Location-Based Intelligence: A New Dimension of Business Intelligence in Financial Strategic Management

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Abstract:

The third millennium has opened a new horizon for organizations and their sustainability has become largely dependent on their intelligence. As we know, intelligence as a general concept has various components and thus has received different titles due to the type of application for which it is used. We deal in this research with location-based intelligence, which results from integration of geolocation and business intelligence. This integration leads to a new dimension of business intelligence called location-based intelligence (LBI). LBI is defined as the arrival of the location-related integrated information in business. In general, companies can turn the location data into the application programs of business intelligence to be useful for every aspect of the organizations. The expectations of this new dimension of intelligence are great and this dimension has a brilliant future.

Keywords: Business Intelligence, Geolocation, Location-Based Intelligence, Innovation

Introduction

Most companies have been overwhelmed in a world of ready-made and easy-to-access information whereby they can improve their efficiency, effectiveness and profitability. Unfortunately, there are presently few companies which take advantage of this rich source of data or which seem to be aware of the existence of this source of data. These data not only have become widespread i most of the modern organizations, but they also call the leaders of organizations for as deep an exploration in themselves as they wish. Data are, in short, the same as an untapped gold mine that can be gathered, analyzed and used easier than expected (Maydanchik, 2007: 14). This untapped gold mine includes demographic and economic sciences, physical geography and other characteristics relevant to location such as the environmental space where the organization works, interacts with its customer and does business. Just like trees which are cut down in forest silence of which no one becomes aware, data also continue their existence unnoticed by anyone. Data are valuable for an organization only when they are collected and analyzed and the results of their analysis are made use of in the organization's decision-making process (Batini, 2010:165). For instance, absolute data, like the population rate of a city, is considered an inappropriate criterion for the market's potential, whereas relevant data such as suitability of a company's locations with the local population rate can be regarded as true location-based intelligence. According to the results of studies (Jaworski, 2010), over 80 percent of the whole data kept by organizations throughout the world involve a location-related content. Just like the analytical solutions with customer relationship management style related to the past decade, location-based intelligence also creates value for organizations by taking advantage of the modern technologies and analyzing them, helping the executive managers and the organization-level users equally to make sound important decisions.

Making use of demographic and economic data, physical geography and other data relevant to location contributes well to the discovery of the patterns, risks and opportunities which are hard to identify via analysis of the many pages of a company's main information. For activities related to finance, insurance, communication and retailing operations, location-based intelligence has special advantages and leads to increased incomes, reduced costs and promoted efficiency for the organization. However, many of the high-level executive managers have unfortunately not accepted this technology yet (Panian, 2012).

Geolocation

Companies are investing heavily to attract the most web users and have specific websites in our country and even translate the content of their websites, a process known as web globalization. All industries are developing their own geographical access through the web.

Unfortunately, with the development of multinational content in the world, web users have become confused in this space (Yunker, 2009). Companies can hardly find out how users have become familiar with their websites, but they should do their best to ensure that the users easily find what they desire in their websites. The answer to this problem can be found in "geolocation" term, which refers to the process of identifying the user's physical location automatically without

having to receive any information such as postal code. The foundation of geolocation is Internet Protocol (IP) address. When users are searching in the web, their computers send these IP addresses into the websites that they visit. It is worth knowing that most of these IPs are not constant for a geolocation, and to know that an Internet Service Provider (ISP) belongs to a certain city is no guarantee for customers' being in a neighboring area. What works in such conditions is Geolocation Service Providers (GSP).

Geolocation service providers provide great databases relating each IP address to a certain area. Since IP systems are constantly changing, most of these providers update their databases per day or week. Some of these companies are reported the rate of changes in the IP addresses of geolocations between 5 and 10 percent (Ionescuem 2010).

Geolocation can supply us with more than a geographical place. Most providers provide up to 30 types of data fields for each IP address by help of which one can easily recognize with more certainty whether users are or are not actually located where they claim to be located, as well as the following information:

- Country, region, province, city, postal code, area code
- Latitude and Longitude
- Time zone
- Designated market area
- The type and speed of the network connection (high-speed or low-speed dial up)
- The type and name of the extension (.com, .edu and so on)
- And so on.

Companies equipped with such information can respond their web users with a wide range of local content. For example, if they have electronic sales, they can sell their products in dollars or yen rather than euro. They can also supply goods suitable for the users' type of place (urban or rural) and seasonal conditions (winter, summer …). With what kind of Internet services the users have become connected to the website makes it possible for the companies to make decisions on their content, for instance, whether to place in their websites the videos which require great bandwidth or to place simple and constant visual pages. They can also place restrictions on some regions in observing or shopping some goods if the goods are illegal in their countries.

It is even possible for companies to guess the language a person speaks their IP, but this is not risk-free. To enhance the possibility of their success, companies should configure their web servers in such a way that they can discover and record the language preferences of the browser which the web user is using. Therefore, when an individual's location is identified to be in France, for instance, and his his browser has also been set in the French language for content reception; it is very likely that that person speaks in French (Panian, 2012).

Geolocation programs can be integrated with the companies' websites using a set of simple Application Programming Interfaces (APIs) or web scripts. These make it possible for the companies' web servers to send a request to the databases of geolocations before displaying the content to a user and implement the "if-then" rules of business as soon as they identify the user's

location (Holdener, 2011:29). If the user is in France, for example, then the server should display the French version of the website or the main website .com with its French translation.

Companies may also apply a set of business rules to prevent fraud in transactions which do not require any cards. For instance, if the user is living in a country with a high rate of fraud, the IP addresses relevant to that country can be deprived of access to the online shop. The server can compare the IP address with the address written in the order form to find any possible mismatch.

Integrating geolocation with the traditional b business intelligence results in a new dimension of business intelligence called location-based business intelligence, which can is effectively used as a strong tool for strategic management. The process of integration of geolocation and business intelligence has been shown in graph 1 (Panian, 2012).

Graph 1: Integration of Geolocation And Business Intelligence

Business intelligence   Geolocation

Location-based
intelligence
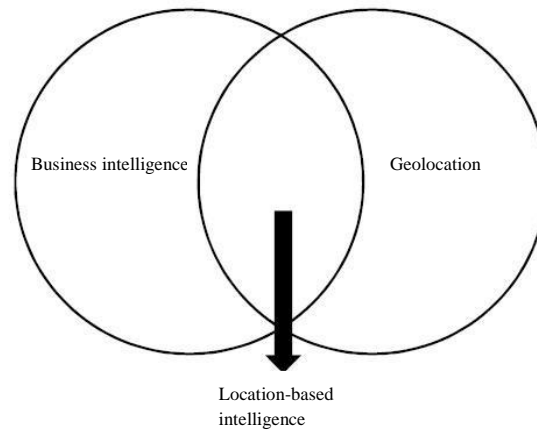
Location-Based Intelligence Power

Almost every organization pays attention, though limited, to the characteristics of location. For instance, when evaluating the traffic patterns to select the location of a factory, an organization may take into account the best travel routes and calculate the costs of transportation to the market in order for the industrial installations to be in appropriate places (Cho & Choi, 2006:131). There certainly are benefits even in these separate and unstructured observations. However, evaluating the effect of location using this method, which is referred to as "location inference" is like exploring stars without the use of a telescope. Although it may be possible to see certain points of light with the naked eye, it is just via the use of advanced optics with fine tunings that it becomes possible to see the delicate relations among stars, their constellation over time or even the far-away planets and neutron stars. Although the needed applications and analytic tools which have been designed for systematic exploration in location-based data are less well-known than the huge telescopes used for this purpose, no one can deny their importance and the ease of their access and their possibility of providing the companies which use them with a better prospect and awareness about their physical environment.

These tools not only allow companies to collect and observe the data which describe even the hidden characteristics related to their location, but also make it possible for the companies to search and extend these data in such a way that it improves understanding of the location influence and enables the organization to reduce its costs considerably and increase its benefit and income. Thus, such tools help us change the written concept of "location inference" into a powerful form of location-based knowledge known as location-based intelligence (LBI) (Panian, 2012).

LBI is conceptually very similar to customer intelligence, which became dominant in the 1990s and which provides well-known technological solutions such as customer relationship management software, known as CRM.

The basic assumption of customer intelligence and particularly CRM software was that if the company gets further information with the passage of time about customers' demographic information, preferences and buying habits, it can mix the marketing suggestions and customers' transactions in such a way that it results in customers' increased willingness to buy its products and generally promote overall customer lifetime value (Tsiptsis, 2009:215).

The concept of customer intelligence was accepted later so much that it can be said that any business uses it at present whether directly or in the form of an official CRM. As pointed out earlier, location-based intelligence has in several devades been a part of business operations at least in its initial form. For example, several years before the advent of computers, postal service companies regulated with precision the programs of reception and delivery of the goods and envelopes in order to minimize the travel time and fuel consumption. Retailers and owners of franchise services such as supermarkets and car repair shops usually examine a number of different factors before deciding on the location of their business. Obviously, real state agents determine the value of a land based on three principal factors: location, location and location!

It is evident that only a small part of practical intelligence associated with the location of a company has been presented in these examples, including just a small share of the value that can be obtained presently by use of the complicated tools of LBI. Location and its relevant concepts affect almost every operation of the company and any objective company is located somewhere. This is almost the case about all the customers and suppliers of the company as well (Panian, 2012).

Businesses With Location Intelligence

For the sake of sustainability, companies should compete in the capability of their supply chain. The competition is no longer between two companies, but between one supply chain and another. Using timely practical information about location, companies can improve their outlook about their supply chain, which has become increasingly possible like limited technology whose use is ecological. In other words, companies have to discover and found, improve and maintain their location-based intelligence. Location-based intelligence can be defined as penetration of the information related to location in organizational intelligence. In most cases, the Enterprise

Resource Planning (ERP), Customer Relationship Management (CRM), Human Resource Management (HRM) systems or the support system already collect this information based on the actual time or temporarily.

Graph 2 shows a company with location intelligence. Pay attention to the number of the activities that a company carries out, the location content of the activities and their support by global technology as well as the interrelationships among the activities (Panian, 2012).

Graph 2: An Organization With Location Intelligence

Risk management refers to:

- Security of the location
- More accurate possible planning
- Discovery of the tendencies of the market and product

Customer services improve due to:

- The Sales Information's request
- Different supporting services
- Review of the transactions' status

Further progress is made in distribution and logistics in case of:

- Greater accuracy in logistic planning
- Higher efficiency in delivery of software products
- Better management of assets

Growth in customer acquisition results from:

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- Further precision in location choice
- Defining the range of sales
- Distribution of sales warranty
- Determining and promoting the goals by help of mobile or the Internet

Operations improve through:

- Faster processing of orders
- Greater utilization of assets
- Allocation of better resources

Collaboration can be improved in supply chain via:

- Accessibility of the promises
- Stimulators of advanced planning
- Better management of the product information

However, companies have not made efficient use of location information in their decision-makings due to many reasons including:

- The costs of buying and maintaining a Geographic Information System (GIS)
- Difficulty in getting timely location information
- The costs of buying, storing and processing location simulators
- The weakness of maintaining location information in information systems
- The complexities related to the use of location information in the present business processes
- Insufficient maturity of global technologies

Companies are getting information about the rate of the location information gathered in their decision-making support systems (Ahson & Ilyas, 2011:155). A question that arises for leaders in their strategic decisions nowadays is how to have better influence regarding "where to be" and managers are still using various approaches rather than an integrated approach to location information and investment management in technologies. In this way, the systems are kept separate. The location information quality is used temporarily and based on special and individual functions rather than at the level of the whole company. As a result, information gaps are created in different functional areas of the company.

From the Company's Location Data to Location Intelligence

In general, companies can insert the location data in their business intelligence programs and take advantage of its results in every aspect of the companies. Location intelligence in a company has the following categories (Winslow, 2007).

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Business Decisions: These refer to the company programs that create an attitude toward the organization's intelligence and optimal strategic operations. The solutions are specific to industry and include a wide range, from selecting the retail business areas to exploitation of the company's asset in Health and Medica Education.

Activities in Favor of Customers: These are the company programs that provide the facilities of CRM such as customer services and self-Services. An estate agent is a place which is selected considering location intelligence and which deals with sales, marketing, customer services and self-services.

Consumer Programs: Chain stores are types of businesses that focus on providing services to consumers. These companies' income is usually obtained via advertising sales. Moreover, companies are using location-based services for the programs of mobile games as well.

The recent technological developments have made it possible to map an area without the places located in the area or to find the location of objects. In particular, satellite-based positioning systems have had abundant benefits for companies in the past two decades. These systems do not work inside the organization. Nowadays, access to positioning technologies for organizational environments has brought about a new set of data that can directly influence how to work in the organization by knowing where the objects have come from or where they have been placed.

The innovation of location intelligence can be considered in two main domains:

Global: a macro-environment where location is determined as one universal longitudinal - Latitudinal dimension. Examples include a range of programs related to analysis of geographical space and favorite geolocations.

Limited: a micro-environment where location is determined in proportion with limited places such as a building, warehouse, a store floors or a university campus. Examples include programs such as optimization of workflows and profit use.

As consumers become more aware of consumer programs, they transfer this awareness to their work office which has long been regarded as operation center. The use of Google Map software and Web 2.0 technologies such as Mash-ups and RSS, which provide consumers with useful information very easily and fast has changed individuals' expectation from the functions of the tools used in their offices. Furthermore, companies seek to know how to optimize location in their programs. Salespeople who use traditional business have turned to establishing cooperation with salespeople of geographical space in order to improve the achievements of their business intelligence.

Consumers are increasingly interested in gaining access to the Internet everywhere and every time. Businesses manage users' access to the Internet to provide their services through location-sensitive technology in order to prevent security breaches. Moreover, the ability of documenting the "where" for concordance with the rules and controlling the policies and procedures has had abundant benefits to the airline industries and Health and Medical Education. While the costs of conformity and security risks have increased, the expenses of the technologies related to location

have decreased. Lower costs, and the stability and flexibility of the platforms used in firmware environments enable businesses to invest in their operations more freely in searching for Wireless Local Area Networks (WLAN) and Personal Area Network (PAN) and machines such as sensors and sending machines (Panian, 2012).

Examples of Relations of Location-Based Intelligence

a. Retailing

In retails, the place where a shop has been located affects the sales performance more than other factors. Great managers, big marketing and advertising programs and even big products often have less influence on sales than does a suitable location. Accordingly, advanced tools of location intelligence help the retail owners to:

- Determine the optimal location of their stores.
- Simultaneously maximize the market share and performance of each store.
- Determine the quantities and avoid substituting between their own different stores.
- Have special predictions for operations and strategic planning.
- Keep adapting their marketing and media messages to their target groups with as much care as possible.
- Determine how to transfer a concept from one market to another.
- Identify those stores which have not had an appropriate performance and decide which one(s) to close and which one(s) to repair and renovate.

b. Financial Services

in financial services, the services' diversification and becoming out of fashion has brought about a reduction in the security margin of financial service companies in that they should optimize each transaction and the rate of contact with each customer in order to remain profitable. Location-based intelligence has many benefits for financial service providers and helps them to:

- Maximize the performance of the branches.
- Appraise the development opportunities by selecting priorities, the number and optimal location of the new branches.
- Allocate man force optimally for its products sales and branches.
- Segregate the problems related to the intrinsic performance of the market from those related to the personnel's performance.
- Understand the customers' needs, preferences and behaviors better.
- Adapt the financial products with both the customer sector population (for example, increasing mortgages in the growing regions of suburbs, pension plans etc.) and the life events (for instance, saving money for college expenses).

- Identify the branches with inappropriate performance and decide whether to close, maintain or transform those (Cherry, 2009).

c. Insurance
   In the insurance industry, insurers who do not pay attention to the areas covered by their policies do not fully understand the risks which bring financial damages to them. Therefore, location intelligence tools help insurers by:

- Assessing the marketing potential, focusing on marketing, sales and distribution management and maximizing the producers' effectiveness.
- Improving insurance decisions by providing more accurate practical analyses.
- Increasing competitiveness through purer and more accurate prices.
- Increasing efficiency and organizational profitability by using automated insurance systems with "the least or no contact" with insures as well as through the use of augmented rules engine technology and advanced service-oriented architecture supported by web software services.
- Managing the risk based on the portfolio and the regulatory reporting requirements in the World Academy of Science, Engineering and Technology.
- Making the claims simple and effective via management of the processes and providing customers with value added services.

d. Telecommunication

The modern communication devices are wireless and portable. Many of the companies providing wireless products have learned the lesson that even a detailed change in location can greatly influence the service quality, customer retention and profitability. Besides minimizing such problems, the telecommunication companies can make use of the location intelligence tools so that they can:

- Analyze the market demand, and cover the network and the competitors' data in order to optimize the network design, development and maintenance.
- Providing better customer services such as identifying the problematic points, calculating the downtime duration of the network and timely use of the network engineers.
- Understanding the customers' demands as well as the competitive threats in order to pave the way for market-driven suggestions and competitive pricing ways.
- Considering highly experienced sales staff for the purpose of accessibility of services and the possibility of membership and joining of different groups of customers.

Let's think, for example, that a telecommunication company needs to examine and specify the market's potential for its services. Using the location-based intelligence solution, the company should first define its business area and then compare the infrastructures and limits of taxation and consider them as the principal layers. It should, then, add to them the demographic data and the data related to customer division and make a spatial analysis out of them in order to compare the customers' preferences in certain regions with the services available in those regions.

When combined with the company's integrated data and the location-based true capabilities, this unique analysis allows the company to use its services in an Intranet or integrate them with the present operational systems and hence enables the company to make efficient decisions for the purpose of profitability.

e. The Public Sector

Nowadays, the principles, applications and implementation of e-government have attracted the attention of many theoretical and empirical researchers. The public organizations are increasingly under pressure for continuity of their work and their operational budget is decreasing more and more (Probert & Turner, 2009:4). LBI can help organizations a lot by providing them with the following:

- Attracting, retaining and supporting the local businesses in order to create jobs and improve the bases of the taxes received from these companies,
- Planning and developing the infrastructural and public work projects in large scale,
- Assessing the needs and effectiveness of the Federal government's helps in the fields of human services, economic development, agriculture, social health and others,
- Improving the forecasting system for disasters and events and preparedness for urgencies and recovery operations,
- Promoting the forecasting capabilities and preventive actions for duties relevant to national security.

f. Internet-based Businesses

Many of the companies providing e-commerce services have found that some of their best customers are living in rural and mountainous regions, remote islands and small and poor towns where the there is little capability of creating physical shops. Location-based intelligence solution can provide other facilities such as:

- Optimal accommodation of combinations of products among geolocations and customer groups,
- Optimization and scheduling of free transportation and other encouraging offers.
- Considering the effect of different days of the week as well as hours of the day on the buying pattern in different geolocations and population areas.
- Optimal timing and pricing of Internet advertising such as buying the keywords of search engines and advertising banners.

g. The Lessons that we learn

No business will succeed in the market unless it has a deep understanding of its customers and their behaviors. Assessment of production, distribution and other logistic issues which have great impact on profitability are also necessary for arrival at the market.

The location-based data used to be analyzed in administrative sectors or other non-revenue sectors or considered only theoretically and intuitively and based on physical location. However, it did not last long and organizations soon learned that not only location is important, but accurate use of the opportunities and effects created by location can also bring about considerable final yields (Panian, 2012).

h.   How can we Take Advantage of Location-based Intelligence?

Finally, location is closely related to the other data sources of the organization. For example, if we know a customer's age, familial status and previous purchases, we can direct the efforts of a retailer of sports products in marketing. However, knowing whether a customer is living in Slovenia rather than in Hungary helps us understand that this customer will be more likely to buy ski equipments or warm clothes suitable for winter, even if that customer has already bought no such items from the company. Likewise, the main map data can guide an insurance service provider where its policies should be implemented with regard to the traffic volume and high-risk areas. However, a more complete set of location-specific data is needed so that the insurer can automatically and accurately draw the policy related to the applicant's precise distance from highways and urban regions, rate of exposure to risk and optimal exemptions, which will result in developed and promoted insurance and customer services and turn the management's claims into action.

The above-mentioned examples and many similar examples indicate that location-based intelligence is a very valuable organizational intelligence, derived from both customer location and organization location and can improve the understanding of the organization operational environment, and consequently be used to help increase the organization income, reduce the costs and promote its profitability. Organizational intelligence provides the organizations which deal with customers with the very values that the analytical solutions of customer relationship management systems used to create for them in the past decade.

Just like the solutions relevant to customer intelligence which were strongly reliant on modern information technologies for empowerment of data management and their analyses, the location-based intelligence solutions not only have used the powers of intuition and collective guessing but can also discover patterns, risks and opportunities which cannot be seen by humans' eyes through the use of the modern tools of data processing and analysis (Panian, 2012).

Conclusion

Geolocation is a process which identifies the user's physical location automatically without having to receive any information such as postal code. The integration of geolocation with business intelligence leads to emergence of a new dimension of business intelligence called location-based intelligence (LBI). The expectations of this new dimension of intelligence are great and this dimension has a brilliant future. As consumers become more aware of consumer programs, they transfer this awareness to their work office which has long been regarded as

operation center. In general, companies can turn the location data into the application programs of business intelligence to be useful for every aspect of the organizations.

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