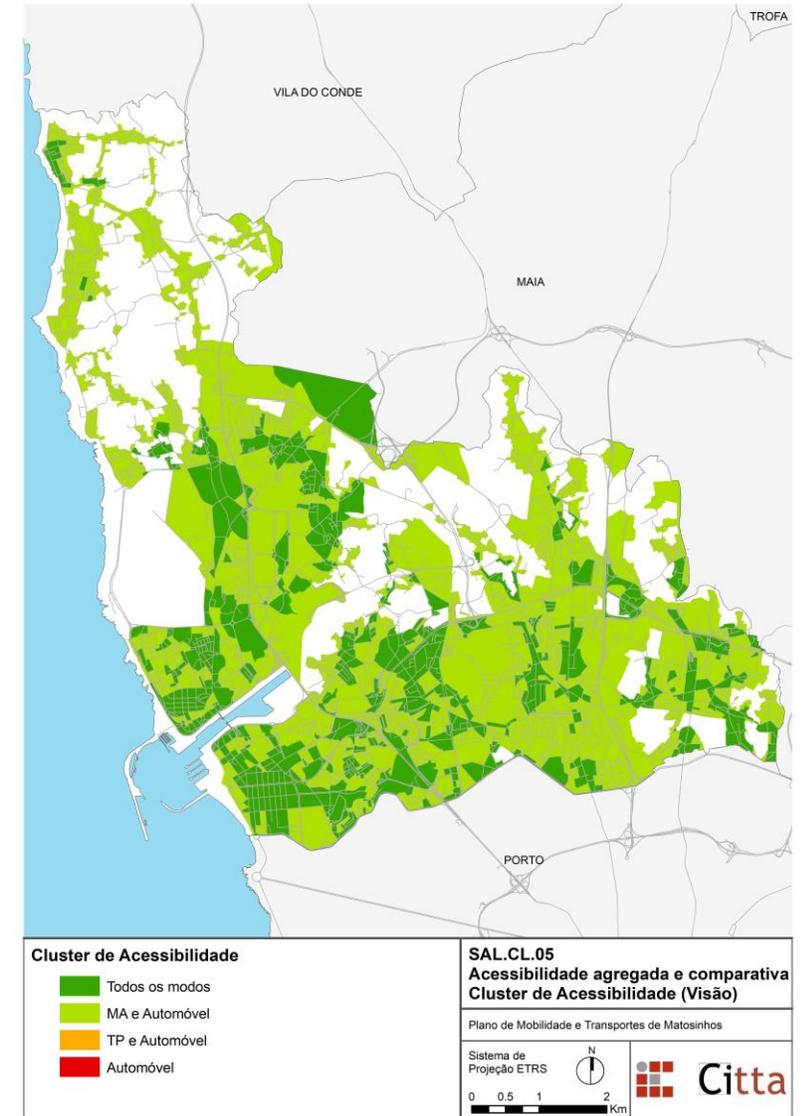
Practical Examples (after specific proposals)



Accessibility Clusters (Diagnosis)



Accessibility Clusters (Proposals Fase 1)



Accessibility Clusters (Proposals Fase 5)

Relevance to Planning Practice

- The main outcomes of the SAL are the diversity of activity index maps for each transport mode and the cluster map (comparing accessibility levels by all transport modes).
- The cluster map provides the baseline information on potential mode choices, categorizing relative competitiveness of different transport modes and thereby identifying areas where inhabitants clearly have no competitive alternative to the car.
- SAL has been used in practice, having been applied within research contexts to analyse accessibility conditions of Greater Porto (Silva, 2008; Silva and Pinho, 2010) and Copenhagen Metropolitan Area (Pinho, 2010) and recently Matosinhos SUMP (2018) in a “real world” PSS.

Strengths and limitations

- The SAL was built with high concerns on usability taking into consideration the 'rigour-relevance dilemma';
- Another important choice within the 'rigour relevance dilemma' was the use of a simple accessibility measure (contour measure) providing a tool which is easy to communicate and understand but does not consider some of the complexity of accessibility such as distance decay or competition effects;
- Finally, the SAL is highly adaptable to local conditions since it leaves a large number of issues to be defined and fine-tuned locally, when calibrating the case specific SAL, however, this adaptability and the disaggregation level of the tool are highly dependent on the availability of data which may limit its use.

Obrigado!