

# Geographic information systems (GIS) applications in retail tourism and teaching curriculum

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## Abstract

Geographic information systems (GIS) have been adopted as a useful tool by a wide range of disciplines. This study used the ESRI's ArcView system, tourism-retail trading decisions, attraction allocations, and visitor demographic data to demonstrate the value of GIS to decision makers and planners of tourism destinations. Results suggest that the analyses of the GIS provide comprehensive access to the database, query features, and create themes, layouts, and reports.

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## 1. Introduction

Geographic information systems (GIS) have been adopted as a useful tool by a wide range of disciplines such as environmental planning, property management, infrastructure siting, emergence planning, automobile navigation systems, urban studies, market analyses, and business demographics. Analyses from GIS can determine both threats and opportunities for development. For business planners, the GIS consider the prospects for a large scale or multiple regions and then narrow the developmental focus to relatively small and specific sites (Joerger et al., 1999). As technology has expanded and improved, both consumers and businesses have benefited. For example, consumers expect ease of accessibility at all times, and through GIS technology, businesses can provide consumers with convenience of shopping experiences.

*Site selection:* GIS could be used to identify specific developmental sites based on a set of criteria using economic, social, environmental, and business-related data. At the very core of the business information is an address, a service boundary, a sales territory, and a transportation system that can be illustrated on a map.

Most recently, GIS has become more widely used among commercial real-estate firms. By using the mapping tool, real estate firms can help locate appropriate areas that will enable a business (e.g., lodging and/or eating places) to remain successful. Businesses use GIS technology to solve problems, find solutions for marketing, delivering better services, and making good decisions. Woodbury (1996) noted that 85% of all computerized databases in the world have a location component, such as street address, a zip code, a census tract, or a legal description. GIS can bring all that data together quickly and let users analyze and visualize information in a way people value it.

*GIS in service management:* The GIS technology has been implemented in service management for displaying large volumes of diverse data pertinent to various local and regional planning activities. In the United Kingdom (UK), fifty-three percent of the major retailers had adopted GIS by 1998 (Hernandez et al., 1999). Brick and mortar businesses can use GIS application to compete with the convenience of Internet retailing. A retailer can develop a map of its store using GIS software to calculate the actual dimensions of a store. This can even handle multilevel stores and shelf depths. When a retailer has the store mapped, a consumer can view the map on a live website, and know the exact location of the item within the store. While using the virtual map, the consumer can see how

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many items are in stock, detailed information about the product, and any associated items that are on sale or available for purchase.

Currently, a GIS application used inside high-tech retail establishments is the smart cart. The smart cart is a computer-enhanced shopping cart that can be found in some retailers today. This cart is designed with a map or database of the store in which a customer can query a specific item as they walk through the store. The smart cart will locate the item within the store, direct the customer to that item using a map, provide additional information about the item, and offer supplementary items needed and their locations (GIS Frontiers, 2001). It is predicted in the future that the smart cart can also be used to check out consumers faster. The smart cart would run through an X-ray type machine that would identify and checkout all items in the cart at once. This would allow businesses to accommodate more consumers in a shorter amount of time.

*GIS applications in tourism:* Determining the ideal tourism modeling for a prospective tourism region involves a complicated set of criteria. Even though tourism development is a distinctly geographical activity with serious implications for destination areas, few researchers have applied GIS to tourism planning and management practices. The following are a number of opportunities for GIS applications in tourism planning (Farsari and Prastacos, 2004):

1. *Visitor flow management:* This involves the use of GIS to identify principal tourist activity spaces within a destination and the flows among destinations. Authorities may implement strategic plans for superior infrastructure (e.g., building public transportation systems linking various tourist activity spaces).
2. *Facility inventory and resource use:* This involves the use of GIS in connection with the issue of environmental justice (namely the fact that tourism may not benefit all segments of society equally). It also involves developing an inventory of resources in order to identify conflicting but also complementary land uses and activities, available infrastructure, and natural resources.
3. *Assessing impacts of tourism development:* GIS can be used to demonstrate tourism impacts on various industrial sectors in a time-series and spatial format (Chen, 2006). Within this category, analysts can use all or several of the previous categories by employing the “what-if” tool of GIS. This tool allows the development of scenarios for predicting what the effect of a change in a certain variable(s) will be in the destination.

The categories listed above are not mutually exclusive and it is more than likely that any application of GIS in a tourism scenario will involve a contribution of more than one of these. Unfortunately, as Farsari and Prastacos (2004) reported, most applications of GIS in tourism relate to identifying suitable areas for developing tourism

activities in the future (land suitability analysis) while the use of GIS in already developed (mature) tourist destinations has been avoided. They suggested that there are a number of ways in which GIS can benefit the study of tourism and implementation of sustainable practices in destination areas.

*GIS applications in retail tourism:* It has been well documented that tourists shopping is a major activity. According to Travel Industry Association of America (2004), 63% of tourists in the year 2004 included shopping during their trips, and the average expenditure was \$333. In today’s economic climate, the tourist customer base has become increasingly important to the survival and growth of Mall properties. For instance, General Growth Properties and the Mills Corporation of Chicago reported tourists as constituting 31% and 25% of their mall visitors respectively (Gentry, 2001). According to Littrell et al. (1994), most tourists are seasonal or one-time customers rather than regular year long clientele. Typical shopping environment tourists may encounter include small independent retailers of local crafts as well as larger retail malls. In line with other anecdotal evidence, academic research has also revealed that many consumers are apt to make a decision regarding where to shop based upon attitude toward a mix of stores and the mall or shopping center environment (Finn and Louviere, 1990, 1996; Gentry and Burns, 1997; Chen, 2004). Therefore, it is imperative for the shopping mall industry to develop and practice methods to attract customers to their site for an initial shopping trip as well as develop strategies to encourage repeat visits to that site.

## **2. GIS in tourism, hospitality, and service management: a case study and teaching curriculum development**

GIS technology is one of the hottest new research tools in academia today and one of the fastest growing high-tech careers for students. Maps are basic tools used to present and analyze information on the spatial distribution of business sectors, resources, and people in need of services. The author has developed GIS courses that provide an overview of the conceptual, analytic, and technical issues involved in working with geographic databases and GIS software. Presentations, case studies, and participatory discussions were used to illustrate the use of the information technology in market applications. This course was designed to equip students with (Appendix 1):

- knowledge of the concepts of GIS,
- ability to discuss and examine the basic data models,
- awareness of the historical development of geographical data and GIS,
- ability for basic spatial analysis,
- capability to understand the keys to successful GIS implementation, and
- skills necessary for graduate study and professional practice in GIS.

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