Incorporating E-commerce into Grocery Sector Retail Location Modelling

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INTRODUCTION

This PhD focusses on incorporating E-commerce interactions (home delivery or click-and-collect activities) within a spatial interaction modelling (SIM) framework to support location-based decision making in the UK grocery retail sector.

The grocery sector is at the forefront of applied spatial modelling capturing traditionally predictable and habitual consumer behaviours and interactions such as the consumer traveling to a store. The nature of these interactions between demand and supply are changing following the introduction of home delivery/click-and-collect facilities. Increased grocery sector E-commerce operations have resulted in significant supply side investment, however location planning modelling tools have not kept pace with the changing nature of consumer behaviour and retail operations. E-commerce introduces new channels and more complex interactions between demand and supply, the drivers of these behaviours are also more complex.

This project takes the approach of updating traditional SIMs to capture these behaviours and relationships and accurately predict multi-channel consumer behaviours within a spatial modelling framework. Retailers will benefit from methodological enhancement in incorporating multi-channel consumer behaviours within a retail modelling framework to support location-based decision making. Academically this work address a gap in knowledge taking the novel approach of developing a custom-built and calibrated SIM which is disaggregated by retail channel, and which benefits from close collaboration with Sainsbury's.

The complex supply side logistics raised in offering E-commerce services means there are high costs involved for retailers. These costs involved lead to retailers offering online services in order to maintain physical market share whilst operating on limited profitability.

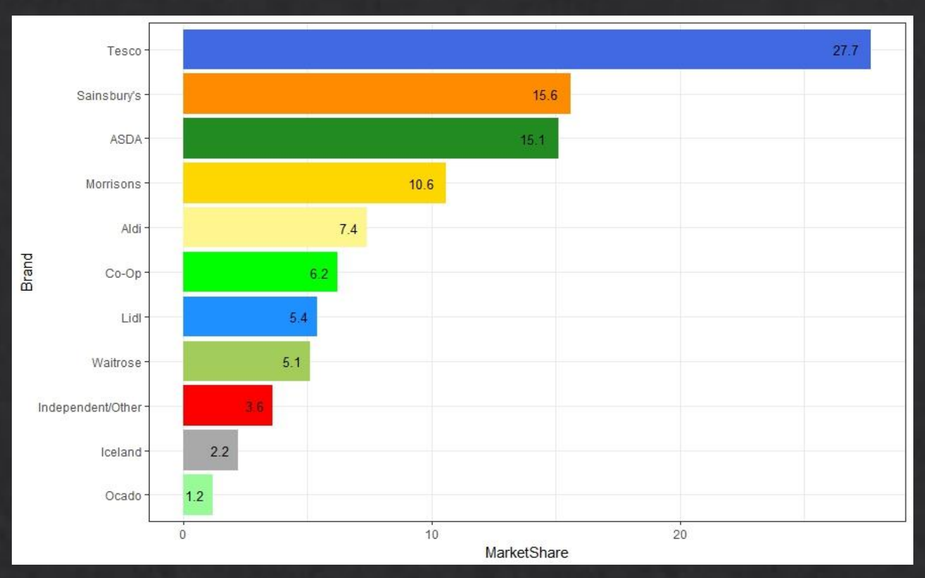

Figure One: UK Grocery Sector Market Share – August 2018 (*Kantar Worldpannel)*

DEMAND

Today the grocery E-commerce market is amongst the most developed in the world, Kantar World Panel reports that the UK Grocery E-commerce market accounts for 7.3% of total grocery sector market share (McKevitt, 2017). The Institute of Grocery Distribution forecasts suggest that the Grocery E-commerce sector in the UK will grow significantly over the next five years, having a valuation £10.4Billion in 2017 they forecast a valuation of £16Billion by 2022 (IGD, 2017). Further market research also highlights the UK having a higher order frequency than any other country, with an estimated average 15.4 online food transactions per year (Rigby, 2017). This project will gain insight into E-commerce demand through CDRC datasets and partner loyalty card data. Much of the understanding of the consumers who use E-commerce services is driven by market research or Geodemographics. The Internet Users Classification provides valuable insight into internet use and E-commerce engagement at the LSOA level in the UK.

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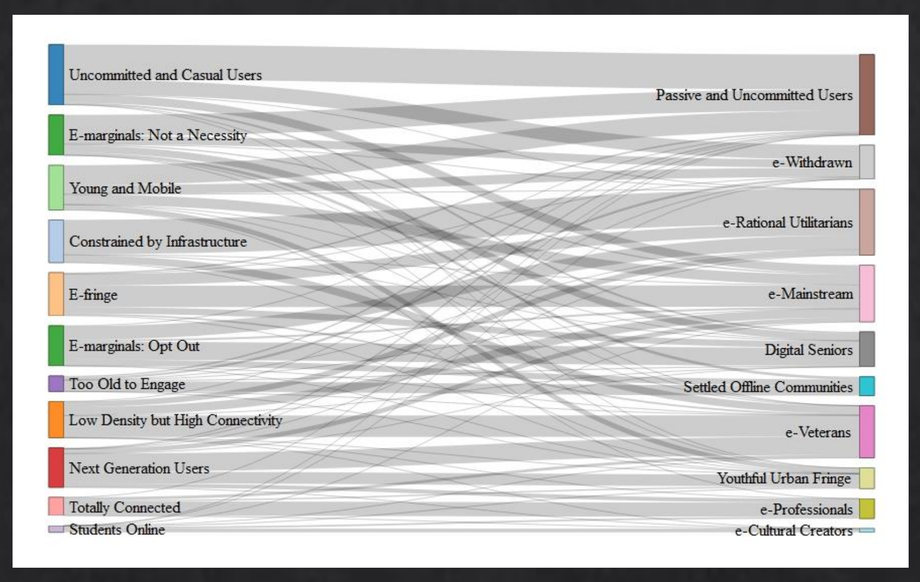

Figure Two: Changes in Internet Users Classification Groups – 2014 to 2018.

SUPPLY

With large networks of physical stores and infrastructure in the UK they need to find a way in how they can serve customers over potentially geographical areas profitably. This poses logistical challenges to retail firms in the strategies they can employ to reach consumers i.e. home delivery fulfilment in the form of instore packing or the use of 'dark stores' and the placement of click and collect facilities. In the early 2000s it was argued that was not just a fine tuning of logistics, but that there was a need to resolve the issue of time and space and manage consumer time and location more effectively (Murphy, 2003). The idea of 'solving time and space' is a recurring theme in geographical study. Tobler's first law of geography for example, stating everything is related but nearer things are more related than distant things, underpins many spatial analysis methods used today (Miller, 2004).

Service Areas are calculated on predicted demand, store capacity and a trade-off between market share and profitability.

Appraisal Areas are an art rather than a science.

Using a calibrated Spatial Interaction Model for supply side optimisation presents an opportunity to address an area of both academic and industrial interest.

A key area I will be focussing on is 'How to Define the Geography of Appraisal Areas'. This involves the identification and design of groups of stores to create areas than can be used to monitor and drive improvements across the supply chain. The design of these groups and a view of the wider estate of stores and distribution networks at the macro level is firmly an art rather than a science. Key to the problem here is that both demand and store capacity is not static.

This project will seek to develop a method of identifying these appraisal areas that are able to meet demand, and the identification of other groups of stores than can assist in meeting demand should capacity be exceeded.

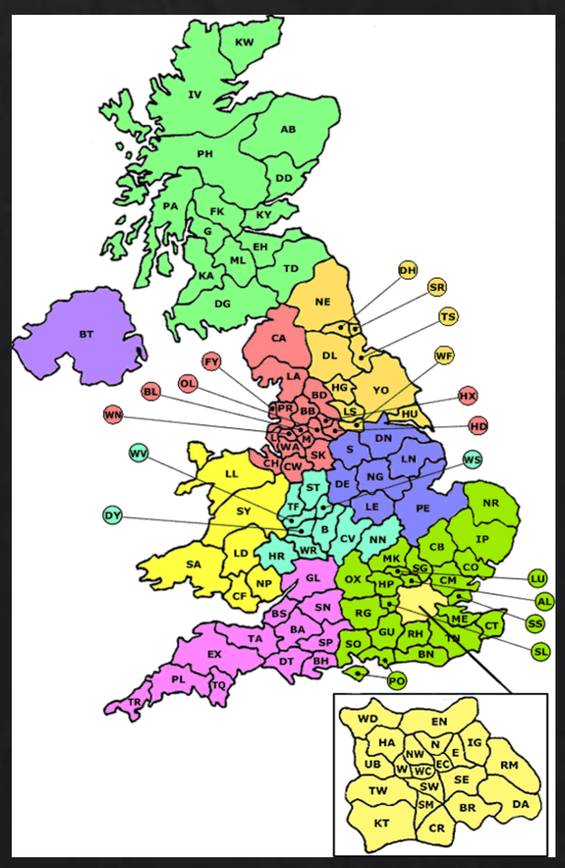

Figure Three: Breaking down the national estate of stores to smaller areas (postal sectors are used here). (Bigadvertising, 2018)

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