Available online at www.elixirpublishers.com (Elixir International Journal)

Management Arts

Elixir Mgmt. Arts 40 (2011) 5201-5205

ISSN: 2229-712X

Location intelligence - a strategic tool for retail location planning

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ARTICLE INFO

Article history:
Received: 31 August 2011;
Received in revised form:
17 October 2011;
Accepted: 27 October 2011;

Keywords
Business Intelligent (BI),
Decision Making,
Geographic Information System(GIS),
Location Intelligence,
Retail Location,
Spatial,
Strategic Tool.

ABSTRACT

To gain competitive advantage and stay ahead in today's highly competitive retail environment, retailers need to know their customers with respect to their outlets, monitor the performance, assess the impact of competition, drill down into a trade area to identify customers and choose new store locations strategically. Location Intelligence with its ability to manage, display, and analyze business information spatially, is emerging as a powerful tool to help retailers achieve all the above. Location Intelligence is the ability to take organizational data and apply location to allow effective decision-making. The organizational data comes from the Business Intelligent system (BI) and the location (spatial) support is derived from the Geographic Information System (GIS). BI systems handle the 'who', 'what' and 'when'. GIS is a powerful location tool, which enables the analysis of the "where "Retail location analysis deals with the collection, analysis and dissemination of spatially referenced information, which is ideally handled by location intelligent systems. Location Intelligence allows easy visualization of the geographically influenced behaviors, activities, trends and processes, communicate the same for improved analysis and decision making. The focus of this paper is to understand the use of location intelligence system on retail location decisions.

Introduction

"You can be the best retailer in the world, but if you set up your shop in the wrong place, you'll never do much business. You'll never do much business if you operate from the wrong properties, you start with your hands tied behind your back, you should always go where your customer is" (George Davis in his autobiography, What Next?). The above message clearly echoes that "location, location, location and location" is the most crucial decision for the retailer to stay ahead of the competition, to enter in to a new market, for the simple reason that location cannot be duplicated but all the other components like merchandise, service, people, visuals, atmospherics can be duplicated. To gain competitive advantage, location decision is the most important component in retailing.

Retail planners are faced with many issues, which include constructing demographic, sales and competitive analysis, finding the best locations for new retail stores, creating effective marketing campaigns, scheduling and route deliveries, and providing better customer care and information.

Traditionally data regarding the above issues has been presented in the form of columnar reports, either printed or viewed on the screen as an excel sheet, or as simple histograms or as pie charts. However the question is: can a simple histogram or a pie chart handle the complex, interrelationship of multidimensional data? Can a decision maker really report and communicate all the necessary information content with just a bar graph or a pie chart? The answer is a "definite no"!

Franklin (1992) says as about eighty percent of an organization's data can be associated with a geographic location (spatial component); this can include customer address, delivery routes, administration boundary, warehouse location, competitor locations, store locations and sales territories. The traditional methods like histograms, pie charts, bar charts or any other graphic methods cannot handle the location component present in the business data.

Location Intelligence is a powerful new technology that can address many of the information needs of the decision maker. Location intelligence is the ability to take organizational data and apply location to allow effective decision-making. The organizational data comes from the Business Intelligent system (BI) and the location (spatial) support is derived from the Geographic Information System (GIS). The Geographic Information System (GIS) is giving retail analysts the ability to quantify spatial attributes, and to add these into the analytical mix alongside more traditional measures such as sales area and turnover. Geographic Information Systems (GIS) allows decision makers to leverage their spatial data more efficiently, by visually bringing together relationships between customers, suppliers, and competitors. GIS are a powerful technology in terms of data storage, analysis and visualization, with the ability to combine information and mapping systems as analytical and modeling tools. GIS takes care of the location aspect of the data since location (spatial) or geographic relationships are inherent in up to eighty percent of organizational data. Thus to gain maximum value from the ever-increasing volumes of data, companies need to make use of the location element of the data to gain deeper business insight in order to improve competitiveness and business performance leading to competitive advantage over the competitors.

The Indian retail industry is the fifth largest in the world. Comprising of organized and unorganized sectors, India retail industry is one of the fastest growing industries in India. With rising disposable incomes, expansion of stores and supporting economic factors, India's retail sector is expected to grow to about US$ 900 billion by 2014, according to a report by global

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consultancy and research firm PricewaterhouseCoopers (retai sales in India, currently estimated at about US$ 500 billion as per the report titled -- Strong and Steady 2011). It is further expected to reach US$ 1.3 trillion by the year 2018 at a CAGR (Compounded Annual Growth Rate) of 10 percent. India is now the fourth-most attractive retail market for global retailers among the 30 largest emerging markets, according to US consulting group AT Kearney's report published in June 2011. (See table below)

Globally there are several instances of GIS application in the area of retailing. Miracle Food Mart of Canada implemented a GIS system to assess customer distribution and to look at market share on a store-by-store basis. Dayton Hudson's Target stores have used GIS as a strategic tool enabling it to determine which areas are not being properly served. McDonald's uses a GIS system to overlay demographic information on maps to help identify promising new store sites.

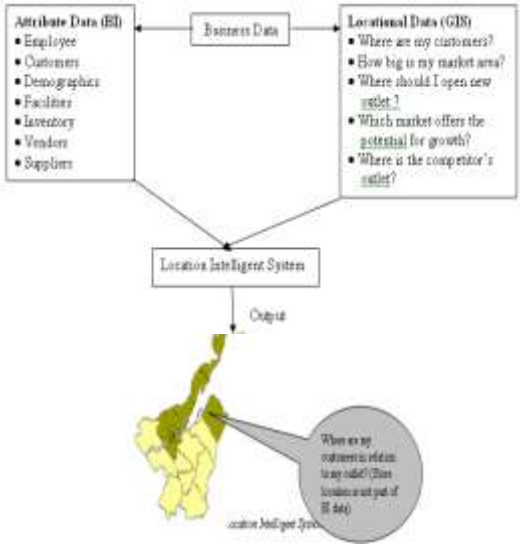
In India the usage of GIS-based technologies is picking up at a fast pace. This paper focuses on how retailers can use location intelligent systems in various decisions especially location, to gain competitive advantage. Choosing new store locations strategically has become a very important decision for the retail planners because retail location decisions are extremely capital-intensive, locations themselves, once chosen, are fixed further locations once chosen cannot be duplicated by competitors thus gaining competitive advantage over competitors.

What is location intelligence (li)?

Location Intelligence is the capacity to organize and understand complex events through the use of geographic relationships inherent in all business data. By combining geographic and location related data with other business data (like employees, customers, inventory, vendors, facilities) organizations can gain critical insights, make better decisions and optimize important processes and applications. Location Intelligence offers organizations opportunities to streamline their business processes and customer relationships to improve performance and results. In short LI is the ability to take organizational data and apply location to empower effective decision making. LI draws on a variety of data source like geographic information systems (GIS), aerial maps, demographic information along with the organization's own databases.In taking major business decisions Location Intelligence offers additional perspective, based on geographic relationships.

Figure1: Value of Location Intelligence

LI is the integration of Geographic Information Systems (GIS) and the standard Business Intelligence systems (BI). By combining geographic data with traditional business data, users are provided with the insights and context to make better business decisions. Business Intelligence systems handle the "Who", "What" and "When" factors specific to the organization, GIS allows for new types of analyses by adding the "Where" factor. It is the integration of these two solutions which enables analytics based on the "Where" factor and map-based visualization which can reveal spatial relationships, dependencies trends and patterns that are difficult to discover otherwise. Visualization helps the analyst interrogate the data and acts as an excellent means of explaining the information to a broader audience.



The BI component of location intelligence

Gartner (2006) defines Business Intelligence as the use of information that enables organizations to best decide, measure, manage and optimize performance to achieve efficiency and financial benefits.

Business Intelligence (BI) is defined as the processes, technologies and tools needed to turn data into information, information into knowledge, knowledge into plans that drive profitable business action - DataWarehouse Institute.

Business graphics, typically charts, which are common components in any reports, are used in BI systems to handle and present attribute data. However BI systems fall short of handling data which have location component inherent in them like customer, competitor location, sales territories etc., since eighty percent of an organization's data can be associated with a geographic location (spatial component) (Franklin 1992). BI tools excel at extracting the who, what and when aspect of the data but are lost when it comes to the where of the data. BI systems are lost and cannot handle business questions like:

1.Where things are like customer, outlets, stores etc.?
2.Where is the nearby competitor, resource point, maintenance crew?
3.What quantities of market size, sales by area, outlets
4.How to reach there- by shortest route and what are the alternatives routes?
5.How many stores can this market support?
6.Where should I open new outlet?
7.Can I consolidate outlet without hurting customer service?

To gain deeper insights of the business and gain competitive advantage over the competitors and have a lead in the market, decision makers have to take care of the location component present in the data. The above questions illustrate how spatial considerations are part of many business problems. Thus adding maps to BI brings a new kind of competitive advantage not only by allowing decisions to be based on more data and more kinds of data but also by communicating the resulting information in a way that is easily understood, since people are visually oriented.

The GIS Component of Location Intelligence

A GIS is a computer system for managing spatial data, the word geographic implies that location of the data items are known in terms of geographic co-ordinates (Latitude and Longitude). The word information implies that the data in a GIS are organized to yield useful knowledge, often as coloured maps and images, but also as statistical graphics, tables and various onscreen responses to interactive queries. The word system implies that a GIS is made up from several interrelated and linked components with different functions. Thus GIS has functional capabilities for data capture, input, manipulation, transformation, visualization, combination, query, analysis, modeling and output. However from a decision makers perspective "GIS is a managerial decision making tool for decision making, involving a spatial dimension as one of the variable among a set of variables considered for decision making "

GIS technology brings together common database operations such as query and statistical analysis with the unique visualization and geographic analysis benefits offered by maps. These abilities distinguish GIS from other information systems and make it valuable for use in a wide range of applications to solve problems and plan ahead by looking at data in a way that is quickly understood and easily shared. Four critical distinctions of Geographic Information Systems are:

GIS Utilizes Precise Real World Relationships:

In spatial data, there is an explicit relationship between the real world geometric features and its associated attribute information, so that both are always available when one works with the data, which is not possible with tabular data.

Geo-coded to Know Locations on the Earth's Surface:

Spatial data is geo-referenced to known locations on the earth's surface.

Exploits Specific Geographic Features:

Spatial data is designed to enable specific geographic features and phenomena to be managed, manipulated and analyzed easily and is flexible to meet a wide range of needs

Thematically Organized into Different Layers:

Spatial data is organized thematically into different layers. There is one layer for each set of geographic feature for which the information will be recorded. For example streets, buildings, rail track, customer location will be stored as separate spatial layers.

GIS's ability to integrate data from different business units and source systems by using this location element as a common denominator. GIS also provides significant advantages in spatial analysis capability and visualization of information to show conditions, patterns and trends.

Location intelligence for retail location planning

Retailers make few decisions that are as permanent and potentially unforgiving as selecting store location (Arthur Blank: Former president Home Depot). Identifying the right location for the store is the most important decision a retailer has to make simply because location cannot be duplicated by competitors. Operating a store is a long term commitment, hence it has to be in the right place or else the retailer has to risk reducing profitability over a period of many years.

In today's competitive marketplace there are numerous location issues that the retailers must address like

1. How many stores can the market support?
2. Which are the best locations for their products?
3. Should the stores be on the high street, in a shopping centre or part of an out-of-town complex?
4. Is current and future demand in the area enough to support the store?

Knowing all the risks, retailers continually need to open stores, manage their existing locations, adapt to new market conditions and react to new consumer demand. A poorly located store can impact dramatically on the retailer's bottom-line profitability. So how do retailers decide where to locate stores? Location Intelligence is the tool that provides retailer the answer to many issues and problems. Location Intelligence exploits the location based information hidden in the business data to identify relationships between different data and use this to drive new decisions.

Retail location analysis activity within the retail business deals with the collection, analysis and dissemination of spatially referenced information. LI helps in the catchments area analysis to identify the trade area and helps the retailers understand the trading area of their stores i.e. area from where the customers come, types of customers in terms of age, gender, occupation, family size, religion, caste etc., number of house holds in different income group like high income group (HIG) middle income group (MIG) and low income group (LIG). Thus when location data is combined with available real estate data, demographic data, data on current customers, and information on prospective customers, the result- Location Intelligence can help identify a site location with maximum revenue potential.

In retail, where a store is located tends to affect sales performance more than any other factor. Great managers, great marketing programs, and even great products often have far less effect on sales than does a premium location. As a result, sophisticated location intelligence tools can help retail owners to:

1. Determine optimal store locations. (Where to open new store?)
2. Quantify and avoid cannibalization among stores.
3. Performing drive-time analysis over street network.
4. Optimizing transit routes for fastest transportation between stores and warehouses.
5. How many potential customers live within 10 miles or 10 minutes drive from the store?(see fig.3)
6. Precisely match media and marketing messages to targeted households.
7. Identify under-performing stores and determine which to close and which to renovate?
8. Identifying and reaching potential customers.
9. Finding new markets.
10. What is the market share and penetration?
11. How many competitors are located within the market area of the store?
12. Investigate that whether the stores should be on the high street, in a shopping mall or part of an out-of town complex.
13. Examining where exactly the high-income consumer group is located, which retail outlet has maximum customers traffic, which locality has maximum no of double income families.
14. Analyzing customer movement and whether customers moving from a particular location.
15. Change analysis by finding new trends created by changes in the city like new shopping malls, café strips or major roads.
16. Matching distribution network match with consumer location.
17. Measure the impact of new store openings, relocations, remodels, closures, and competitive acquisitions.

18. Where a new store should be located in order to minimize the impact it has on the current location of stores?

LI provides answers to all the above questions in the form of market mapping, catchments area identification, consumer profiling and identification, mapping of key performance variables, and the complex modeling of an entire retail network.

Figure 3: Market Area Analysis by Location Intelligent, Identifying Customer within 2, 6 and 10 Mins. Drive from the Store

Benefits of Locations Intelligence

A recent research report released in March this year by Saugatuck Technology defines the benefit of LI in the following way:

"*Integration of Location (GIS) and standard BI platforms brings LI to greater usefulness by making it available as an option to anyone who is familiar with the more readily-available BI solutions, and without the need to master new concepts or a new user interface. Spatial relationships also greatly enhance many of the details commonly reported by BI systems, providing an added level of analysis that is useful in viewing and assessing trends (and existing data types).*"

Location Intelligence provides the ability to visualize spatial or geographic data on maps. This style of visualization differs from standard table or grid reports and charts in that it associates business data with a particular location and allows to easily see patterns, which are otherwise hidden within a dataset.

1. Used where traditional tables/grids, graphs and other analysis tools fall short (see fig.4).

Tables/grids and charts only tell a part of the story. Map visualizations are the only way to quickly relate BI data with locations that are meaningful to business and to detect geographic trends such as customer clusters.

Figure 4: Location Intelligence for better understanding

2. Shows where data is not located in addition to where it is located

Geographic visualizations are complete. This means that when looking at a map decision maker sees it in its entirety. For example, when looking at a map of Karnataka state in India the entire Karnataka state is laid out before the user. Thus when overlaying data onto a map not only do one see where they are on the map but where they are not located. This provides an instant insight into the potential markets that the business may be missing out on.

Faster answers to queries

To gain competitive advantage over competitors decision makers should have the right kind of information. Information is of value in the business environment if it reaches the right decision maker, at the right time and in an easily understood format. LI has the ability to locate more data and information faster by tying many internal and external data sets together through location

Improving data quality and credibility

Due to the vast amounts of data stored by companies on almost every conceivable aspect of their business operations, it is maybe inevitable that errors sometimes occur which degrades the usefulness and credibility of information. With many data types being used, some of these errors may be difficult or even impossible to detect in tabular database formats. Often it is only when this data is pulled into a GIS through a process like geo-coding and mapped or spatially analyzed that some of these errors can be detected and corrected.

Conclusion

Retail location decisions are said to be the most fundamental decisions because it facilitates getting the merchandise to the ultimate consumer at the right place, at the right time, in the right quantities, and at the right price. In addition, location decisions are capital intensive and strategically important for the retailer because they help in developing sustainable competitive advantage over the competitors simply because location cannot be duplicated by competitors.

With eighty percent of the business of data containing location element a simple pie chart or a bar graph and other typical graphics simply fall short of handling and supporting spatial data and fail to support better decision making.

Innovative visualization technologies like Location Intelligence are required to effectively synthesize data into information and present the content in an understanding manner to the end user. People are visually oriented thus, when decision maker sees something on a map as opposed to a spread sheet or a pie chart, they understand the relationship between different pieces of business data better, resulting in effective decision making. Data visualization evolves into a means of transforming data quickly into information, information into knowledge, knowledge into strategies for profitable business activities (see fig.5).

LI helps integrate demographic information and other spatial data to an organization's existing business data, making maps truly interactive, allowing the users to drill down to data associated with any given location. What is the average income in areas where the highest performing stores are located? Where are the competitors stores located in relation to the one that is being planned? Where will my customers come from? This kind of information is valuable when planning new store locations and making other strategic decisions about the store, customers, merchandise and warehouse. For example McDonald's uses LI to overlay demographic information on maps to help identify promising new store sites (Alan, 2004). Indian retailers will be benefited from LI for making strategic decision. Indian retailers would not like to be left behind in using technology like LI, since Indian retail business sector is scheduled to reach US$ 1.3 trillion by the year 2018.

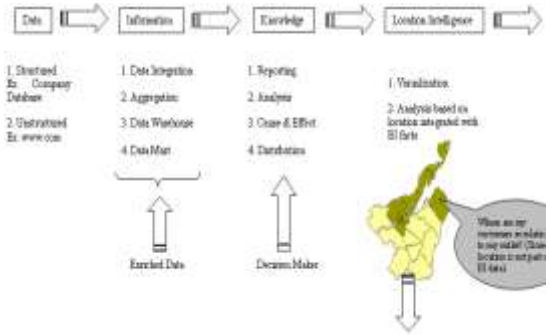


Figure 5: LI for Competitive Advantage

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