

Functional Urban Regions and the Distribution of Sports Infrastructure

GREP Balanced Development Module

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Outline

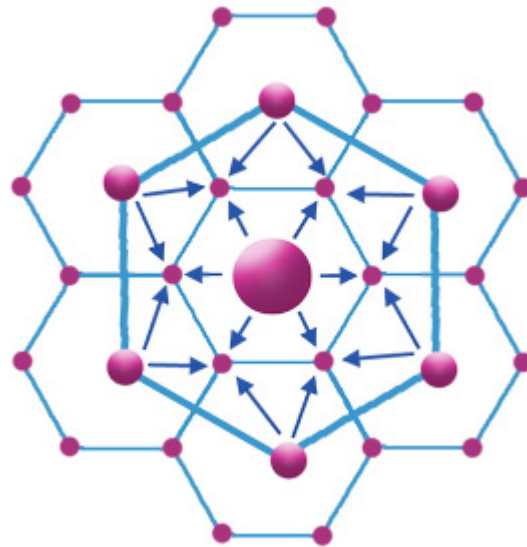
- Introduction/Motivation
- Central Place Theory
- Sports Place Theory (Bale, 2003)
- Empirics of Sports Place Theory (Ahlfeldt and Feddersen, 2008)
- Discussion

Introduction/Motivation

1. New Economic Geography theoretical framework and urban growth:
 - how do spreading forces, such as congestion, change the long-run equilibrium allocation of economic activity across urban space?
 - disadvantages of uneven distribution of local resources and limited availability of space? (clustering and agglomeration of economic activity)
2. Rapid demographic and socio-economic developments of urban areas
=> A need to alter the existing spatial distribution of social infrastructure?

Theoretical Framework: Central Place Theory (Christaller, 1933)

- Seeks to explain number, size and location of settlements in an urban system.
- Asserts that settlements simply function as 'central places' providing services to surrounding areas.
- Oft-cited example: Dutch polders



- settlements form in a hexagonal lattice (no overlap), with an urban hierarchy

Central Place Theory – Simplifying Assumptions

- A flat, homogeneous, unbounded surface (abstract space)
- evenly distributed population and resources
- all consumers have similar purchasing power and demand for goods/services
- no provider of goods or services can earn excess profit
- only one type of transport and equally easy in all directions
- transport cost is proportional to distance traveled

The theory then relied on two concepts: threshold and range.

- 1) Threshold: minimum market (population or income) needed to bring about the selling of a particular good or service.
- 2) Range: maximum distance consumers are prepared to travel to acquire goods

Theoretical Framework: Sports Place Theory (Bale, 2003)

Sports Place Theory: location of sports facilities occurs in a hierarchical manner

- Sports places are centrally located within their market areas.
- Low-order sports places provide sporting facilities for small catchment areas; only small threshold population needed
- High order places are fewer and more widely spaced; large population thresholds.

A hierarchy of sports places exists in order to make as efficient as possible the arrangement of sports opportunities for

- (a) consumers who wish to minimize their travel to obtain the sport they want
- (b) producers of sport who must maintain a minimum threshold to survive.

Sports Place Theory - implications

1. The demand for sports and recreational facilities diminishes with distance due to increasing travel costs.
2. A sports facility's sphere of influence ends where demand is zero, and such a point is a potential location for a neighbouring sports facility.
3. Infer local sphere of influence from pair-wise distances for sports facilities of distinct hierarchical orders (small, medium, large).

We relax the homogenous surface and even population distribution assumps.

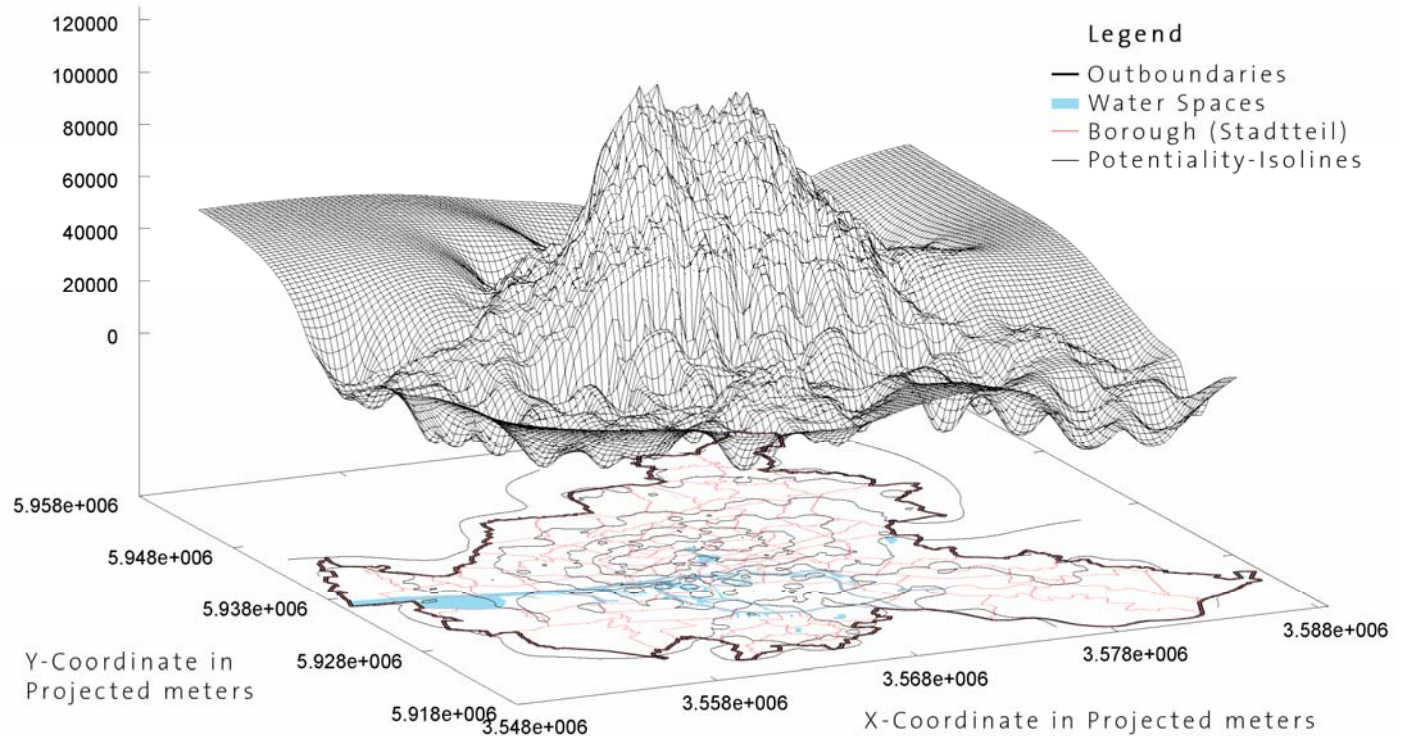
Alonso's (1964) bid-rent theory:

Providers of sports facilities are likely to be defeated in competition for central locations due to high property prices.

Testing Sports Place Theory (A&F, 2008)

1. Classify Sports facilities by size. Construct local spheres of influence using pair-wise distances. Test against theoretical predictions.
2. Income and socio-economic disparities: construct distance-weighted population measures and distance-weighted sports facility size measures
 - do neighbourhood differentials determine provision of sports facilities?
3. Distinguish between private and publicly provided facilities
 - assess the dispersion of each type of facility,
 - should more public facilities be provided in certain disadvantaged areas?
4. Socio-economic characteristics of the indigenous and foreign populations
 - relationship between nationality/ethnic group and provision of facilities?

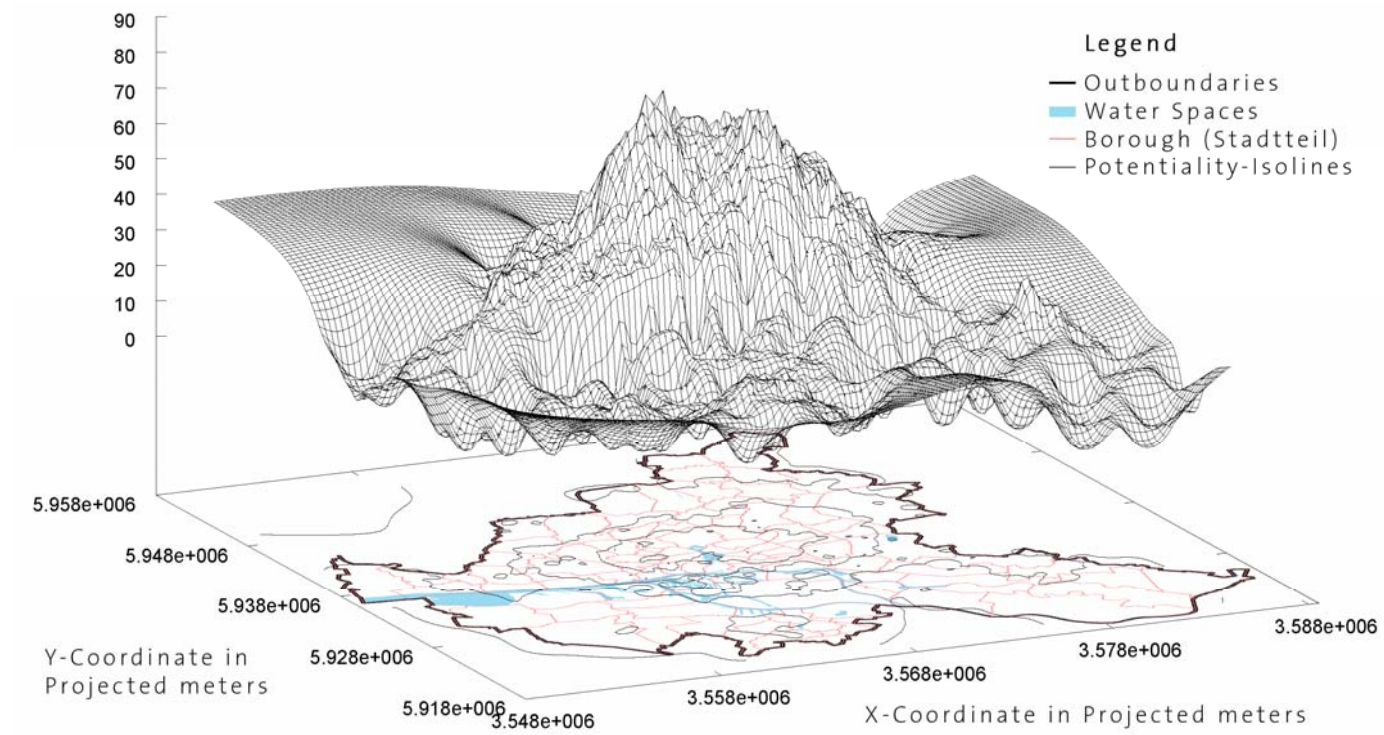
Population Potentiality [demand for sports infrastructure]



$$PP_i = \sum_j P_j \exp(-a d_{ij})$$

Where d_{ii} is the effective road distance between areas' i and j centroids and a is a distance decay factor (captures travel costs)

Sports Potentiality [supply of sports infrastructure]



$$SP_i = \sum_j S_j \exp(-a d_{ij})$$

Where S_{ii} captures the aggregate size of sports facilities within each area

Other potentiality variables

- Purchasing Power differential (PD)

$$PP_i = \sum_j \left(y_j - \bar{y} \right) P_j \exp \left(-a d_{ij} \right)$$

Where y_j is area j's average per capita income and \bar{y} is average city level per capita income

- Potentiality difference for foreign population (FD)

$$PP_i = \sum_j \left(f_j - \bar{f} \right) P_j \exp \left(-a d_{ij} \right)$$

where f_j is the total number of foreigner in area j and \bar{f} is the city average.

Two Empirical Models

1. Major determinants of distribution of sports facilities

$$SP_i = \alpha + \beta_1 PP_i + \beta_2 PD_i + \beta_3 FD_i + \beta_4 LV_i + \varepsilon_i$$

Facilities = f (pop density, income, foreign, land value)

This models the absolute endowment of infrastructure.

[A&F (2008): high R2; pos significant PP, LV; neg significant FD, PD.]

Two Empirical Models

2. Now, looking at area's relative endowment of sports infrastructure.

Here ISI is (sports potentiality/population potentiality)

$$ISI_i = \alpha + \beta_1 \frac{y_i}{y} + \beta_2 u_i + \beta_3 uyouth_i + \beta_4 f_i + crime_i + POP_i a + LV_i + \varepsilon_i$$

Rel. End. = f (rel. income, unemp, youth unemp, foreign, crime, age group, land value)

[A&F (2008): lower R2; pos significant crime; neg significant f, LV, and 21-45yr .]

Discussion

Is this approach suited to Irish urban areas?

- Changing urban population mix/ ethnicity/location/ density
- influence of property prices

Is the allocation of Irish social infrastructure largely driven by population density?

Or is Irish social infrastructure used to tackle social exclusion, social integration?

Is there a place for this type of rigorous quantitative approach in Irish spatial planning?