A pioneering study exploring retail centre attractiveness using GPS data in London

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Project Background

Retail centre attractiveness is a concept first introduced in the 80's which often encompassed subjective measures of attractiveness. Due to technological advancements in data collection, an increased range of attributes have been proposed to influence the evaluated attractiveness and the patronage behaviour of retail centres within the relevant choice of consumers. These proposed attributes are more often quantitative rather than qualitative but novel and innovative techniques are rather scarce in research. Much of the research is focused on stationary attributes such as anchor stores whereas the aim of this paper is to present the concept of using GPS as a pioneering method to analyse retail centre attractiveness with respect to each ward in London. There is a considerable gap in research surrounding consumer mobility and its effect on consumers' attraction to a retail agglomeration thus highlighting the need for the study.

Data and Methods

This study explored a ranking system for each retail agglomeration per ward in London using GPS data. Considering the limited volume of literature which has used GPS data for analysis, this methodology focused on exploring the variety of techniques and filtration processes required for a large unstructured data set. The analysis used retail areas as opposed to individual stores and targeted 66 retail areas in London. Of the total 23 million users available in the data set, only 11% of users could be used for analysis as these users were confidently located in their home ward. The study was carried out in the month of December as those who dwell within a retail agglomeration in December can be assumed to be shopping. In this study, retail agglomerations overall strength/rank (attractiveness) relative to each ward has been calculated using 6 attributes:

Weighted dwell rank + Weighted Distance Rank + Weighted Count Rank (Calculated using GPS data)

+

Population Rank + Income Rank + Accessibility Rank (Calculated using data sourced from London DataStore).

Key Findings

One of the most difficult tasks within the study was defining home locations of users. To interpret the results of calculated home locations, % of users per ward using the GPS data was compared to % of people per ward using census data. In this study, there was a strong positive correlation between calculated home locations and actual home locations within wards in London, r = .495. These results demonstrate around half of users with a defined 'home' using the method outlined in this study, were correctly identified.

However the main aim of this study explored the relationship between each retail agglomeration and each ward. Based on the methodology in this study, East Ham Central is the most attractive ward to London West End (figure 1).

Retail Agglomeration	Home Ward	Overall Rank(Sort: Retail)
London West End	East Ham Central	1
London West End	Fortis Green	2
London West End	Tachbrook	2
London West End	Royal Hospital	4
London West End	Furzedown	5
London West End	Norland	5
London West End	South Richmond	7
London West End	Whitton	7
London West End	Canbury	9
London West End	Dundonald	9
London West End	Darwin	11
London West End	Pembridge	11
London West End	Stanley	11
London West End	Notting Barns	14
London West End	Twickenham Riverside	14
London West End	Balham	16
London West End	Willesden Green	16
London West End	Chiswick Riverside	18
London West End	Fieldway	18
London West End	Newbury	18
London West End	West Thornton	18
London West End	Wimbledon Park	18
London West End	Enfield Highway	23
London West End	Avonmore and Brook Green	24
London West End	Turnham Green	24
London West End	West Harrow	24

Figure 1: Home ward ranking for London West End.

Perhaps more interestingly the relationship between dwell time and distance was explored. The principle of 'gravitational' theory is shoppers are more likely to shop in a more attractive town or shopping centre (i.e. in this case, number of visits) but attractiveness decreases with distance. This study found there is a relationship between dwell time and distance in a retail agglomeration however there is room for improvement.

Value of the Research

The results in this study have explored a pioneering technique in which movement data has facilitated a ranking system of retail locations within London. The methodology in this study has proven the difficulty in defining home locations from GPS data however the successful filtration processes will prove useful for future research. Often research has overlooked attraction as an important aspect of retail catchment analysis generalising attraction as one attribute such as population. Therefore, the results of this study could be applied to existing ranking systems as a comparable data set or be included in catchment analysis.