

Developing Geographical Information Systems as Retail Information Technology for Hypermarket Business: Current Issues and Future Prospect

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In general, hypermarket business is one of the most promising fields of retailer sector in which to used Geographical Information Systems (GIS) with the top one reason was to performance mapping the results of marketing activities, such as location analysis, lifestyle change, geo-demographic, and many more. Traditionally, retail business have been applied Retail Information Technology (RIT) as their information system. Based of literature review, there are some major challenging of managing customer relationship using RIT, especially on how to sustaining the relationship with huge number of customer in the current location. On the one hand, retail has been used intensively on RIT-related systems. However, on the others hand, sadly, results that produced by these systems is not really precise yet according to geographical point of view and the current change in the real marketplace. In fact, these RIT-related systems has un-covered concurrent and real-time of business environment in marketplace. As implications, it pressures RIT to the back as opposite of what hypermarket expects more from RIT. Thus, the objective of the paper is for discusses current issues of implementations of retail-based information system on hypermarket business. Secondly, this paper demonstrates GIS capability as RIT purposely for modelling the location of hypermarket and customer in the real location of marketplaces. An interview approach will be used as method for gathering some information on current issues, where it was involved academician expert and hypermarket key-person as respondents. Meanwhile, Arcview software will used to demonstrate how hypermarket can visualize their geographical location includes precise location of their customer. The main result indicates that GIS is potentially used as alternative of RIT where it covers a path of spatial-based analysis. At the end, suggestion was made to develop GIS application as a heart of RIT where it can contributes to the current practice and body of knowledge of retailing research.

JEL Codes: M3, M31 and M15

1. Introduction

In general, hypermarket business is one of the most promising fields of retailer sector in which to used Geographical Information Systems (GIS) sophistications. The top one reason for apply GIS for hypermarket business purposes was to performance mapping activities of the results of marketing analysis and programme, as well as location, lifestyle change, demographic, consumer behaviour, customer value, market segmentation, and many more. Obviously, GIS is used and applied in the real world business operation

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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 GIS in business firms are vital important because every single of business asset is geographically dispersed and needs to be managed using GIS tools. According to ESRI (2002), GIS technology is a tool for making maps, analyzing data, and reporting results. Since 1969, GIS has been helping people solve real-world geographic and business problems. Until today, more than 100,000 organizations around the world use GIS 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.

Recently, in today's highly competitive environment, marketing is a customer-orientated operation that is essential for business success. To become success in sustaining the business performance, ESRI (2007) stated that successful businesses use GIS 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. Thus, retail business processes, including market analysis, site selection, merchandising, distribution, delivery, and facilities management, actually involve geographic relationships. GIS enables retailers to understand and visualize these geographic relationships toward the end for improve productivity, effectiveness, and efficiency in these processes. At the same time, predictive investigators such as market and customer analytics are also enhanced by GIS capabilities. 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. However, the beauty and power of GIS is that it 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. As opposite of GIS sophistications by ESRI (2007), the retailing information technology (RIT) will be affected, especially on how effectiveness of RIT compared to GIS.

Generally, most of leading retailers as well as Tesco, Carrefour, Giant, and many more actually understand and sharply projecting their customers exceptionally well. Better understanding customer values will lead the retailers to the higher performance, specifically in generating their long term profits. But, for international retail operation, retailers will face the different view of global customers and it environment. Here, RIT has limited capability as well as disadvantages of marketing information systems. Hoffman, Wildman, Rebollo, Clarke and Simoes (2008) believe that when retailers come to global business retailer landscape, the sheer diversity of customers can confuse the best of product brands. Thus, to success in a global marketplace requires a fine balance of two essential capabilities which is refer to a global approach to the business and a local view of the customer. As implication, retailer needs other alternative information system to discover and strengthening some aspects of marketing programme. Therefore, researchers Laudon and Laudon (2008), Berman and Evans (2007), Miller (2007), and Toppen and Wapenaar (1994) coined to analyzing the market and customers either international and local based perspectives, retailers need to utilize GIS to helps them better understanding and analyses on real needs and expectation of customers. GIS facilitates retailer with spatial based solution and make close relation between predictive and real situation of customers. More important facts is GIS helps retailer to enhancing decision making with more precise information on the customers niche and values.

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2. Literature Review

Traditionally, retail business have been applied Retail Information Technology (RIT) as their information system. Based of literature review, there are some major challenging of managing customer relationship using RIT, especially on how to sustaining the relationship with huge number of customer in the current location. On the one hand, retail has been used intensively on RIT-related systems such as Customer Relationship Management (CRM), Sales Force Automation (SFA), Enterprise Resources Planning (ERP), Retail Information System (RIS), Marketing Information System (MIS), and many more. However, on the others hand, sadly, results that produced by these systems is not really precise yet according to geographical point of view and the current change in the real marketplace. In fact, these RIT-related systems has un-covered concurrent and real-time of business environment in marketplace. As implications, it pressures RIT to the back as opposite of what hypermarket expects more from RIT.

Retailing is one of the research areas in marketing that always significant for every time and place. The reason is retailers and marketing always face new environment and challenge and could be differs based on location, time and situation. Beaumont (1991) stated that marketing is perhaps one of the most obvious research areas in which to apply GIS. Certainly, marketing is a question of demand (customers) and supply (retail outlets and shopping centers). Both demand and supply are easy to mapping to a geographical location. Therefore, these factors are interesting to analyze using tools from GIS. According to Toppen and Wapenaar (1994), retail marketing is one of the most promising fields of business in which to apply GIS. For years, the one and only reason to use GIS in retail marketing was to map the results of marketing research. But nowadays, more and more analytical operations are performed within a GIS environment. Actually, there are some model were developed to understanding related activity regarding retailing and marketing, as well as determine catchments areas, identify retail sites, conduct competitor analysis, and calculate current and future shopping trips and operate within a GIS environment. In addition, there are various kinds of GIS applications for marketing research that helps the marketers to answered fundamental question, such as location of customer, buyer characteristics, market segmentation, market penetration, competitors forces and location, potential turnover (by location), product distribution (within rural and non-rural area), expected market share, new branch (location plan), expand an existing branch, promotion of product, and advertisement.

In certain firms, marketing department is familiar with others RIT such as Marketing Information System (MKIS), Retailing Information System (RIS), Marketing Decision Support System (MDSS), Sales Force Automation System (SFA), Office Automation System (AOS), Enterprise Resources Planning System (ERP), Customer Relationship Management System (CRM) and many more. However, there is a question on effectiveness of all these kind of information system in handling marketing activities. Some of marketing department are utilizing RIT for a long time, but still have less ability to analyzing customer in geographical environment. In the enterprise business systems, ERP for example, which up to now have had minor spatial aspects, spatial data are become more critical issues. In the ERP for one large business, for examples, Pick (2008) mention shows that over 98 percent of analysis is non-spatial and only 2 percent is spatial. Hence,

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proportion of the non-spatial uses must be considered in recognizing the perceived importance of spatial data and the priorities given by managers and other stakeholders in utilizing it. Close similar, Zhao (2000) noted that more than 80 per cent of all information in an organisation can be geographically referenced. Therefore, RIT continuously questioned of its capability especially on how precise of it for customer-based analysis specifically on any information that tied to spatial platform.

Nowadays, the use of MKIS in every marketing management supports the comprehensiveness of data gathering and analysis. This is important because MKIS offers many tools and services to help marketing staffs to perform their works. MKIS support the activities such as pricing of products or services, sales analysis, predicting trend of price of products, managing salesperson productivity, maintaining new products and service, analyse the product innovation process, establishing the market planning, and many more. In recent years, companies have invested in implementing marketing software systems, such as customer relationship management which helps the firm to facilitate marketing resource allocation decisions. However, these investments will not be optimally leveraged if the understanding of how such MKIS can influence customer perception and market penetration is low (Abdul Manaf Bohari 2008). Thus, MKIS is unable to performance more complicated analyses especially when facing the spatial based variables or data. Thus, to enhance the ability of MKIS, spatial platform should be considers in redesign any kind of marketing based information systems.

As marketing decisions are becoming more complex because of the increasing of products and brands and, under the pressure of competition, an ever shorter time frame for the decision-making process, MKIS approach is one of the importance thing for management. In reality, the marketing information revolution is producing enormous amounts of data, and systems are needed to translate these data into actionable information. This is one of disabilities of MKIS because MKIS not enough capabilities in generating spatial information and transforming it into non-spatial based information that valuable in measuring the customer value. To makes MKIS better performance than before, some new spatial capabilities and function should be considers as new functions of MKIS. To enhance the performance of MKIS or any RIT, such information technology should have capability on tied spatial information with marketing database. Therefore, this is one of reasons why GIS is significant for develop in marketing department as retailing information technology where it can discover specific analysis on customer in the geographical marketplace.

Although MKIS are unable to meet the functions in spatial based analyses, but, fundamentally, there are sixth (6) reasons why MKIS is vital important to a manager or marketing persons in business firms, accordingly to Laudon and Laudon (2008), Turban, Rainer, and Potter (2006), and O'Brian and Marakas (2008). Summaries of some important point of MKIS are includes:

(1) MKIS will help the managers in in-enhance capital management capabilities in marketing decision area (Laudon & Laudon 2008). MKIS need spatial capabilities to depth understanding on capital management in relation with spatial variables.

(2) MKIS is one of the important tools that plays critical role for guiding the firms on how to increasing the productivity of firms including high growth and future performance (Turban, Rainer, & Potter 2006). Therefore, MKIS must be able to link between spatial information and non-spatial information to get more precise information regarding firms growth and profitable.

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(3) MKIS is one avenue for achieving a marketing strategic advantage by establishing the products differentiation strategy (O'Brian & Marakas 2008). In addition, MKIS must develop geographical platform as their avenue for generate better understanding on suitability of strategy in geographical places.

(4) MKIS will make the managers realize new sources of business opportunity, as well as develop new products, design new services, establishing new marketing niche, includes strengthening the relationship between the business and customers (Laudon & Laudon 2008). Here, MKIS need more advance function and tools, because of existing capability is not really handle the latest challenges of managing new resources.

(5) Many marketing management activities are supported by computerized information systems and by this, the marketing function will generate accurate demand for the company's product or services and then the company will generate enough product for meet that demand (O'Brian & Marakas 2008; Laudon & Laudon 2008; & Turban, *et. al.*, 2006). In addition, projecting the demand and supply of product or services must empower by spatial based information systems because demand-supply is something related to real geographical environments.

(6) MKIS is concerned with identifying the customers for the firm's new products or services, determining what customers need or want, planning and developing new brand of products and services to meet their needs, and then, advertising and promoting these products and services (O'Brian & Marakas 2008; Laudon & Laudon 2008; & Turban, *et. al.*, 2006). But, to make the analysis of customers are more valuable, GIS should explored to support existing marketing based system within marketing department.

Globalization is one of the strategic key elements for business in designing their customer and market based activities that contributed to firm profitability. As the globalization era transforming world to become more interconnected, more borderless, and more sophisticated, the pressure to driven-up the performance of any kind of business has accelerated and needed for more customers, location and space of operation. 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, GIS 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, retail profitability analysis, competition and market force, and many more.

Thus, it's important to utilize the customer information directly from the marketplace because it has some impacts on retailer profitability. Due to precisely valuated, precise information is vital important that is cannot supply by any kind of RIT or MKIS. In some cases, RIT and MKIS can provide accurate, currently, and update information about market situation and customer locations, however those kinds of data is not well-spatial yet. At the end, the firm actually need to development GIS as alternative of RIT or MKIS that more spatial-friendly.

3. The Methodology and Procedure

Firstly, to investigate what are the current issues of implementation of RIT, MKIS or customer-related information system in the business, an interview approach will be used as method for gathering some information. The interview is conducting in un-structured format where it was involved academicians expert from Universiti Utara Malaysia (2 persons), Universiti Teknologi MARA Malaysia (1 person), LimKokWing University (1), and Universiti Sains Malaysia (1 person) that all the university was situated in Malaysia. Secondly, hypermarket key-person has targeted as respondents which are focused on International Hypermarkets in Seberang Perai of Penang in Malaysia. There are 18 key-people of hypermarkets; as such marketing researchers (4 persons), CRM managers (5 persons), Sales managers (2 persons), Head of marketing department (3 persons) and supervisor's (4 persons) are volunteers to cooperate to this study. Totally, there are 23 respondents' that volunteer to be interviewed in this study.

The main question that asked to them is what is the current issue of implementation on RIT, MKIS or customer-related information system in the firm? In addition, other related questions are:

- (a) What is the current issue of managing customer in the current marketplace?
- (b) How the RIT, MKIS or customer-related information system functionally in managing the customer information?
- (c) How effective the RIT, MKIS or customer-related information system in handle customer profitability.

Meanwhile, Arcview software (GIS software) will used to demonstrate how hypermarket in the area of Seberang Perai of Penang in Malaysia can visualized based on their geographical location. In addition, location of customer also can integrate with location of hypermarket by using map platform. This is important to view that GIS can be used as alternative of RIT, MKIS or any related information systems for the latest retailing information technology.

4. The Findings

The main result indicates that GIS is potentially used as alternative of RIT where it covers a path of spatial-based analysis. In detail, discussions and arguments of findings are shows as below.

4.1 Current Issues of Implementations of Retail-Based Information Technology

Fine the real best customers that contribute high purchases on firm product are more difficult than identifying the customer segments with the highest potential, as agreed by 21 of 23 respondents. Whether a retailer is taking an aggressive or conservative approach to the new market of customer, managing customer information still a core concentration that help retailers analyze business opportunities and act accordingly. Thus, most of retailers tend to maximize the value of each customer interaction because for some reasons, such as (1) to manage profitability of retailers; (2) to increase volume of sales; (3) to compete with others; (4) to maximize customer re-visit and recency of shopping; and (5) to beat competitors by making strong decisions based on value information. This is similar to Long, Goodchild and Rhind (2005) that stated profitable performance tomorrow, then, depends on providing the right product mix at the right time to customers. Retailer must investigate what customers want before they even know they want it. That

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kind of customer knowledge is more insight and it is a fact-based foundation of successful customer-centric retailing.

Basically, the RIT, MKIS or customer-related information system in any marketing department is concerned specifically on identifying the customers (current and new customer) for the firm's products or services, determining what the current customers need or want, developing new products and services to meet the customer needs, planning effective marketing programme of market penetration, handle such kind of advertising and promoting and many more. In specific, the department such as CRM department, sales department and marketing department are concerned with establish relationship with customers, promoting new products to marketplace, selling the products and services to another market segment, taking orders and prepared stocks, and following up on sales. These statements as above is agreed by all 23 respondents. Therefore, in perspective of RIT, MKIS or customer-related information system, researchers Li, McLeod and Rogers (2001) mention MKIS supports all these activities related to sales analysis and trend, and usable for manage corporate information resources. At the strategic level, MKIS monitor trends affecting new products and sales opportunities, support planning for new products and services, and monitor the performance of competitors. For example the Marketing TPS collects sales data that can be segregated along several dimensions for early detection of problems and opportunities, usually by searching for trends. In addition, an interesting computerized technology that can support this type of sales analysis is a Geographical Information System. By using pre stored maps at various levels of details, a marketing manager can learn a lot about the company's customers and competitors.

Practically, the capabilities of RIT, MKIS or customer-related information system in managing customer issues are continuously questioned even by the respondents of the study. As exemplified, as such as Customer Relationship Management (CRM) software on its function for analyzing customer profitability includes lifetime value of customer. However, the software has capability on geographical information platform which is vital for manage customer value geographically. These statements are agreed by all 23 respondents. This is because of the function of RIT, MKIS or customer-related information system are lowering the failure rate and supporting the success of marketing department are the ultimate goals of any researchers and practitioners as mention by Markus and Tanis (2000). In addition, this is similar to other works as mention the failure rate of Customer Relationship Management (CRM) implementations is estimated to be greater than 65% (Davids, 1999) and it have implication on customer relationship management events. Currently, Forrester Research has evaluated 18 leading customer relationship management (CRM) suite solutions against 516 criteria reflecting the requirements of large organizations. They found that Leaders Oracle Siebel and SAP still offer the most complete solutions, with better usability and improved total cost of ownership (TCO) and other vendors such as CDC Software, Microsoft, Oracle CRM on Demand, RightNow Technologies, and salesforce.com are gaining ground with flexible, quick-to-implement solutions. The Leaders are challenged by a pack of Strong Performers, Oracle E-Business Suite (EBS) CRM and Oracle PeopleSoft Enterprise CRM remain good options for enterprise resource planning (ERP) customers. Meanwhile, Chordiant Software, Pegasystems, and Sword Ciboodle offer business process management (BPM) strengths to orchestrate complex customerfacing processes. Maximizer Software, NetSuite, SageCRM, Sage SalesLogix, and SugarCRM offer sound solutions but are best suited for midsized organizations. FrontRange Solutions, a Contender vendor, offers a solution to meet basic needs (Band 2010).

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The issues of customer management have grown rapidly in recent years, with highly consideration on how the firms manage customers as key assets. Regarding customer value management, there are some key challenges that firms and researchers face in understanding, managing, and implementing successful customer management strategies. Kumar, Lemon, and Parasuraman (2006) noted there eight key challenges for managing customer, such as (1) Managing customers across multiple channels, (2) Achieving customer centricity, (3) Managing brand equity versus managing customer equity, (4) Developing and operationalizing appropriate customer lifetime value (CLV) models, (5) Understanding the link between CLV and shareholder value, (6) Developing forward-looking customer metrics, (7) Successfully implementing customer relationship management (CRM) strategies and (8) Implementing CRM in global environments. Overall, managing customer is one of factors for success in managing retail profitability, as indicated in Janiak (2009), Fabel, Sonnenschein, Sester and Golestan (2008), Hoffman, Wildman, Rebollo, Clarke and Simoes (2008), Moriarty, Ben-Shabat, Gurski, Padmanabhan, Kuppuswamy, Prasad and Groeber (2007), Baum and Singh (2008), Berman and Evans (2008), and Long *et. al.* (2005). However, such kind of RIT, MKIS and customer-related information system has lower capability to analyze the current issues of customer especially on customer information for predict better results in business profitability.

In future, customer orientation is more vital than ever because today's best customers are not necessarily tomorrow's. To sustain profitability in the flow of a changing marketplace, retailers need to offer the customer a constantly relevant reason to buy which is a differentiating reason that can vary from one customer, situation and region to another. This statement is agreed by 22 of 23 respondents. In Long *et. al.*, (2005), 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. 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. Further more, Gulati and Garino (2000) believe that it is important to understand customer behavior through analyzing customer information to differentiate between customers, to identify the most valuable customers over time, and to increase customer loyalty by providing customized products and services. As opposite of Long *et. al.*, (2005) and Gulati and Garino (2000), RIT has no ability to perform advanced analysis of customer analysis where need to integrated spatial information into the based-line of analysis.

As results from the interview session, here, GIS is suggested as alternative of analyzed the customer's information as well as prospecting the retails profitability. By utilizing GIS application and tools, it will bring new ideas on how to utilize spatial-based information as a part of information of understands the current situation in the geographical marketplace.

4.2 GIS Capability as RIT

It is important to understand and apply the best practice on servicing the customer because customers are the backbone of business. Not surprisingly, customer focus is always identified as the key to successful retailing in any marketplace. Obviously, successful retailers apply customer based strategy globally for gearing many more customers for contributes to firm profitability. To ensure retailers get more details on real customer situation, GIS should considered as important strategic tools for any reason, such as, GIS is an ideal tool for identifying and expanding markets, and increasing profits (Zhao 2000), GIS provides answer for question about demand (customers) and supply

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(retail outlets and shopping centers) (Beaumont 1991); and GIS purposely used for target store sales predictions, sales territory modeling, product placement, and customer analytics (Thum 2008). By using GIS technology, retailers enable and performing such kind of customer based strategy, as well as market differentiation, customer value identification, and streamlining and integrating their global customers to achieve high profitable market.

In practices, GIS has ability to modeling the location of the hypermarket by using spatial-based information as shows in Figure 1. From Figure 1, the boundary of Seberang Perai Tengah of Penang has been used as base-line for projecting location of hypermarket where it represents the actual location in the marketplace. Obviously, each hypermarket is close to each other, which are in between 2-5 kilometers. Meaning that, customer has ability to choose and switch their destination of shopping, even tough they can shop for more than 2 hypermarkets for one day.

Figure 1: Location of Hypermarkets in Seberang Perai Tengah, Penang.

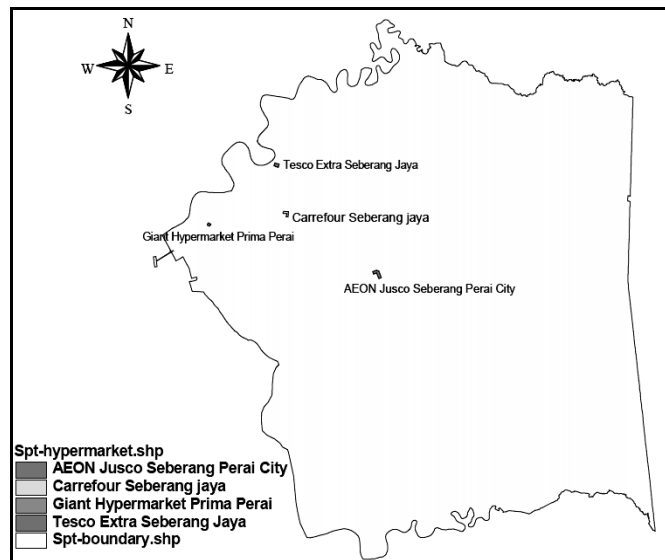


Table 1 is shows database of customer in Seberang Perai of penang where is contain such particulars, as such customer postal address. Traditionally, hypermarket used these postal address for marketing activities via distribute information on mass media. However, this will be more effective if each postal address of customer can map into specific location. Then, hypermarket can trace and analyzed the customers for better results in understanding of which customer is more profitable to them.

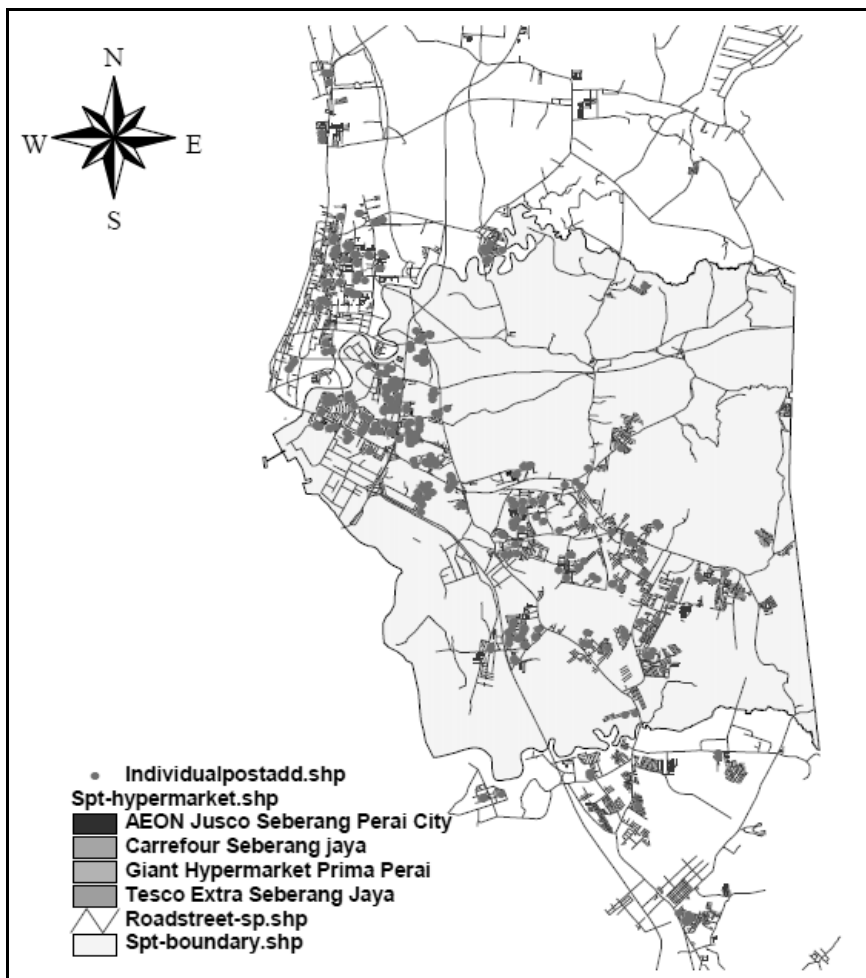
As present in Figure 1, each hypermarket is so close to each other. By integrate location of customer as in table 1 into map of hypermarket as in Figure 1, thus, competition among hypermarket can visualized according to distribution of customers. Therefore, Figure 2 shows the location of hypermarket and customer that visualize using spatial data as such street and road systems. The best thing about GIS is it can show hidden data that may potential to use for marketing activities. In addition, figure 2 shows location of customer that is located outside the Seberang Perai Tengah also can figure-out that potentially can helps hypermarket to do market penetration in more precise.

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Table 1: Customer Database of Current Postal Address.

<i>Idname</i>	<i>Address</i>	<i>Alias</i>	<i>Postcode</i>	<i>Pecapaian</i>	<i>Town</i>
006-TNN	11 Tingkat Siakap 1	Tingkat Siakap 1	13700	Seberang Jaya	Perai
007-TNN	43 Pintas Terubok 4	Pintas Terubok 4	13700	Seberang Jaya	Perai
008-TNN	8 Lorong Kalui	Lorong Kalui	13700	Seberang Jaya	Perai
009-TNN	42 Lorong Sutera Prima 9	Lorong Sutera Prima 9	13700	Seberang Jaya	Perai
010-TNN	127 Lorong Tenggiri 25	Lorong Tenggiri 25	13700	Seberang Jaya	Perai
011-TNN	44 Lorong Kurau 22	Lorong Kurau 22	13700	Taman Chai Leng	Perai
012-TNN	14 Lorong Sembilang 2	Lorong Sembilang 2	13700	Seberang Jaya	Perai
013-TNN	11 Lorong Talang 1	Lorong Talang 1	13600	Taman Talang	Perai
014-TNN	22 Pintas Terubok 1	Pintas Terubok 1	13700	Seberang Jaya	Perai
015-TNN	14 Tingkat Tuna 2	Tingkat Tuna 2	13700	Seberang Jaya	Perai
016-TNN	47 Lorong Siakap 24	Lorong Siakap 24	13700	Seberang Jaya	Perai
017-TNN	59 Lorong Kurau 25	Lorong Kurau 25	13700	Taman Chai Leng	Perai
018-TNN	9 Lorong Kikik 1	Lorong Kikik 1	13600	Taman Inderawasih	Perai
019-TNN	38 Lorong Bawal 7	Lorong Bawal 7	13700	Taman Inderawasih	Perai
020-TNN	128 Lorong Bukit Minyak 19	Lorong Bukit Minyak 19	14000	Taman IKS Bukit Tenga	Bukit Mertajam
021-TNN	31 Lorong Tenggiri 5	Lorong Tenggiri 5	13700	Seberang Jaya	Perai
022-TNN	51 Lorong Sembilang 18	Lorong Sembilang 18	13700	Seberang Jaya	Perai

Figure 2: Location of Hypermarkets-Customers in Seberang Perai, Penang.



Conceptually, in relation with Figure 1 and Figure 2, 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. In practice, 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. Indeed, the goal of an enterprise GIS is to implement

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interoperable technologies, standard and methods so that GIS data and services can support core business needs more efficiently and more effectively.

The used of GIS is significant to the current issues of customer in the marketplace. ESRI (2002) estimates that approximately 50 percent of today's retail stores do not capture customer information as part of the business transaction. Without this find of information, it is difficult to quantify the demographics of your customers or market areas. So, GIS application is powerful and useful which provides one means of identifying characteristics of a mathematically generated market area. Other analyses can be performed to add to the value of these areas including drive time and ring analyses. In addition, Berman and Evans (2007), the issues of customer ia relates to the retail trade area zone where the revenue is actually generated from. By using GIS analysis on retail trade, they can predict where the best prospects instead of increasing retail profitability. GIS can help the retailer in term of understand the best allocate their resources, such as retail locations, sales force, promotion tactics, marketing activity, advertising incentives, include mail based campaigns with final aimed to grow their businesses.

In the level of decision making, mapping the location of hypermarket and customers as in Figure 1 and Figure 2 can contributes to the overall performance of the business. Bastedo (2008) stated that GIS are enhancing business value in a complex organization, which are includes understanding values related to place, customer, organization (revenue), shareholders, and brand. Andronikov (2008) mention that GIS functionally in enhancing the business decision making process in many area of business, such as site analysis, market analysis, analysis of demand, supply chain management, risk management, and network routine modeling. In addition, Zwillinger (2008) stress that one of the primary benefits of GIS is that it allow businesses to improve decision making by using spatial analysis. That why, for customer management, GIS highlighting the proximity between the location and key potential customers and provide some insight into the potential daytime customer demand.

ESRI (2002) noted GIS is finally able to address the key issues of top management such as marketing, competition, and profitability. As shows in Figure 1 and Figure 2, senior management needs GIS for understand their potential markets, customers, and current situation on marketplace where is always in un-predictable situation. Specifically, the hypermarket key-persons as noted previously, want to follow, through time and space, the competition in relation to their best markets and determine if the competition is growing or shrinking. In addition, they also want to site new businesses and track sales in existing locations as well as determine profitability of a new or proposed location. With this information, marketing key-persons know which stores are under producing relative to potential.

In term of contribution to body of knowledge, especially in customer relationship management, this study will provide new method for developing GIS as RIT of any retailers where it is critical important to handle any un-solved problems that un-able to RIT-related systems such as Customer Relationship Management (CRM), Sales Force Automation (SFA), Enterprise Resources Planning (ERP), Retail Information System (RIS), Marketing Information System (MIS), and many more. This study also provide a guideline on how to make a transformation for replacing the RIT with GIS that perceived more customer-friendly and real-time base, where marketplace can be modelled and analyzed as in the real situation.

5. Summary and Conclusions

Until now, retailing is an important field to study because of its impact on the economy, its function on distribution, and its relationship with firms selling goods and services to retailers for their resale or use. Overall, retailing is a major part of world commerce and retail sales and employment are vital economic contributors, and retail trends often mirror trends in a nation's overall business (Berman & Evans 2007). Increasingly, retailers are using GIS software, with combine digitized mapping with key location data to graphically depict trading-area characteristics such as population demographics, data on customer purchases, and listings of current, proposed, and competitors location. Commercial GIS software programs lets firms quickly research the attractiveness of different locations and access computer-generated maps (Johnson & Kunz 2005; Lowe 2005). Thus, GIS used for helps the retailers to delineate and analyze trading areas and supply valuable information for decision making activity instead of predicting the most profitable location and customers. Event now GIS also provide insight analyses tools for ensure the retailers get in-depth analysis on customer value, market situation, retailers competition and business environment.

Customer is the greatest asset to retailer, specifically, the current customers who will remain as customer in future also. In common understand that the customer is the fundamental reason for the company's existence and operate in the market place. Therefore, suggestion was made to hypermarket or any retail business to develop GIS application as a heart of retail information technology where it can contributes to the current practices of retailing sector. In reality, the trends for business uses of spatial technologies are change and move towards high platform such as web based services, mobile spatial devices, advanced visualization, multi-tasking, but simpler functionality of user interfaces. In practical view, more sophisticated and complex technology applied and used in marketing and retailing areas and really advance rather than before. On the one hand, Longley, Goodchild and Rhind (2005) estimated the total revenues for spatial technologies and associated products and services has been reach at over \$15-20 billion. On the other hand, Miller (2007) indicates the value of GIS technology for the business and marketing industry has never been greater than it is today. Small and large businesses alike are finding GIS to be an indispensable analysis tool in site selection, market area analysis, sales territory management, customer profiling, sales and service-call routing, and merchandising strategy development.

Specifically, GIS plays important roles in marketing, including in retailing and customer management. According to Zhao (2000), the application of GIS in business has grown rapidly and major retailers, automobile dealerships, video rental companies, media organisations, and fast food corporations are just some of the many businesses around the world that have discovered the value of GIS. Research has shown that since more than 80 per cent of all information in an organisation can be geographically referenced and that why the business strategists are finding GIS to be an ideal tool for identifying and expanding markets, and increasing profits. For examples, by linking statistical methods with GIS this are be able to enhance GIS capabilities with the power of statistical analysis, and effectively use data from different sources for market analysis. GIS allow users to visualise spatial data in different form, including visualise the spatial distribution of data on maps prior to further statistical analysis. By doing this, the potential of GIS application in market analysis have been seen as a tool for reaching a desired solution especially for Executive Business, Marketer and Retailers.

References

- Abdul Manaf Bohari 2008, *Management information system*, Asia e-University Publication, Kuala Lumpur.
- Andronikov, S 2008, 'Geospatial analysis to enhance business decision making', *Proceeding of 2008 ESRI Business GIS Summit, ESRI Business GIS Summit*, Chicago, Illinois. pp. 92 – 98.
- Band, W 2010, *The Forrester Wave™: CRM Suites for Large Organizations*, Q2 2010 (June 16, 2010), Forrester Research, Inc., Cambridge.
- Bastedo, M 2008, 'Business value of GIS in a complex organization', *Proceeding of 2008 ESRI Business GIS Summit, ESRI Business GIS Summit*, Chicago, Illinois. pp. 122 – 32.
- Baum, M & Singh, I 2008, *Winning the customer service battle*. A.T. Kearney, Inc. Chicago.
- Beaumont, JR 1991, GIS and market analysis. In. Maguire, D.J., Goodchild, MF & Rhind DW (eds) (1991), *Geographical information systems: Principles and applications*, Pp. 139 -151. Longman Scientific & Technical, Harlow.
- Berman, B & Evans, JR 2007, *Retail management: a strategic approach*, Pearson Prentice Hall, New Jersey.
- Clancy, G 2008, 'Best practices for implementing a successful GIS project'. *Proceeding of 2008 ESRI Business GIS Summit, ESRI Business GIS Summit*, Chicago, Illinois. pp. 144 – 52.
- Dauids, M 1999, 'How to avoid the 10 biggest mistakes in CRM', *Journal of Business Strategy*, 20(6), pp. 122-11.
- Environmental System Research Institute, ESRI 2007, *GIS for retail business*. GIS Best Practice (Febuary 2007), ESRI, California.
- Environmental System Research Institute, ESRI 2002, *ArcView business analyst: the value added*, An ESRI White Paper June 2002, ESRI, California.
- Fabel, M, Sonnenschein, M, Sester, A & Golestan, L 2008, *Customer energy: The empowered consumer is revolutionizing customer relationships*. A.T. Kearney Inc. (Marketing and Communications), Chicago.
- Gulati, R & Garino, J 2000, 'Get the right mix of bricks and clicks', *Harvard Business Review*, 78, pp. 107-114.
- Hoffman, JL, Wildman, R, Rebollo, JM, Clarke, A, & Simoes, V 2008, *Retailing in a global marketplace to achieve high performance*, Accenture Inc., Chicago.
- Janiak, S 2009, *The age of transformation: A retail outlook for 2009 and beyond*, Deloitte Touche Tohmatsu, New York.
- Johnson, SP & Kunz, JE 2005, 'Private sector makes census bureau's TIGER roar'. *Geospatial solution* (May 2005), pp. 28-32.
- Kumar, V, Lemon, KN & Parasuraman, A 2006, 'Managing customers for value: An overview and research agenda', *Journal of Service Research*, 9, 87.
- Laudon, K & Laudon, P 2008, *Management information systems*. Prentice Hall, New Jersey.
- Longley, PA, Goodchild, MF, & Rhind, DW 2005, *Geographic information systems and science*, John Wiley and Sons, New York.
- Li, EY, McLeod JR, & Rogers, JC 2001, 'Marketing information systems in Fortune 500 companies: A longitudinal analysis of 1980, 1990, and 2000', *Information & Management*, 38, pp. 307-322.
- Lowe, JW 2005, 'Web GIS gets flashy', *Geospatial solution* (May 2005), pp. 33-36.

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- Markus, L & Tanis, C 2000, 'The Enterprise System Experience: From adoption to Success'. In Zmud, R. (Ed.), (2000). *Framing the domain of IT management*. Pinnaflex Education Resources, Inc., pp. 173-207.
- Miller, FL 2007, *GIS tutorial for Marketing*, ESRI Australia Pty Ltd, Adelaide.
- 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*. A.T. Kearney Inc., Chicago.
- O'Brian, JA & Marakas 2008, *Management information system*, John Wiley & Sons, Inc., New York.
- Peppard, J 2000, 'Customer relationship management (CRM) in financial services'. *European Management Journal*, 18, pp. 312 - 327.
- Pick, JB 2008, *Geo-Business: GIS in the digital organization*, John Wiley & Sons, Inc., Singapore.
- Thum, P 2008, 'Location matters: The intersection of data warehousing, business intelligence, predictive analytics, and geographic information systems', *Proceeding of 2008 ESRI Business GIS Summit, ESRI Business GIS Summit*, Chicago, Illinois. pp. 104 – 26.
- Toppen, F, & Wapenaar, H 1994, *GIS in business: Tools for marketing analysis*, EGIS Foundation, The Hague,
- Turban, E, Rainer, RK, & Potter, RE 2006, *Introduction to information technology*, John Wiley & Sons, Inc, New York.
- Zhao, L 2000, Integrating rank correlation techniques with GIS for marketing analysis. *Geo Computation 2000 Sydney*. School of Geography, The University of New South Wales.
- Zwillinger, SL 2008, 'From default to dynamite: 6 techniques to make your maps talk'. *Proceeding of 2008 ESRI Business GIS Summit, ESRI Business GIS Summit*, Chicago, Illinois. pp. 104 – 26.