Role of Geographical Information System (Gis) in Determining Locations

Rohtash

Assistant Professor Deptt. of Geography D.N. College Hisar

ABSTRACT— *Modern Commerce, advanced technologies and infrastructure stimulates business expansions. India being an emerging market finds its continuous expansion exhibiting the growth registered every year. This phenomenon of expansion in retail business is in the verge of sustenance as observed by the rapidly increasing number of Malls all over metros of India. The study serves as a basis for creating awareness about the GIS technology and theoretically exploring about the opportunity to explore competitive and sustainable advantage and also tries to answer some of the needs of the market and tries to cognize the scope of innovative methods like GIS. It explains how GIS along with classical methods and new advanced tools could be used to foster a new approach of the business acumen in site suitability analysis, customer profiling, exploring future market potential analysis and the emerging trends in the retail sector.*

KEY WORDS— GIS, retailing, Cannibalization, satellite image, layers

INTRODUCTION- GIS is an emerging method of data storage and interpretation. GIS is, simply put a database. It is many tables of data organized by one common denominator, location. The data in a GIS system is organized spatially, or by its physical location on the base map. The information that is stored in the database is the location and attributes that exist in that base map, such as streets, highways, water lines, sewers, manholes, properties, and buildings, etc. each of these items don't just exist in the database, the attributes associated with the item is also stored. A good example of this would be a specific sewer line, from and arbitrary point A to a point B. Ideally, the sewer line would be represented graphically, with a line connecting the two points or something of the like. When one retrieves the information for that line in particular, the attribute data would be shown. This data would include the size of pipe, the pipe material, the upper invert elevation, the downstream invert elevation, the date installed, and any problem history associated with that line. This is the very gist of what a GIS system is. Building a GIS system from the ground up is a very time consuming and extremely expensive venture.

This is why only large metropolitan areas have developed or are developing GIS systems.

GIS is extending business minds by abstracting their world with models, maps and imagery that creates a framework for understanding their business in the sense of geographic expansion."

Geographic information system, (GIS) is a system designed to capture, store, manipulate, analyze, manage, and present all types of geographically referenced data .Or in simpler terms, GIS is the combination of digital data in the form of map ,Statistical analysis of data and database technology.GIS provides a framework for planners to design things more efficiently by designing capabilities.

Thus GIS integrates hardware, software, and data for capturing, managing, analyzing, and displaying all forms of geographically referenced information.GIS allows us to view, understand, question, interpret, and visualize data in many ways. Geographic Information System (GIS) continues to accelerate, and is compelling right now, because maps communicate better than words, spatial analytics helps us understand and make decisions about our world with a broader sense and cloud computing extends further more in the line. GIS is helping to unlock in

environmental conservation, ecological science, natural resources, disaster response, business analytics, crime mapping, etc. GIS is becoming societal infrastructures as a national information system. GIS no doubt massively could go beyond just simply desktop use. The issue of climate change is going to have a major impact, and GIS has a huge role to play in the desperate race to turn around the impact.

GIS Operations and Functions

a. Data Input

Data input covers the range of operations by which spatial data from maps, remote sensors, and other sources are transformed into a digital format. Among the different devices commonly used for this operation are keyboards, digitizers, scanners, CCTS, and interactive terminals or visual display units (VDU). Given its relatively low cost, efficiency, and ease of operation, digitizing constitutes the best data input option for development planning purposes.

Two different types of data must be entered into the GIS: geographic references and attributes. Geographic reference data are the coordinates (either in terms of latitude and longitude or columns and rows) which give the location of the information being entered. Attribute data associate a numerical code to

each cell or set of coordinates and for each variable, either to represent actual values (e.g., 200 mm of precipitation, 1,250 meters elevation) or to connote categorical data types (land uses, vegetation type, etc.). Data input routines, whether through manual keyboard entry, digitizing, or scanning, require a considerable amount of time.

b. Data Storage

Data storage refers to the way in which spatial data are structured and organized within the GIS according to their location, interrelationship, and attribute design. Computers permit large amounts of data to be stored, either on the computer's hard disk or in portable diskettes.

c. Data Manipulation and Processing

Data manipulation and processing are performed to obtain useful information from data previously entered into the system. Data manipulation embraces two types of operations: (1) operations needed to remove errors and update current data sets (editing); and (2) operations using analytical techniques to answer specific questions formulated by the user. The manipulation process can range from the simple overlay of two or more maps to a complex extraction of disparate pieces of information from a wide variety of sources.

d. Data Output

Data output refers to the display or presentation of data employing commonly used output formats that include maps, graphs, reports, tables, and charts, either as a hard-copy, as an image on the screen, or as a text file that can be carried into other software programs for further analysis.

Elements of a GIS

a. Hardware and Software Components

Hardware components of a basic GIS work station consist of: (1) a central processing unit (CPU) where all operations are performed; (2) a digitizer, which consists of a tablet or table where analog data are converted to digital format; (3) a keyboard by which instructions and commands as well as data can be entered; (4) a printer or plotter to produce hard copies of the desired output; (5) a disk drive or tape drive used to store data and programs, for reading in data and for communicating with other systems; and (6) a visual display unit (VDU) or monitor where information is interactively displayed. Several GIS software packages are available representing a very broad range of cost and capability.

b. Users and Users' Needs

Planners need to carefully evaluate their GIS needs and proposed applications before taking

the decision to acquire an install a GIS. Once a positive conclusion has been reached, its hardware-software configuration should be designed based on those needs and applications and within the constraints posed by the financial and human resources available to operate the system.

Sharing information has its costs as well as benefits. Negotiating with other users can be a painful task, and compromises inevitably ensure that no one user will get the equipment most precisely suited to his uses. In this regard, it is important to establish a comfortable working relationship among sharers.

c. Information and Information Sources

General reference maps and information on natural hazards and natural resources should form a "library of knowledge" for any GIS. Most areas of Latin America and the Caribbean have general background sources of such data. Virtually all countries have topographic maps, road maps, generalized soils maps, some form of climate information, and at least the locational component of natural hazards information (e.g. location of active volcanoes, fault lines, potential flood areas, areas of common occurrence of landslides, areas of past tsunami occurrence, etc.). Natural hazards location data can be made compatible in a GIS with previously collected information about

natural resources, population, and infrastructure, to provide planners with the wherewithal for a preliminary evaluation of the possible impacts of natural events.

Even though some of this information is available in almost every country and can be supplemented with satellite data, the question remains, are there enough data to justify a GIS? The principal value of the GIS is in processing and analyzing masses of data that have become overwhelming for manual handling. In determining the applicability of a GIS, an agency must decide if it is data handling or merely the lack of data that is the main obstacle to hazard management.

A glimpse of a GIS

GIS is changing our planet by helping us understand our world, rooted in the science of geography. GIS got its start as computational geography, by blending computers, mapping and geographic science, a new kind of exploration that looks at relationships, patterns and processes. The early pioneering work led to the creation of a platform that supports visualization, modeling, and spatial data management

GIS organizes geographic data so that a person wants to know specific information can read a map can select data necessary for a specific

project or task. A thematic map has a table of contents that allows the reader to add layers of information to a base map of real-world locations. For example, A Business analyst might use the base map of Maharashtra, Mumbai, and select datasets from the India to add data layers to a map that shows residents' education levels, ages, and employment status. With an ability to combine a variety of datasets in an infinite number of ways, GIS thus is a useful tool for nearly every field of knowledge information extraction from Geology to Criminology.

Companies like Digital Globe, design the instruments that can capture, process and display an image of reality. More Prominently Google Earth is meant to stimulate business benefit and is part of an industry named as GIS oriented to the principle of Web Mapping.

This action needs to be done through modeling processes, in a suggestive manner so as to obtain a spatial representation of the market's characteristics for site suitability analysis, market selection, cannibalization, space management in stores and many more. These new tools to be taken into consideration are computer based solutions known as Geographical Information Systems (GIS), which are used successfully in USA for market analysis of any kind. A digital map becomes a

way in which spatial data, can be captured sophisticated spatial analysis and display procedures that can be integrated.

GIS SOLUTIONS FOR BUSINESS

In the present context of globalization of the economic activities and the expansion of knowledge management, the structured information a company owns becomes a vital resource for maintaining the level of competitiveness. GIS helps to break down the barriers between the Organizations. The quality and the opportunity of information held influence the strategic decision process, and have a major impact on the future development of the organization. In this context managers need to use powerful instruments for decision making, instruments that can capture, process and display a true image of reality in a suggestive manner through a spatial representation of its characteristics. Considering these aspects, the paper aims to draw attention on the impact of using Geographical Information Systems (GIS) in providing scientific way to solve the Business problems. Through the tools users can perform complete and complex market analysis analysis that brings together geographical, economical and census datasets. This means using complex applications for market analysis, based on GIS

technologies any business scour could be achieved on real time analysis with a display of geographical

indications of the businesses as well.

GEOGRAPHICAL INFORMATION SYSTEMS FOR SALES

MANAGEMENT SUPPORT

GIS Applications reached many business activities, because it is not just a way to see things and get informed, it is a way through which analysis can be performed and solutions could be found. GIS can be found at operational, tactical and strategic decision making levels. We can say that retail is one of the fields in which a business can really take advantage of GIS benefits. If until now Different models have been developed and they all work in GIS environment Retail marketing establishes relation between demand and supply, clients and suppliers. These two major components can be easily displayed on a map, as each of them has a geographic component and then it becomes easy to analyze with the help of GIS. Practically, large organizations allocate considerable resources for focus-groups, for market-polls and other instruments used to determine the consumer's profile and its behavior. But, it's obvious that, besides the

demographic information regarding: age, sex, income, family situation, etc, the managers need also the geographic information to control the expansion or to optimize the presence on the market, facilitating in this way the management for interest zones and also the oriented marketing.

GIS SOLUTIONS FOR RETAILERS

Organizations can go beyond standard data analysis by using GIS tools to integrate, view, and analyze data using geography. These applications could be used across entire organization, in any field. Successful business decision makers use GIS software viz ARCGIS , ARCVIEW, ARCINFO. Retail business processes, including market analysis, site selection, merchandising, distribution, delivery, and facilities management, involve geographic relationships. Predictive investigations such as market and customer analytics could also be enhanced by GIS. Many different forms of real-world and modeled data can be used with it to understand the demographic, competitive, and psychographic interaction of consumers, suppliers, and the geographic space in which the data is distributed. The powerful technology GIS allows companies to consider many possibilities, understand potential, review the impact of different investments, store and produce configurations, and analyze changing

trends in the retail landscape. GIS is used in different industries but in the business sector very few companies like Reliance Industries ltd Reliance Infocomm , Rolta Iindia, Genesys International have taken into consideration. It's high time that Companies have realized the potential and cost advantages also the fact that GIS are platforms for knowledge management. By using this spatial enabled computer technology it is possible to turn it into a real economic advantage.

CONCLUSIONS

The expansion of GIS technology is a major asset for the business world. GIS is a technology is widely accepted in the US and in India, Reliance Industries has benefitted to a large extent by maintaining database of entire country for in house in the form of digitized maps and these base maps can be used for any business applications viz for optimizing transportation routes, maintenance of pipeline across globe etc. Also diversified areas of business can be thought of. All the benefits of using spatial data are available for businesses and major providers of GIS technology take into consideration adapting them even more to the business needs. In the present context of the market, in which competition becomes more

and more intense using these advanced solutions can turn into a real competitive advantage. Thus Retailers can benefit from GIS and maybe in the future can think of building a national database with data that all economic agents can access, as in case of USA. Thus GIS can bring in Significant improvements in boosting their sales , reducing costs and wastes ensuring faster decisions to the retail and marketing managers. GIS as a tool or technology actually exists but somewhere in the analytics of the GIS process it is encountered that there is a gap in the availability of resources and interpretation from the resources in retail GIS analysis and discovery process. This is could be due to lack of skill in using and handling data. In addition, the researchers have differing levels of computer skills and relied heavily on "institutional" knowledge acquired over the course of years but we have noted that something over and above software education and understanding is required to handle GIS and expertise in this technology, as use of this is specific to situation, location and needs per say.

FUTURE SCOPE OF RESEARCH IN GIS

GIS is changing rapidly and co-evolving along with measurement technologies, whole new levels of data volumes, computing and the

cloud, networks, and science that is becoming more quantitative and analytic. GIS is becoming more multidimensional, easier to use, with better data management and usability, and more mobile and real-time. The technology of GIS is widely accepted in the computerized US , western world, this is thus getting in the inseparable part of globalization and globalization now as India is slowly catching up with this prevailing concept and technology. Organizations like Reliance are going on GIS for business expansions and customer satisfaction, companies feel and agree that thoughtful use of this tool is adding up to the business acumen, success and progress, thus adding to the GDP of the organization and the nation as well. There is wide gap in need demand and training in the technology, as apart from software expertise geological knowledge and geographical understanding is required to know, use and understand this technology. Future scope of research in this field would be training in geographical expertise along with software understanding required for business expansions and customer satisfactions using this technology.

BIBLIOGRAPHY:

[1] Donaldson, B(2001)- Sales Management: Theory and Practice 3rd edition, Codecs Publishing House

[2] Bennison, D(2005) Retailing and the Marketing of Urban Places: a UK perspective, International Review of Retail, Distribution and Consumer Research, 15 (2), 191-215 (with G. Warnaby and B. Davies)

[3] Bennison, D(2004) People and Partnerships: Marketing Urban Retailing, International Journal of Retail and Distribution Management

[4] Alexander, R., et al (1886)"Applying Digital Cartographic and Geographic Information Systems Technology and Products to the National Earthquake Hazards Reduction Program." Final Report Atlas, Appendix B to Research Project RMMC 86-1 in Proceedings of Conference XXXVIII: A Workshop on "Earthquake Hazards Along the Wasatch Front, Utah," Salt Lake City, Utah, May 14-16,1886, Open File Report 87-154 (Reston, Virginia: U.S. Geological Survey, 1987).

[5] Berry, J.K.(1986) "Learning Computer Assisted Map Analysis" in Geographic Information Systems Report, Part III (October 1986), pp. 39-43.

[6] Burrough, P.A.(1986) Principles of Geographical Information Systems for Land

Resources Assessment (Oxford: Clarendon Press, 1986).

[7] Carstensen, L.W. (1986)"Developing Regional Land Information Systems: Relational Databases and/or Geographic Information Systems" in Surveying and Mapping, vol. 46, no. 1 (March 1986).

[8] Chambers, D.(1989) "Overview of GIS Database Design" in GIS Trends, ARC News Spring 1989. (Redlands, California: Environmental Systems Research Institute 1989).

[9] Devine, H.A., and Field, R.C.(1986) "The Gist of GIS" in Journal of Forestry (1986).

[10] Fox, J., and Chow, J(1988) Geographic Information Systems for Rural Development: Appropriate Technology or White Elephant? (Honolulu, Hawaii: Environment and Policy Institute, 1988).

[11] Frank, A.(1986) "Integrating Mechanisms for Storage and Retrieval of Land Data" in Surveying and Mapping, vol. 46, no. 2 (June 1986), pp. 107-121.

[12] GIS World.(1988)"The 1988 GIS Software Survey" in GIS World, vol. 1, no. 1 (Fort Collins, Colorado, 1988).

[13] Rojas, E., et al (1988)"Land Conservation in Developing Countries: Computer Assisted Studies in Saint Lucia" in Ambio, vol. 17, no.4 (1988), pp. 282-288.

[14] United States Environmental Protection Agency (EPA). Geographic Information Systems (GIS) Guidelines Document. (Washington, D.C: EPA, 1988).

[15] White, M.S., Jr.(1984) "Technical Requirements and Standards for a Multipurpose Geographic Data System" in The American Cartographer, vol. 11, no. 1 (1984), pp. 15-26.

[16] Zwart, P.(1986) "User Requirements in Land Information System Design-Some Research Issues" in Surveying and Mapping, vol. 46, no. 2 (1986), pp. 123-130.

[17] Dr.Kavita KM, Prof Gouri Patil (2011) Geographic Information System (GIS) – forBusiness Analytics International Journal of Scientific & Engineering Research, Volume 2, Issue 11, November-2011 ISSN 2229-5518