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## Understanding non-standard travel patterns with mobility and ridership data

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### Introduction & Background

The commuter paradigm, focusing on the needs of commuters during weekday peak hours primarily traveling to centralised urban areas, has long dominated transport and service planning. While optimising for peak demand has benefits, such as efficient capacity management, it can overlook the section of a population whose temporal rhythms do not align with these periods. Traditional data sources such as the English National Travel Survey (NTS) understandably underreports non-standard trips, and can suffer from small sample sizes.

### Objectives & Approach

To overcome this, our analysis brings together two novel forms of data – BT mobility data & TfL public transport (PT) ridership data – to help uncover the holistic picture of off-peak travel that has hitherto been suppressed. Our exploratory, aggregate analysis first evaluates the different processing methodologies, before comparing the two to understand the similarities in journey purpose and temporal patterns. We then combine them to understand modal shares for shift workers versus standard commuters.

### Relevance to Digital Footprints

Using novel forms of data – at an aggregated level to eliminate concerns over data linkage – can help to better understand the potential communalities of populations like night workers and shift workers, who are faced with more limited transport options during off-peak hours.

### Results

The comparison of these datasets shows trip purpose proportions are similar across datasets and days, though BT mobility data detects a higher proportion of inter-peak (road based) trips (this is due to the lower PT use in the inter-peak, hence these are excluded from TfL data). Combining the datasets, we find that standard commuters have a higher rail and bus modal shares than shift workers and road use increases on weekends by all, and especially amongst shift workers.

### Conclusions & Implications

By leveraging these sources, we uncover travel patterns not only for work but also for other types of trips, offering a more inclusive understanding of travel behaviours and informing more equitable infrastructure and service planning.

### Keywords

Mobility, Ridership, Travel Patterns, Hard-to-Reach



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