

Temporal profile of daily sales in retail stores in London

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Summary

This project will explore the temporal variation of daily sales by key Stock Keeping Unit (SKU) groups in various retail stores in London. Daily sales data is obtained from a major UK retailer which has hundreds of retail stores in the UK. The aim of the study is to identify distinguishable temporal patterns in sales behaviour between various types of stores in London and to detect and explain outliers. It would also answer broad questions such as when customer congestion is most likely to occur, how stock can be redistributed during lunch hours and evenings in various retail stores.

KEYWORDS: SKU, convenience store, store sales data, temporal profile

1. Introduction

In mid-2014, as the UK economy returned to robust growth after six years of economic crisis and austerity, the IGD (Institute of Grocery Distribution) published a 5 year forward look to the likely configuration of the grocery market in 2019. Whilst the overall size of the grocery market was forecast to grow from £175bn to £203bn (16.3%), a major part of the growth is attributed in the estimated sales growth of both online and 'discounter' grocery channels to reach market shares in 2019 of 8.3% and 10.5% respectively and the convenience store grocery sector which is predicted to account for 24.1% market share of total UK grocery sales in 2019 (having already grown to 21.4% in 2014). It is also predicted that the market share of the 'superstores and hypermarkets' would collapse from 42.2% to 34.9% (IGD, 2014).

Over the past decade, important and highly complex shifts in consumer behaviour have been taking place in the UK. Consumers have adjusted to and increasingly embraced online shopping, but additionally have sought convenience at the local/neighbourhood and workplace level. This might have been caused by technological advancement, growth of non-traditional households, the increase in women's participation in the labour force, longer working hours and population ageing (Wrigley and Lambiri, 2014).

The important shifts in consumer behaviour and prevailing cultures of consumption towards the convenience culture is also helped by the intense technological innovations, favouring massive growth of online and 'on the go' retail channels (e-commerce, m-commerce), combined with the adoption of and ownership of technology that has created challenges for even the most sophisticated consumer facing retailers (Wrigley and Lambiri, 2014).

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This study seeks to research the customer transactions in different types of Retailer’s stores (convenience store, superstores, store with click and collect facility etc.) in different locations of London for 24 hour periods over few months and investigate the spatial and temporal variation of sales of various products in these stores. The retailer that forms the focus of this study operates over thousands of supermarkets and convenience stores, employs more than 100,000 staff and deals with more than 20 million customer transactions in each week.

The research will investigate the prospects for improving profitability by changing the composition of products sold at different times of day for certain stores and will investigate the impact of multichannel retailing through the inclusion of ‘click and collect’ facilities.

2. Data:

2.1. Stock Keeping Unit (SKU) Data

For this study the retailer has agreed to provide the information at the Stock Keeping Unit (SKU) level for each shopping transaction in several stores. Each SKU is contained within a logical hierarchy of products sold through the stores. Data are also available on deli counter purchases. Aggregation of SKUs into key groups will be used in this study, such as Sweet, Fresh Fruit & Veg, Ready Meals, Lunch etc.

2.2. Temporal distribution of customer transactions by store

Several stores will be selected in various locations of London within the categories as convenience store, superstores, including stores with ‘click and collect’ facilities. The total number of SKU sales by hierarchy for each of the stores will be provided. The data will include key store attributes; postcode (location), size and format, number of items by SKU, including total and transaction value (£) by SKU. For a selected number of stores, the average number of transactions, value of transactions (bands) and quantity of items (bands) per transaction for each day will also be provided by 10 minute intervals. An example of the store attribute table is shown in Table 2.1 and a temporal variation of the store transactions is shown in the Figure 2.1.

Store code	POSTCODE	Store size	Format
Store 1	W1T 1BJ	3,000ft ²	Convenience
Store 2	IG1 2AA	10,000ft ²	Supermarket
Store 3	W6 9NJ	2,500ft ²	Local
Store 4	W6 0PZ	10,500ft ²	Supermarket

Table 2.1. Example table of the store attribute table (simulated)

Depending on further agreements, the retailer may also provide the customer details which pertain to more than 15 million loyalty card users and more than a million online customers. For stores with click and collect facilities, the total number of pick up’s from customers for each store may be provided. For further research, travel data for retail customers in London could be collected through the Oyster card data from Transport for London (TfL) and could be supplemented by London travel demand survey (LTDS) data and Journey to work Census data from Census 2011.

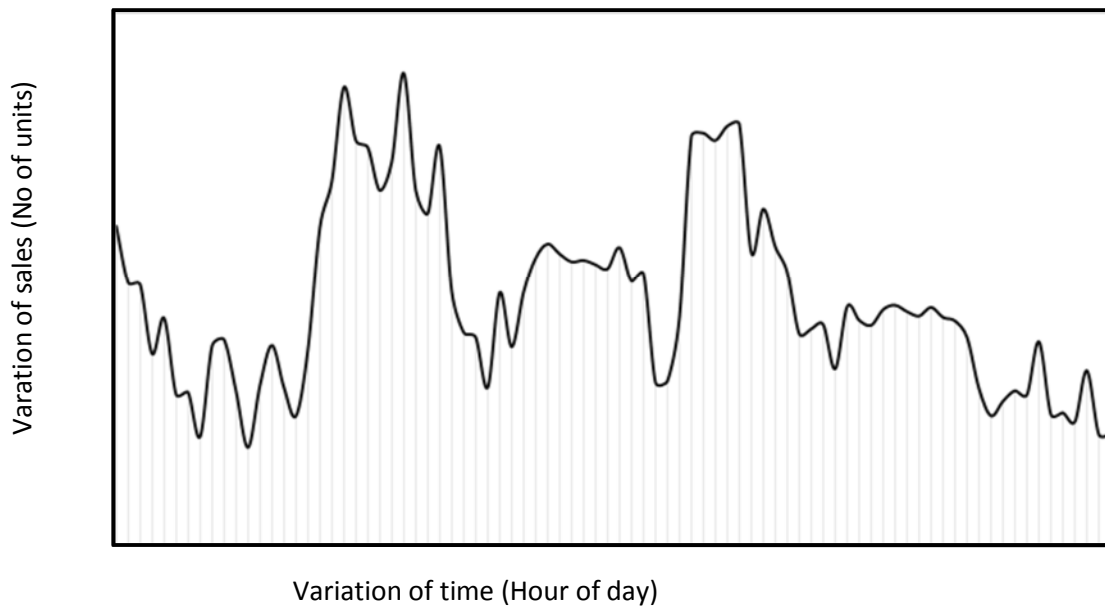


Figure 2.1 Temporal variation of transactions per day for a Retailer's store (simulated data)

3. Results and Conclusion

The study is likely to provide following findings,

- Distinguishable temporal patterns in sales behaviour in various stores in London,
- Identification of likely time period for customer congestion and
- Optimisation of stock display during lunch hours and evenings in various stores.

Further research could be carried out in the following areas,

- Possibility of introducing more click and collect options for various convenience stores,
- Investigation of future expansion proposals towards more multichannel retail opportunities
- Link customer travel pattern in London with the retail transactions

4. Acknowledgements

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5. Biography

Syed Rakib Uddin is a Research Engineer at Consumer Research Centre, UCL pursuing MRes in Urban Sustainability and Resilience. Before joining UCL, he was a Principal Demand Planning Engineer with Transport for London and has research interests in transport and land use planning & engineering, demand planning, data analysis, analysis of multi-channel retailing and its relationship with urban sustainability and resilience.

Paul Longley is Professor of Geographic Information Science at UCL, where he also directs the ESRC Consumer Data Research Centre.

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