

Delineating Functional Regions – Does one size fit all?

Andie (Hoe-Chee) Yam

SGS Economics and planning

ayam@sgsep.com.au

A functional region is a territorial unit that is socially and economically connected without jurisdictional, historical or topological influence. What are the social and economic indicators that best define functional regions? Here, we discuss the roles of functional regions for each commute, migration, communities of interest and household travel purposes, and observe that each of these regions vary in shapes and sizes. Without an equitable geography, regional governance becomes much challenging and hard to carry out especially in creating a collective environment for planning and policy integration. In addressing that, we present a multicriteria hierarchical clustering algorithm to identifies functional regions that fulfill each of the abovementioned criteria optimally and simultaneously. This opens up doors for constructing models for delineating functional regions with optimal performance and equitable for governance.

Delineating Functional Regions - A Multicriteria Clustering Analysis

SGS Tuesday Workshop
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Independent insight.

Presentation structure

- Functional Regions – Objectives and Definitions
- Method / Model
- Case Study / Results

A Functional Region is ...

*a territorial unit resulting from the organization of social and economic relations in that its boundaries **do not reflect geographical particularities or historical events*** (OECD, Redefining Territories : The Functional Regions, 2002, p 11)

- characterised by high frequency of intra-regional interactions

Table 1. Definitions of functional regions in certain OECD Member countries

	Functional region	Number	Criteria	Delineation around poles	Full national coverage
Austria	Arbeitsmarktbezirke – NUTS IV* (Local labour market districts)	85	Established by law	No	Yes
Belgium	• No definition of local labour market (in progress)
Canada	• Census Metropolitan Areas	25	Commuting conditions	Yes	No
	• Census Agglomeration Regions	112	Commuting conditions	Yes	No
Czech Republic	• Pracovní okrsek (Local labour market micromarkets)	235	Commuting conditions	Yes	Yes
Denmark	• Pendlingsoplant (Commuting catchment areas)	27	Commuting conditions	Yes	Yes
Finland	• Sub-regions, NUTS IV, local labour markets	82	Commuting conditions + co-operation between municipalities	No	Yes
France	• Employment areas	348	Commuting conditions	No	Yes
	• Urban areas	361	Commuting conditions	Yes	No
Germany	• Local labour markets	271	Commuting conditions + travel time	Yes	Yes
	• Spatial planning regions	92	Commuting conditions	Yes	Yes
Hungary	• Regional labour centres/ regional unemployment offices	148	..	No	..
Italy	• Sistemi locali del lavoro (Local employment system)	784	Commuting conditions	No	Yes
Japan	• No definition of local labour market
Korea	• No definition of local labour market
Mexico	• No definition of local labour market
Norway	• Economic regions – NUTS IV	90	Commuting conditions + retail trade	Yes	Yes
Portugal	• Unidades Geográficas de Empregos (Geographical employment units)	33	Commuting conditions	Yes	Yes
	• Bacias de Emprego (Local labour markets)	40	Commuting conditions	No	Yes
Spain	• No definition of local labour market
Sweden	• Local labour markets	81	Commuting conditions	Yes	Yes
Switzerland	• Labour markets	16	Commuting conditions	Yes	Yes
Turkey	• No definition of local labour market
United Kingdom	• Travel-to-work-areas	308	Commuting conditions	No	Yes
United States	• Commuting zones	766	Commuting conditions	No	Yes
	• Metropolitan areas	268	Population density + commuting conditions	Yes	No

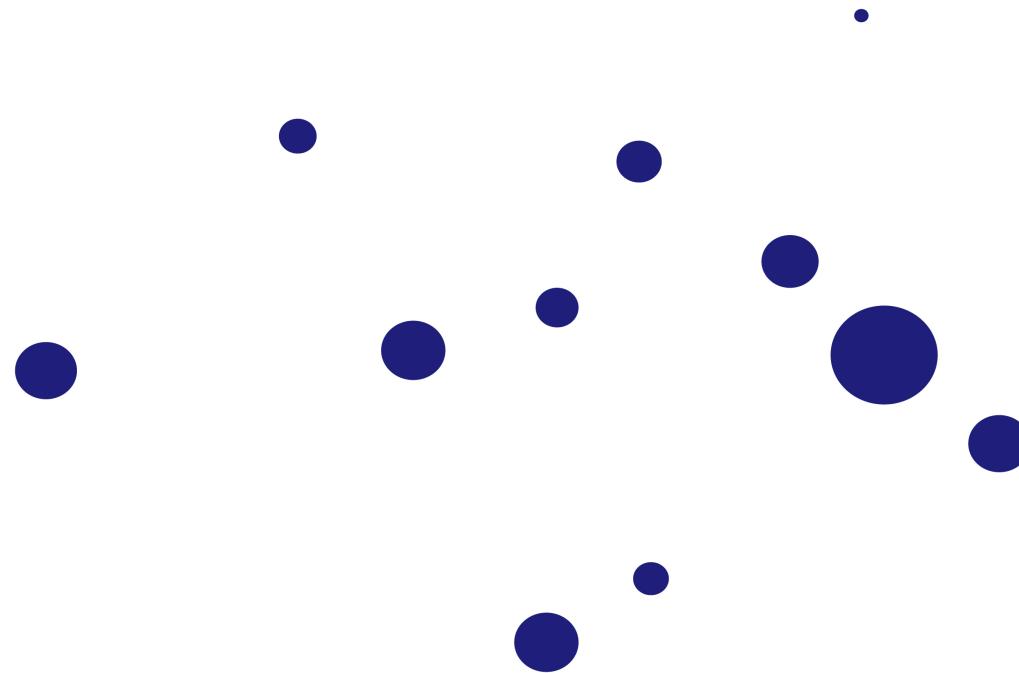
* Administrative regions which could be used, for analytical purposes, as a proxy for functional regions.

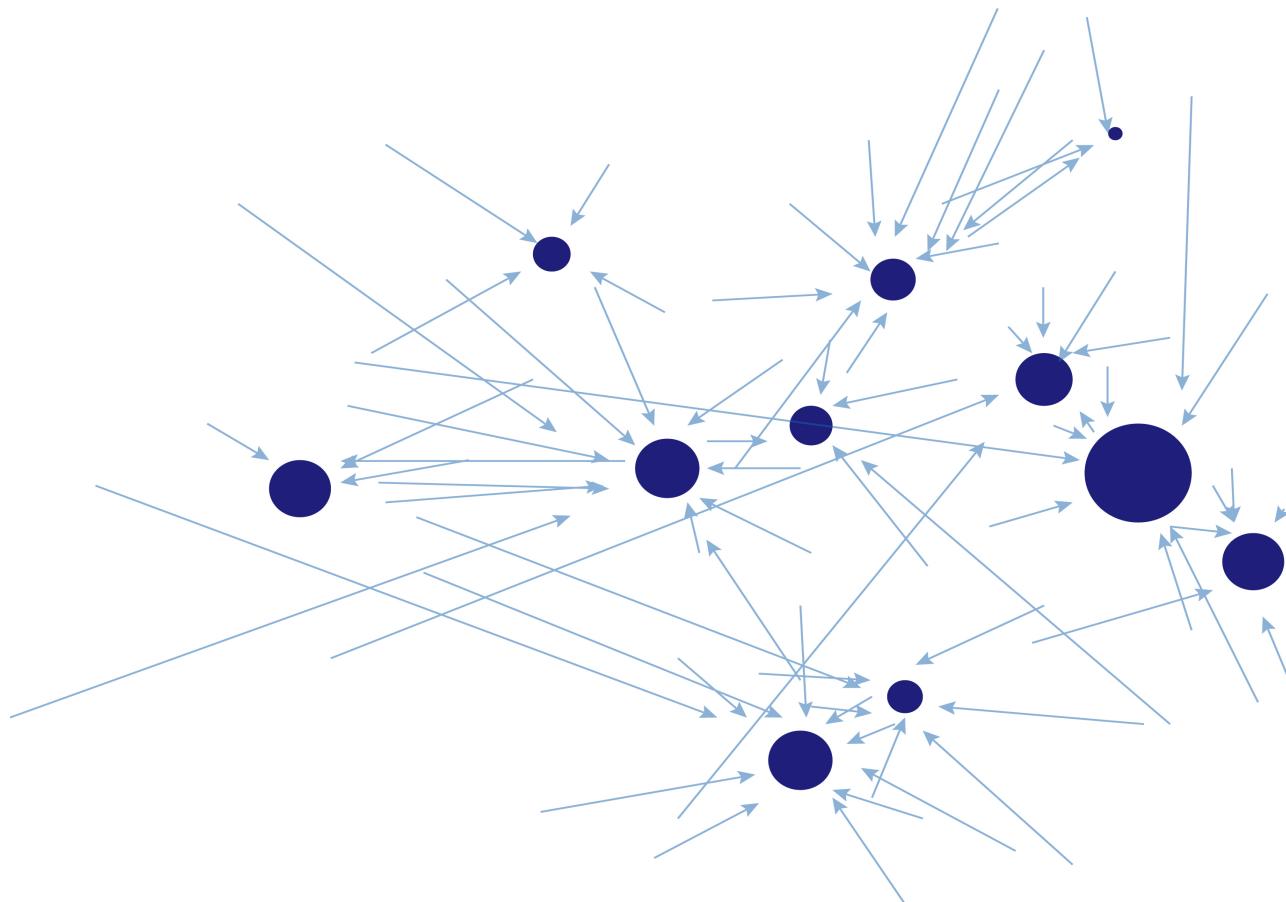
Source: Questionnaire on Functional regions, OECD, 2000.

- The most typical concept used in defining a functional region is that of labour markets
- integrated housing and working areas within which commuting is common and natural (OECD, 2002)

- UK - Functional regions as a guide for the reorganization of local government (Casado- Diaz, 2000)
- Ideally, the implementation of policies around a functional region (instead of a municipal level) would lead to an optimal level of economies of scale and scope. (OECD, 2001)

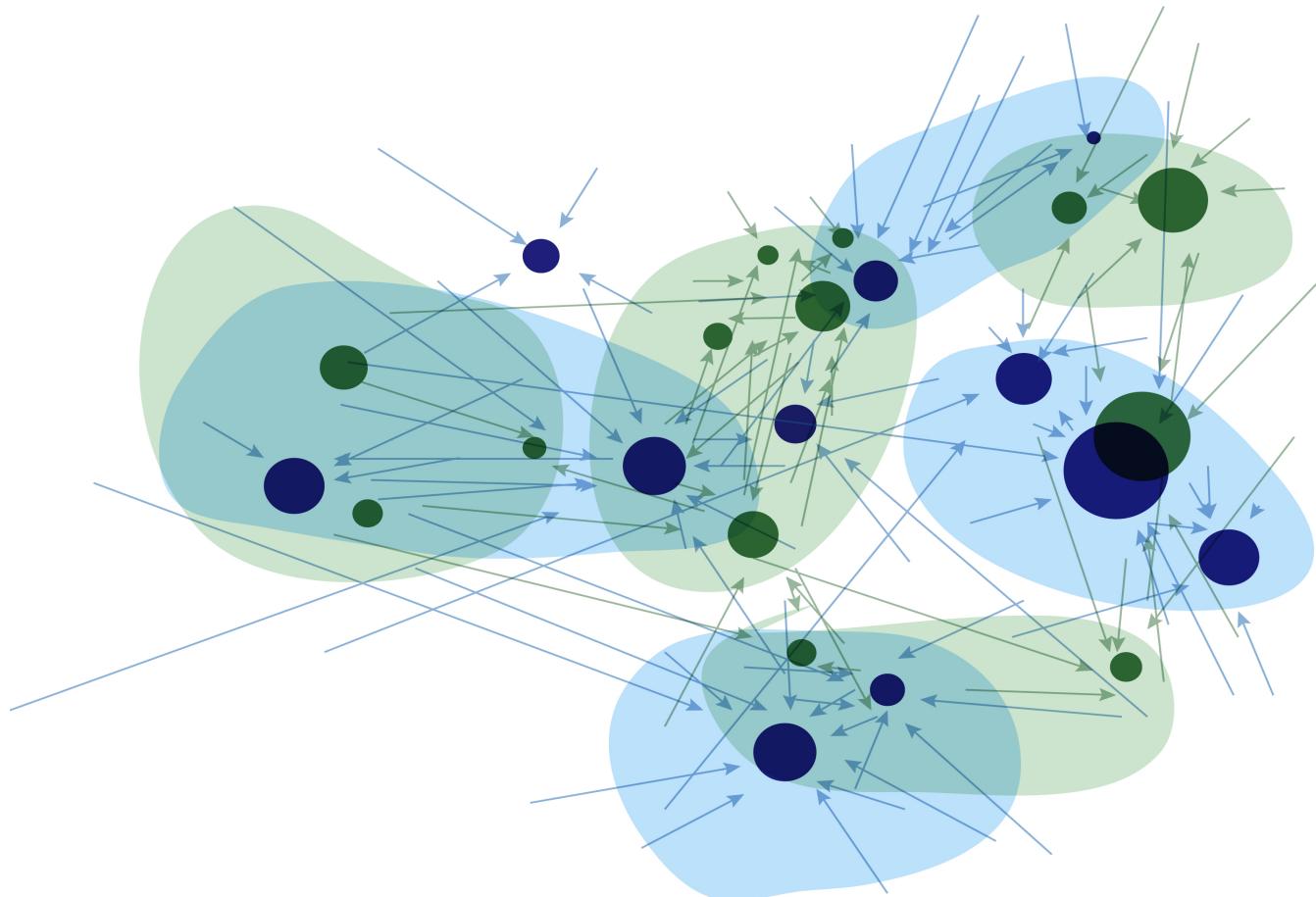
- **Why multicriteria?**
- Economies of Scale and scope are different for every function
- Labour / Housing markets requires supplementing from other key markets: such as supply chains in industry and commerce; and service markets for consumers

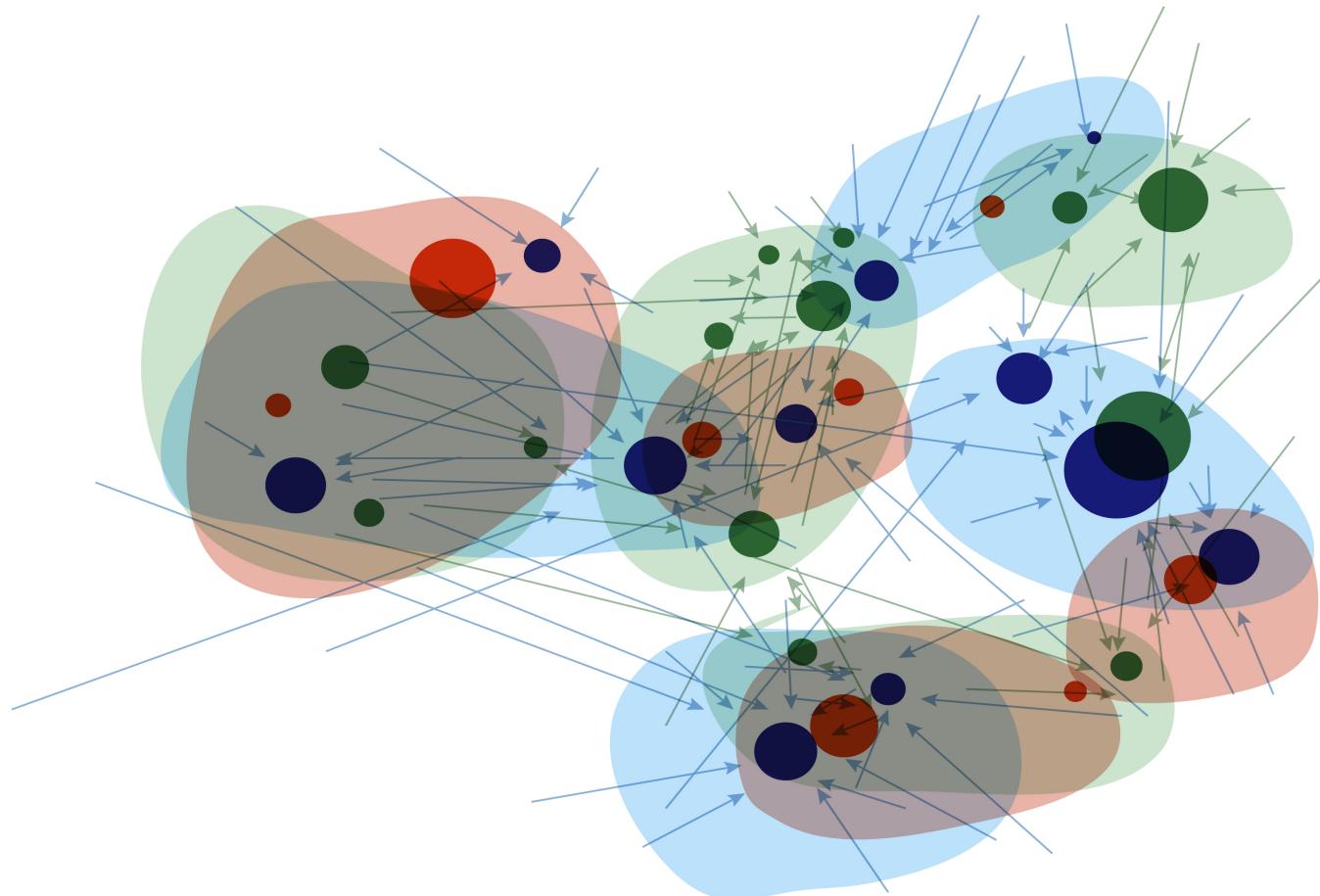


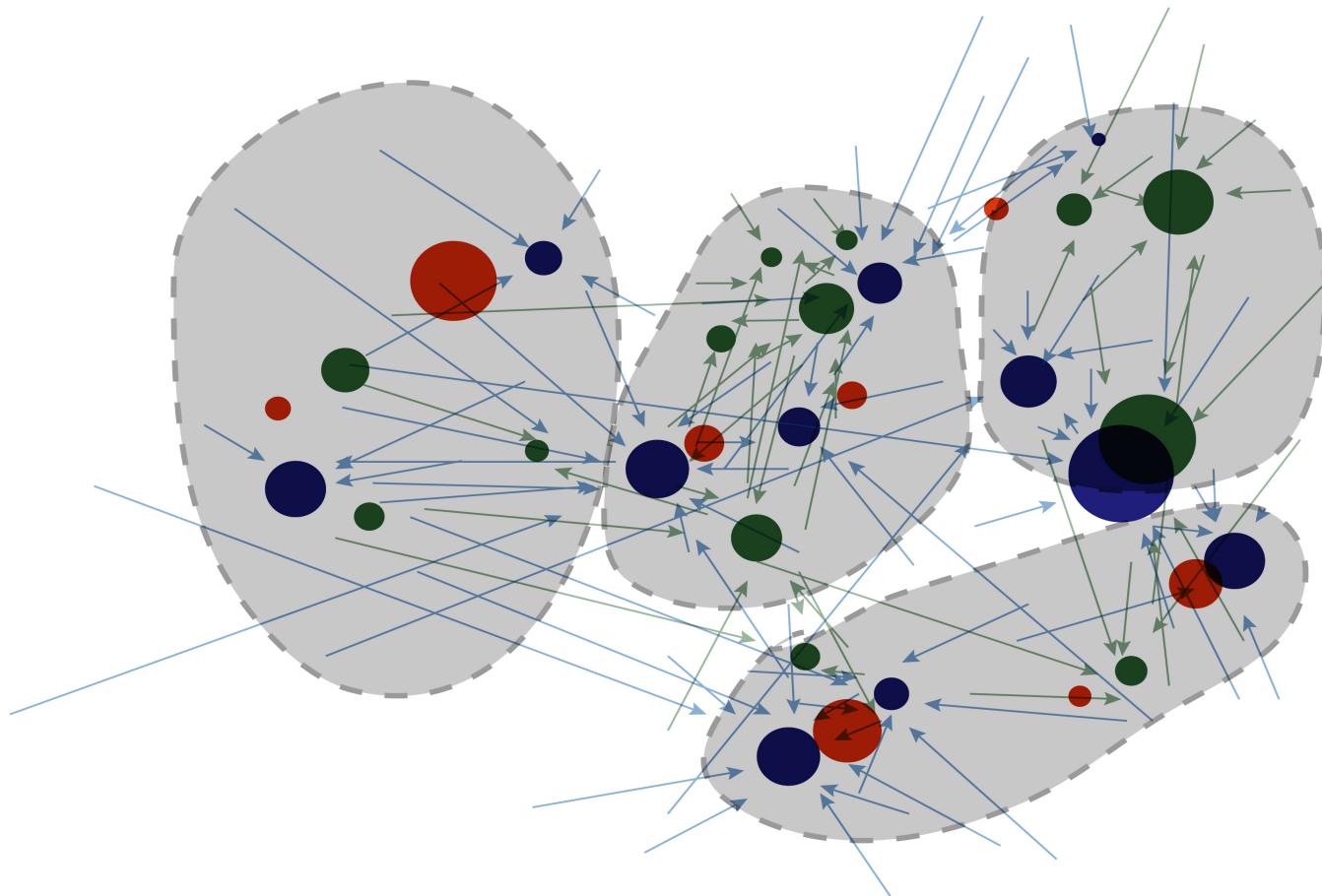












Methodology

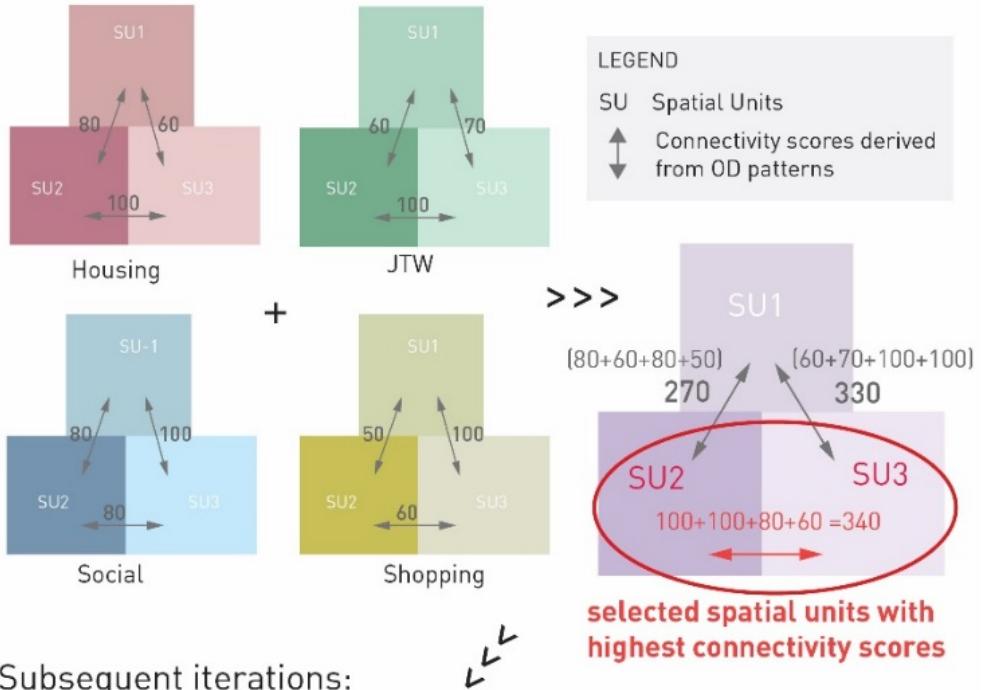
Identifying Clusters as Regions

- hierarchical clustering procedure that maximises the proportion of the total interaction within the aggregated geographies
- **Connectivity score 'I'** = $(T_{ij}/O_i*D_j)+(T_{ji}/O_j*D_i)$
- **Qualifier 1:** High levels of self containment and self sufficiency

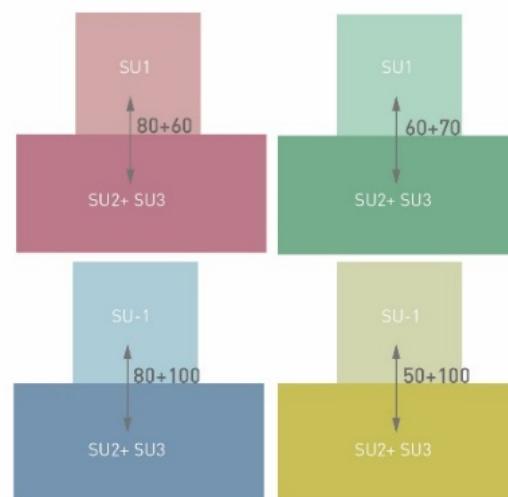
Multi-criteria clustering

- Qualifier 2:**
Simultaneously yield high connectivity scores (i) for all considered criteria

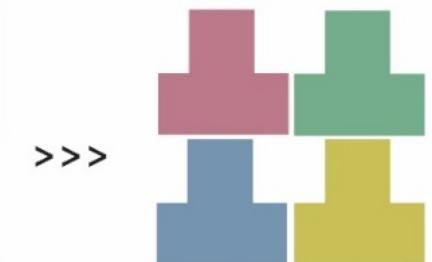
First iteration:



Subsequent iterations:

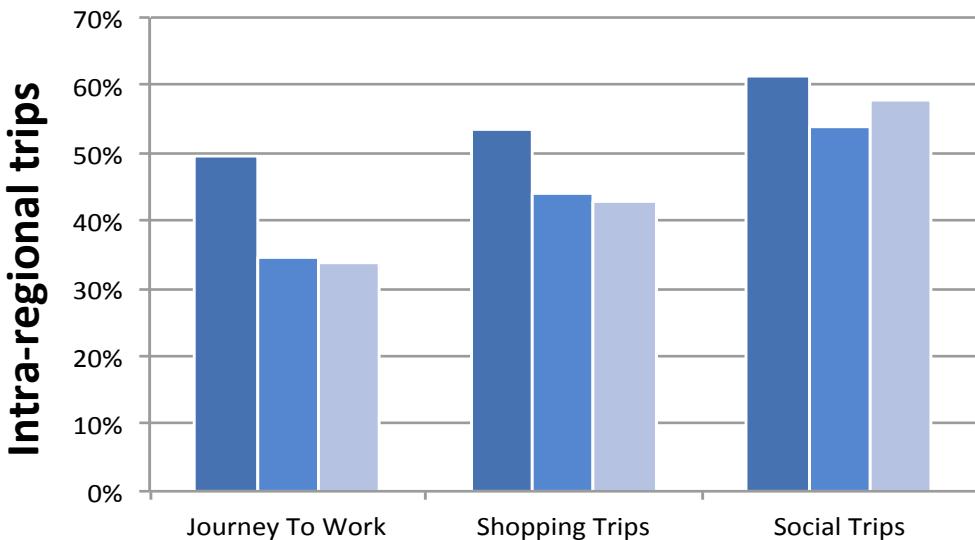


N-th iteration

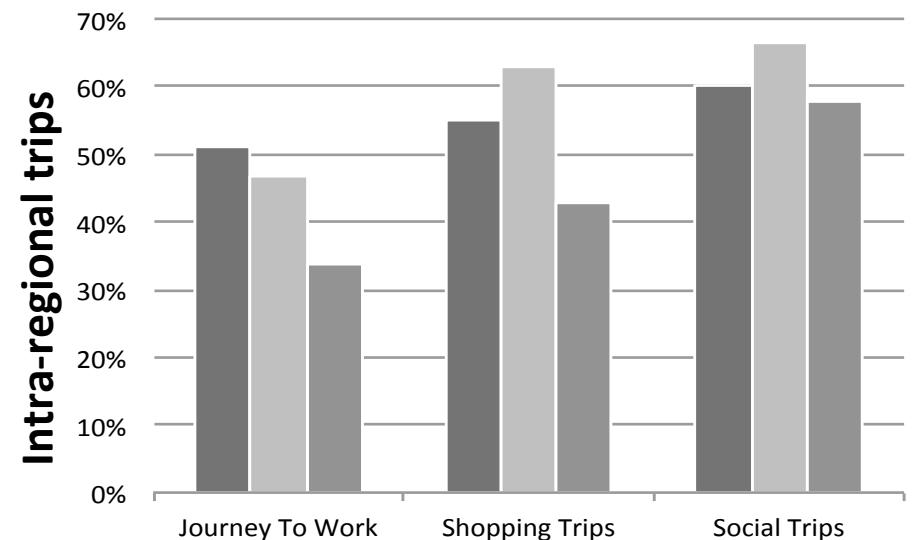


Functional regions	Labour market	Housing markets	Retail markets	Social catchment	AVERAGE Standard Deviation
– Labour market	0.19	0.23	0.26	0.29	0.25
– Multi-criteria	0.16	0.19	0.22	0.25	0.21

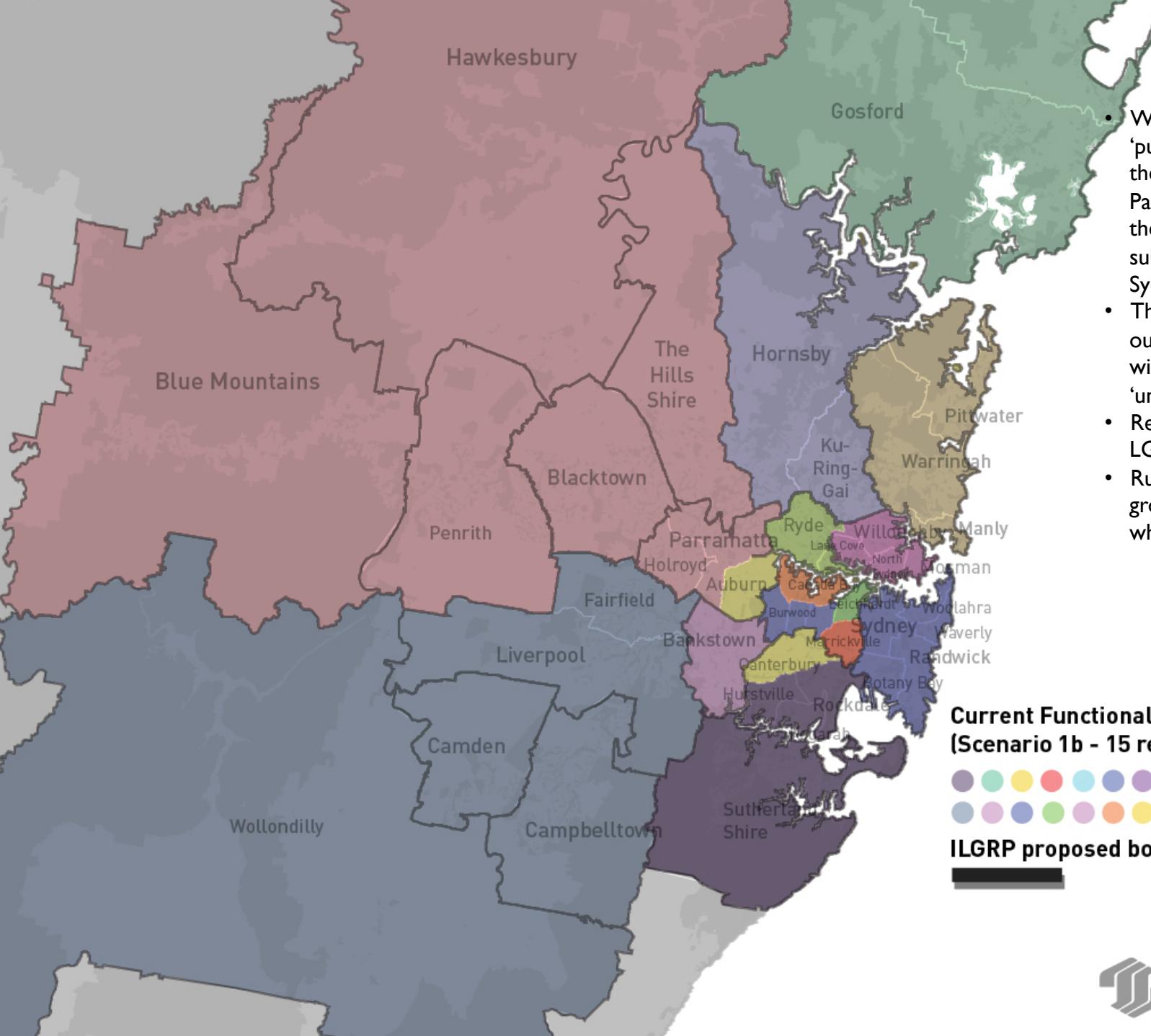
Multi Criteria



Single Criteria



Case Study



- With fewer functional regions the ‘pull’ of the Parramatta centre groups the north-west LGAs with the Parramatta grouping, and the pull of the Sydney CBD groups the eastern suburbs LGAs with the City of Sydney LGA
- The LGAs with a lot of inbound and outbound activity, and perhaps without a dominant centre, remain ‘ungrouped’.
- Relatively remote or fringe groups of LGAs group together
- Rural LGAs tend to be drawn into a group with a neighbouring LGA where this has a centre

Conclusions

- Identify areas where functional collaboration on contractual grounds can work very well and often replace additional government layers or upper government
- implementation of policies relating to jobs and transport
- Serve as a benchmarking geography / reference for censuses and other types of survey and data collection
- To carry out structural analysis of economic disparities / competitiveness at a regional level