Network Planning and Retail Store Segmentation: A Spatial Clustering Approach

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ABSTRACT

Store segmentation aims to divide a network of stores into meaningful groups, typically based on a combination of operational, site and trading environment characteristics. It is an increasingly important component within network planning activities of major retail chains due to the significant capital investment that is physically grounded in their large store networks. The paper outlines findings from case study research that has focused on developing spatial decision support tools that enable decision makers to explore, construct and visualize store segments. An integrated spatial statistical approach to store segmentation is detailed and associated benefits and shortfalls discussed. The paper highlights the potential to develop customised geospatial tools to support network planning decision making activities. It is argued that geospatial decision support tools need to be designed to accommodate the varying GIS skill-levels of potential end-users and that fundamentally more emphasis needs to be placed on creating tools that can be used by decision-makers as opposed to analysts.

Keywords: Cluster Analysis, Network Store Planning, Retail Location, Segmentation, Spatial Decision Support

INTRODUCTION

Corporate concentration and globalization within the retail and service sector has fuelled a marked increase in the presence of dominant chains within the Canadian economy. In fiscal 2009, less than 100 companies (operating approximately 25k stores in total) controlled 80 percent of total non-automotive retail sales in Canada (Daniel et al., 2010) – with this number having increased steadily over the last decade (Gomez, 2005). The large store portfolios operated by many of Canada’s major retail and service chains have resulted in an increased interest in store segmentation and associated analogue store identification (i.e., the grouping of similar stores). The primary aim of store segmentation is to divide a given network of stores into meaningful groups, typically based on a combination of operational, site and trading

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environment characteristics (Guy, 1998). For example, a retailer with a network of 350 stores may generate 6 different store types, with each comprised of a ‘similar’ set of stores based on user-defined variables. Often a retail or service chain will want to then identify analogue stores for comparative analysis of sales volumes and/or to predict potential sales revenue at a new site. For example, if a given company plans to open a new store in a market with a similar trading environment to an existing store in their network, then this analogue store can be used as a surrogate for the purpose of sales estimation (i.e., all things being equal, the new store would be expected to generate a similar sales volume). The value-add of store segmentation for the retail and service chains include, the ability to tailor marketing, merchandising and advertising approaches by store type, streamline logistics, delimit sales territories and to assess performance of individual stores in relation to the performance of similar stores. The formation of segments for a network of stores is often a balancing act between grouping on the basis of the similarity between store characteristics and their geographical location. In order to optimize store segments (and company efficiencies), each segment would ideally be made up of ‘similar’ stores in close ‘spatial’ proximity to each other.

To date, store segmentation approaches have underplayed the ‘spatial’ context of the store network, with emphasis instead placed on selecting an appropriate mix of variables to define clusters and a meaningful number of store segments to generate. Of note, much of the work in store segmentation has remained in the area of consultancy, with little in the way of academic research (Davies & Clarke, 1994). Integrating spatial concepts into store segmentation present a number of challenges with respect to generating explicit measures of spatial proximity and operationalizing them within traditional clustering techniques. While extensive literatures exist on: (i) aspatial cluster methods; and (ii) spatial clustering and (point) pattern detection - to date, work on combining approaches has been limited. This paper presents findings from research that has focused on developing decision support tools to undertake store segmentation. The work builds on the research of Clarke et al. (2002) that explicitly aimed to capture and utilize the knowledge, intuition and experience of retail real estate decision makers in the store segmentation process. The research outlined in this paper develops the decision support approach adopted by Clarke et al. (2002) providing the foundation upon which to formalize the spatial context of store segmentation.

The paper is divided into four sections. First, we discuss the research context is established via a brief overview of retail location analysis and corporate decision making practices, with emphasis placed on store segmentation and associated portfolio management. Then we go into detail about enhancements to the MIRSA decision support tool are detailed (the CAN-MIRSA approach), including the integration of clustering techniques, reporting and visualization functionality within the decision support system. Afterwards, the development of a new approach that combines spatial measures within a traditional clustering framework are introduced, with theoretical issues and operational constraints discussed with reference to a case study dataset. Then finally, we highlight on-going research and identifies areas for future research.

**SEGMENTATION WITHIN LOCATION DECISION MAKING**

Segmentation is the act of dividing a given (sample) population into a meaningful set of groups (segments) (Kotler & Armstrong, 2004; Dibb et al., 1997). These groups should be defined in such a manner to facilitate informed decision making within an organizational context (and ideally would promote organizational learning and knowledge creation). In most instances segmentation is a process through which a complex reality can be broken down into a number of manageable segments that can be operationally, tactically and strategically leveraged by the organization (Weinstein, 1994). Segmentation from a marketing perspective has been applied to both consumer demand and retail/service supply
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