

Geographical Information Technology Approach and Model for Visualizing the Lifetime Value of Customers in the Geographical Marketplace

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ABSTRACT

Geographical information technology is one of the top most techniques for handling and managing the world wide business issues including customer lifetime value on the geographical based environment. In fact, visualizing the lifetime value of customer, specifically hypermarket's customer is important to determine the most profitable customer's to the business as well as strategic important for estimating how long life the customers will engage and doing transaction with the business. Besides that, others kind of technology, as well as financial information systems, retailing information systems, decision support systems, and so on are fail and unable to visualize clearly on how these lifetime value 'alive and acting' in the real marketplace. Critically, in perspective of multicultural societies just like Malaysia, visualizing customer lifetime value of multicultural customers are potentially as become strategic issues because it has major influence on certain aspects of current and future prospect of the business. In addition, although some of information technology has ability to visualize factors for prospecting customer lifetime value, however, it still unable to visualizing the real situation of customer's in the platform of geographical marketplace. Thus, this paper is purposely for reviews some of geographical information technology approach and model that be potential to handle the issues of customer lifetime value in the geographical marketplace. Moreover, understanding the advantages and disadvantages geographical information technology approach and model are practically important to strengthening the past and current methods of visualizing customer lifetime value on the ground place. At the end, suggestion was made on how to improvise the performance of visualizing the customer lifetime value for application of Malaysia multicultural geographical marketplace.

Keywords: Geographical Information Technology, Lifetime Value, Geographical Marketplace, customer lifetime value, strategic issues.

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1. INTRODUCTION

Geographical information technology is one of the top most techniques for handling and managing the world wide business issues including customer lifetime value on the geographical based environment. In fact, visualizing the lifetime value of customer, specifically hypermarket's customer is important to determine the most profitable customer's to the business as well as strategic important for estimating how long life the customers will engage and doing transaction with the business. Besides that, others kind of technology, as well as financial information systems, retailing information systems, decision support systems, and so on are fail and or unable to visualize clearly on how these lifetime value 'alive and acting' in the real marketplace. Critically, in perspective of multicultural societies just like Malaysia, visualizing lifetime value of multicultural customers are potentially to become as strategic issues because it has major influence on certain aspects of the current and future prospect of the business. In addition, although some of information technology has ability to visualize factors for prospecting customer lifetime value, however, it still unable to visualizing the real situation of customer's in the platform of geographical marketplace which is the real platform where customer acting and do transaction with the business firm.

In global perspective of business, successful businesses such as hypermarket business IKEA, Giant, Carrefour, and many more develop an exceptionally keen and detailed knowledge about local and international markets specifically about customer need and niche. This kind of initiatives is important to permits them to tailor product assortment, product differentiation, product need and expectation, local niches, customer capability, and many more, with final objectives to increase customer satisfactions. In future, it becomes more valuable to every retailer before they operate in different country, culture and values. Fabel, Sonnenschein, Sester and Golestan (2008) suggest that by 2010, China and India together will contain 123 million middle-class households. Mainly, as shown on Figure 1, China achieves CAGR around 8.0%, following by other Asia Country as well as Russia India (4.1%), and South Korea (4.1%). In addition, China estimates to reach US\$14,527 billions by year 2025, than following by United States (US\$ 12512 billions), India (US\$ 4264 billions), Russia (US\$ 2489 billions) and Japan (US\$ 2291 billions). Here, the businesses should now how to fostering and prospecting new opportunities in multiple markets where the sources of competitive advantage are in constant flux must grapple with multiple risks.

Plainly, there is no single route to transform in higher performance for hypermarket business and all successful hypermarket retailer such as Giant, Tesco, Carrefour, and many more, however, will have maintained the integrity of their core customer by combining some of marketing fundamental elements

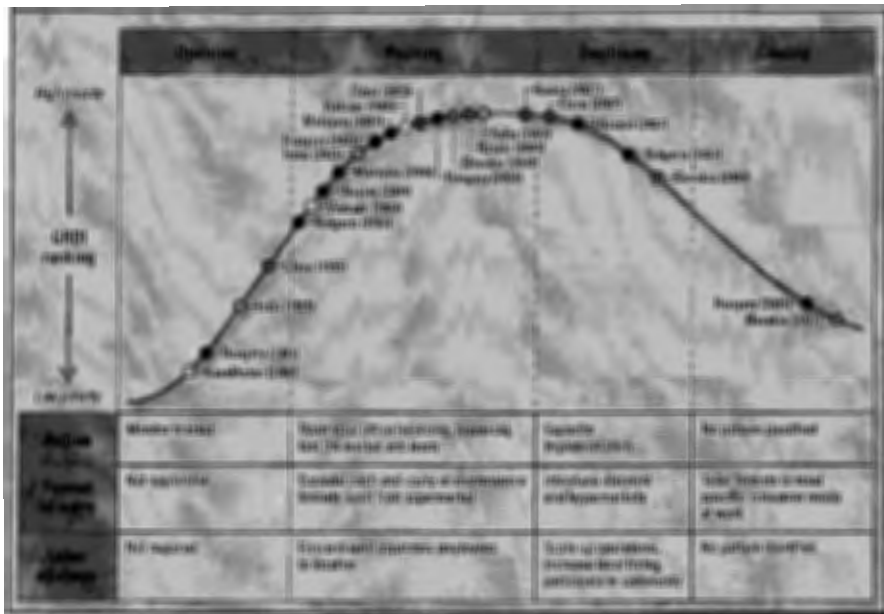
especially customer value. Managing customers value are identifies as strategic factors for retailer success, moreover, will reflect a strategic planning on customer relationship management that is fully aligned with their business objectives and an operating model that is standardized, streamlined and globally implemented by their global layout. According to Fabel *et. al.*, (2008), retailers should be setting high response to differentiate different face of customer then lead them to tackle the challenges of globalization successfully. Moreover, Moriarty, Ben-Shabat, Gurski, Padmanabhan, Kuppuswamy, Prasad, and Groeber (2007) developed a window of opportunities framework to understand all matter about retail market and customers. The retailer can apply window of opportunities as a time frame to plan their market strategy including on how to analyze their customer value. Thus, retails get valuable information about country market level which typically progress through four stages, identified as opening, peaking, declining and closing. However, to get more precise about customer in these four stages, Geographical Information Technology (GIT) view as high priority technology because GIT supply an indispensable analysis tool (Miller, 2007) for analyse customers in every stage, and ability to integrate, view, and analyze data from geography view (ESRI, 2007) specifically different location of customers in different countries.

	2005	2025	CAGR
China	2,038	14,527	8.0%
United States	7,325	12,512	2.7%
India	1,924	4,264	4.1%
Brazil	740	2,409	6.2%
Japan	1,780	2,291	1.2%
United Kingdom	1,068	1,707	2.4%
Germany	1,180	1,512	1.2%
Russia	757	1,455	3.4%
France	917	1,324	2.0%
Italy	826	1,162	1.7%
Mexico	646	1,129	2.9%
Canada	529	1,045	3.4%
Spain	560	945	2.7%
South Korea	412	914	4.1%
Australia	279	597	2.9%
EU	12,106	20,845	2.3%
EEA	7,579	24,799	6.1%
World	30,174	54,990	3.0%

Sources: Adapted from Fabel *et. al.*, (2008)

Figure 1: Estimates for Top 15 Consumer Markets by 2025. (US\$ billions)

Specifically, based on window of opportunities analyses (Figure 2), customer is one of factors that contribute to business development. There are many countries identifies in times for stage of peaking, includes Malaysia (2006 & 2007), Vietnam (2003 & 2006), India (2003 & 2007), and Hungary (2003 & 2004) and for that, Moriarty *et. al.*, (2007) indicates that information about business conditions as well as shows in Figure 2 is important for retailer to build their customer entry strategy under differs circumstances. On the one hand, window of opportunities results guides retails to continue wide investment and maintaining the relationship with customer. On the other hand, there are instance when consumer are ready to adopt modern retail independently of a market's current states. But, overall, key for success for exploring the new opportunities on customers market is by targeting and segmenting the customer, accordingly to certain customer models. Projecting the strategic location to operate is also important for capturing the best consumers. Thus, for helps the retailers in analyzing the location of customers, GIT can be employed for enhancing the retails decision making such as site location analysis (Andronikov, 2008) and improve decision making by using spatial analysis based (Zwillinger, 2008).



Sources: Adapted from Moriarty *et. al.* (2007).

Figure 2: Window of Opportunities Analysis

Finally, to deal with these new global retailers challenges, the businesses should explore the advantages of (GIT) because of some reasons, as well as GIT utilize by business community (Pick, 2008) and emerging of enterprise GIT (Clancy, 2008). Furthermore, GIT applications ultimately deliver value to the business (Harries, 2008) where as ultimately to achieve strategic position and competitive advantages on it.

2. AN OVERVIEW OF GEOGRAPHICAL INFORMATION TECHNOLOGY

Basically, GIT establish for as one of solution for handling and dealing with the character and structure of spatial and non-spatial data and usually its methods utilize for performing geographical based activities such as acquisition, data capture (analog and digital based), data organization, classification and qualification, spatial based analysis, display and presentation, distribution and dissemination, management, as well as the objectives of GIT design and development in organization. Conceptually, GIT is a synergism of various disciplines, includes GIT, computerized databases, applications development, computer science, graphical processing, visualization presentation, cartography, photogrammetry or air-photos, statistics, modeling, remote sensing, and many more. But, the important view is that applications of GIT actually well develop as solution for the real-world problems, both natural and man-made environment includes any kind of the objects related to geographical based events. So, this would encompass the fields of natural resources management, un-natural resources creation, resources capacity planning, decision making, business and marketing, utilities management, and many more. Nowadays GIT is used to managing and handling any field and research related to geographically issues with highly capabilities tools and solutions.

Understanding the advantages and disadvantages geographical information technology approach and model are practically important to strengthening the past and current methods of visualizing customer lifetime value on the ground place. Here, the discussion is more on the advantages of applied the GIT approach and model for tackles the issues of visualizing the customer lifetime in the geographical marketplace. Obviously, GIT is used and applied in the real world business operation including Baystate Health, Chico's, Kaiser Permanente, Lamar Advertising Company, Rand McNally, Southern Company, Sears Roebuck, and Sperry Van Ness (Pick, 2008). The usability of GIT in business firms are vital important because every single of business asset is geographically dispersed and needs to be managed using GIT tools. According to ESRI (2002), GIT technology is a tool for making maps, analyzing data, and reporting results. Since 1969, GIT has been helping people solve real-world geographic and business problems. Until today, more than 100,000 organizations around the world use GIT technology through ESRI Company to

manage location, information and any types of knowledge related to spatial. For examples, by visualizing specific information, businesses and government agencies can better organize and visualize their data for improved communications and enhanced decision making.

Conceptually, spatial technologies and GIS have significant impacts on productivity of business performances. The significant of GIS is dramatically increase from time to time, according to innovation on previous applications of business based Information Technology (IT). In the business world, Pick (2008) stated that GIS as information technologies have become more pervasive, interactive, mobile, internet-based, and diffused throughout the enterprise, likewise spatial technologies have done so. GIS only appeared commercially in the late 1960s and became widespread in government in the late 1970s. In practice, GIS was first adopted by governments, remained largely a public-sector feature for two decades, and then became widespread in businesses in the 1990s. Moreover, Clancy (2008) stated enterprise GIS now become important application in business sectors. This is because of enterprise GIS is integrated, multi-departmental system of components used collect, organize, analyze, visualize, and disseminate geographic information.

GIT based technologies have been growing rapidly in every single of segment of business. In today's marketplace, many of the world's leading commercial organizations, as well as Pest Control Company, Levi Strauss & Co., HSBC bank, Suzuki Motor Corporation, Kentucky Fried Chicken, Domino's Pizza, and many more are relying on GIT technology to enhance strategic competitiveness and improve efficiency in how they operate in the real environment of business and establishing the strategic business planning for the future performance. According to Pick (2008) GIT are increasingly being employed by the business community purposely for location-based services, supply chain management, management of field-distributed equipment, geographical marketing and promotion, and the spatial web. GIT spatially enabling the business to create unique advantage to competing in market environment, acquiring new customers, retain customers, make better decisions, and optimize workflow of business processes.

Globalization is one of the strategic key elements for business in designing their customer and market based activities that contributed to firm profitability. In relation with the globalization era, Abdul Manaf Bohari (2008) noted the huge demands for new customer entrance, customer segmentation, market value, demographics or populations, business resources, technology and innovation, degrees of efficiency and complexity in competition actually already intense. Thus, it's could be an urgent reality for any business or firms on every location of customers. Due to all of these needs and requirements, transformation of any kind of organization with objectively to capitalize and utilize new opportunities of unexpected market has become more complicated and ever challenging than

before. Thus, to maximize the potential of new market and customers demand, GIT can play as platform for transforming the traditional paradigm to modern approaches of conducting any kind activity and planning related to business such as marketing and site analysis, customer management, profitability analysis, competition and many more.

Overall, in today's highly competitive environment, marketing is a customer-orientated operation that is essential for business success. Thus, ESRI (2007) stated that successful businesses use GIT tools purposely to integrate, view, and analyze data from geography view. These applications can be used across an entire organization, in the field, and on the Internet including market analysis, site selection, merchandising, distribution, delivery, and facilities management, actually involve geographic relationships. GIT enables retailers to understand and visualize these geographic relationships toward the end for improve productivity, effectiveness, and efficiency in these processes. In addition, 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. So far, no other software technology has such a far-reaching potential.

3. CUSTOMER LIFETIME VALUE AND VISUALIZATION ISSUES

Customer lifetime value (CLV) is a key concept for any business, includes retail and marketing based business and frankly understanding on it will transform the business perspective to a great extent. Totally, retailer can use it to estimate the current value of all its customers form wherever they are locating. Projecting the current value of the customer, retailers have ability to categorize customers into different categories based on different point of value. Bejou, Keiningham and Aksoy (2007) argued the CLV concept is extensively changing the way today's business is managed. By understand CLV, it provides the best way to gain the competitive edge in business. CLV can utilize to reshaping the way the business manage with final aim to maximize their profits. The managers and researchers can best use CLV to a business's advantage because CLV explores various practical approaches to the measurement and management of customer value that is focus on maximizing profitability and growth. It is important to leverage CLV in all aspects of business, including customer management, employee management, and firm valuation. Moreover, Gilbert (2007) and Epstein, Friedl and Yuthas (2008) believed that CLV concepts is more toward customer valuation technique which is considers previous and currents information of customers, for estimating the future values of customers toward firms or business.

Realizing full CLV is more than an individual program; so it is the adoption of an organizational shift towards true customer-centricity. But more importantly, the imperative for change should be designed to improve and optimize

customer experience, services and including altering how, when, where, and what is communicated to customers. Lenskold (2003) mention that for well over a decade, the desire to increase profits through improved customer loyalty has been moving its way up the corporate agenda. Research shows that the value of retaining customers can be as much as 100 percent more profitable than acquiring new customers, yet acquisition marketing programs still tend to draw a greater share of marketing budgets. But, in-contras, other researcher such as Berman and Evens (2007), Hoffman, Wildman, Rebollo, Clarke and Simoes (2008); and Long, Trouve, and Blackmore (2005), noted that customer value in new dimension is more that managing the customer loyalty.

In the real marketplace, retailers actually just have limited option on how to maximize the customer value because of highly in market competition. Retailer must generate innovative ways to strengthening long relationship to their key customers and finally gaining high performance through customer base value. Principally, the idea of the customer as king has become engrained in the retailer way of thinking and influencing the retailer performance and profitability. That why, Berman and Events (2007) argue that to prosper, a retailer must properly apply the concept of 'value' and 'relationship' for ensuring the customer strongly believe the firm offers a good value for the money and both customers and channel members want to do business with that retailer.

Hypermarket business, as one of the retail industry is a worldwide business and involved many customer, business and location in different country and value. Clearly analyses of customer value can be produced by using GIT technology and because of that, GIT are considers as useful technology to helps retailer to penetrate the market and customer. Chen (2007) stress that the use of geo visualization system in the retail industry at micro-level, market, regional, and national scales. At the micro level, the measurement of the profitable operation of a leased retail space and indicates how the geo-visualization system could be used to support decisions relating to lease renewals, anchor tenant subsidies, mall access planning, and optimizing tenant mix. At the market level, GIT used to view how an ethnic composition of businesses along the Greater Toronto Area's retail strips decreased over the 1993 - 2003 period. GIT has been used to view how the geo-visualization application could facilitate the spatial analysis of retail sales by category across the entire regional portfolio of stores. At the national level, mapping retailer sales can be used for dominant metropolitan markets such as Toronto, Montreal, Vancouver, Calgary, Edmonton and Ottawa.

Fundamentally, customer knowledge is one of measurement for indicates retailer business success. Long, Trouve, and Blackmore (2005) indicates that in this consumerist world, the critical retail skill is not so much serving today's customers but keeping profitable customers coming in tomorrow, especially as the competition becomes ever more ingenious at luring those customers away.

In addition, retailer advised to use customer centricity approaches for continually successfully monitor their business performance with key segments, testing the relevance of their strategy with that ever-evolving profitable consumer. While, Peppard (2000) stated that successful company does well in both keeping and managing its customers through providing a set of attractive, and then personalized services that satisfy its customers' needs. This understanding is build based on servicing the existing customers are cheaper compared to attracting new customers is expensive. Furthermore, Gulati and Garino (2000) believe that it is important to understand customer behavior for differentiate between customers, to identify the most valuable customers over time, and to increase customer loyalty by providing customized products and services. Critically, based of argument of Long, Trouve, and Blackmore (2005); Peppard (2000) and Gulati and Garino (2000), the business need to apply kind of technique than can cope the information at their surround business environments. These are critical for getting better understanding on customer value and how customers alive and survive in the place.

The application and further research on CLV are dramatically expanded in other area and sector of business. Lao and Zhang (2007) identified that the most popular customer lifecycle value model which is recognized by many specialists and scholars is the net current value evaluating system put forward by Frederick in 1996. Actually, this is the extended variation of CLV definition term, as well as discussed by Lucas (2008), and Lenskold (2003). In addition, Lao and Zhang (2007) noted that Kotler developed the theory and thought that customer lifecycle value is the current value of all profits which customers contribute to companies during the whole lifetime. In addition, ESRI (2002) focused that customer knowledge is critical to the success of any business. The more retailers know about customers, distributions, demographics, psychographics, and density, the more profitable to business. It is important to keeping inventory on-hand based on customer purchase information, reduce unneeded inventory, and provide a better merchandise mix specific to a store location. Finally, GIT business analyst allows the creation of density maps and defines patterns.

Glady, Baesens and Croux (2009) views the value of an individual customer is important for the detection of the most valuable ones, which deserve to be closely followed, and for the detection of the less valuable ones, to which the company should pay less attention. At the aggregated level, a marketing campaign targeting a group of customers can be budgeted more efficiently when the value of this group is known. Furthermore, Fruchter and Sigué (2009) look that CLV is one of the forward looking marketing metrics that can help marketers to design effective marketing programs for individual customers and maximize their profitability in the future. Presently, Pfeifer, Haskins and Conroy (2005) conceptualize the CLV as the present value of the future cash flows attributed to the customer relationship and argue that marketers should

strive to build and maintain long-term, lasting relationships, the ultimate goal being to maximize future cash flows from each individual customer. Regarding the conceptual definition, Fruchter and Sigué (2009) voice out the focal questions, such as (i) Can sellers rely on buyer commitment? (ii) Are long-lasting relationships always profitable? (iii) Is maintaining a relationship (customer retention) indeed less costly than building a new relationship (customer acquisition)? In extend of discuss by Fruchter and Sigué (2009), additionally, managing CLV needs spatial based view because every point of customer location in the place has unique values and dramatically of spatial environment.

4. CONCLUSION

Spatial technologies and GIT are impacting the productivity of business and retailing, including its profitability and continuously growth in future prospects. Currently, GIT based technology is transform to another higher based platform where as standing, closely with IT based technology, such as multimedia, graphic, programming, and so on. Pick (2008) argued that as information technologies have become more pervasive, interactive, mobile, internet-based, and diffused throughout the enterprise, likewise spatial technologies have done so. Increasingly, more sophisticated and advance GIS technology will introduce to the business area with aimed to create highly impact on business operation and performance, including marketing value. In essence, GIS provide three essential capabilities which are identified as visualize and modeling the real phenomena, in-depth analysis of spatial aspects, and manage and utilize the information for better decision making execution. This ability actually vital important to solve common business problems, such as market analysis, retail site selection, territory design, logistics, business continuity, risk analysis, and many more.

REFERENCES

- Abdul Manaf Bohari (2008). *Management information system*. Kuala Lumpur: Asia e-University Publication.
- Andronikov, S. (2008). Geospatial analysis to enhance business decision making. *Proceeding of 2008 ESRI Business GIS Summit. ESRI Business GIS Summit*. April 27- 30, 2008, Chicago, Illinois.
- Bejou, D., Keiningham, T.L., & Aksoy, L. (2007). *Customer lifetime value: Reshaping the way we manage to maximize profits*. New York: The Haworth Press, Inc.

- Berman, B. & Evans, J.R., (2007). *Retail management: A strategic approach*. New Jersey: Pearson Prentice Hall.
- Chen, R.J.C (2007). Significance and variety of geographic information system (GIS) applications in retail, hospitality, tourism, and consumer services. *Journal of Retailing and Consumer Services*. 14, 247–248.
- Clancy, G. (2008). Best practices for implementing a successful GIS project. *Proceeding of 2008 ESRI Business GIS Summit. ESRI Business GIS Summit*. April 27- 30, 2008, Chicago, Illinois.
- Epstein, M.J., Friedl, M. & Yuthas, K. (2008). Managing customer profitability: Determine which customers are most valuable to your organization. *Journal of Accountancy (Business and Industry)*. Harvard Business School: December, 2008.
- Environmental System Research Institute (ESRI) (2007). *GIS for retail business*. GIS Best Practice (February 2007). California: ESRI.
- Environmental System Research Institute (ESRI) (2002). *ArcView business analyst: The value added*. An ESRI White Paper June 2002. California: ESRI.
- Fabel, M., Sonnenschein, M., Sester, A. & Golestan, L. (2008). *Customer energy: The empowered consumer is revolutionizing customer relationships*. Chicago: A.T. Kearney Inc. (Marketing and Communications).
- Fruchter, G.E, & Sigué, S.P. (2009). Social relationship and transactional marketing policies: Maximizing customer lifetime value. *Journal of Optim Theory Appl*, 10.
- Gilbert, S.J. (2007). How do you value a "free" customer?. *Research & Ideas*. Boston: Harvard Business School.
- Gladly, N., Baesens, B., & Croux, C. (2009). A modified pareto/NBD approach for predicting customer lifetime value. *Expert Systems with Applications*, 36, 2062–2071.
- Gulati, R., & Garino, J. (2000). Get the right mix of bricks and clicks. *Harvard Business Review*, 78,107-114.
- Harries, J. (2008). Business process solution maps. *Proceeding of 2008 ESRI Business GIS Summit. ESRI Business GIS Summit*. April 27 - 30, 2008, Chicago, Illinois.

- Hoffman, J.L., Wildman, R., Rebollo, J.M., Clarke, A., & Simoes, V. (2008). *Retailing in a global marketplace to achieve high performance*. Chicago: Accenture Inc.,
- Lao, G. & Zhang, Z. (2007). A three-dimensional customer classification model based on knowledge discovery and empirical study. In K.C. Chang et al. (Eds.) (2007). *APWeb/WAIM 2007*. Berlin: Springer-Verlag, 510 - 515.
- Lenskold, J. (2003). Retention marketing profitability: ROI challenges influencing the retention versus acquisition debate. *Marketing Profitability White Paper Series*. _____: Lenskold Group.
- Long, J., Trouve, O., & Blackmore, K. (2005). *Finding and keeping your best customer through customer-centric retailing*. Chicago: Accenture Inc.,
- Lucas, A. (2008). *Customer Lifetime Value Modelling*. _____: Rhino Risk Ltd.
- Moriarty, M., Ben-Shabat, H., Gurski, L., Padmanabhan, V., Kuppuswamy, R., Prasad, P., & Groeber, M., (2007). *Growth opportunities for global retailers: The A.T. Kearney 2007 global retailers development index*. Chicago: A.T. Kearney Inc.
- Miller, F.L. (2007). *GIS tutorial for Marketing*. Adelaide: ESRI Australia Pty Ltd.
- Peppard, J. (2000). Customer relationship management (CRM) in financial services. *European Management Journal*, 18, 312 - 327.
- Pfeifer, P.E., Haskins, M.E., & Conroy, M.E. (2005). Customer lifetime value, customer profitability, and the treatment of acquisition spending. *Journal of Manag. Issue*, 17(1), 11 -25.
- Pick, J.B. (2008). *Geo-Business: GIS in the digital organization*. Singapore: John Wiley & Sons, Inc.,
- Zwillinger, S.L. (2008). *From default to dynamite: 6 techniques to make your maps talk. Proceeding of 2008 ESRI Business GIS Summit. ESRI Business GIS Summit*. April 27- 30, 2008, Chicago, Illinois.