RESEARCH OF THE MOBILE LBS IN CHINA AND ITS FUTURE STRATEGIES

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ABSTRACT

LBS (Location Based Services) have been used for many years and now are becoming more and more popular in China. With the development of mobile networking and popularizing of smart phones, an emerging market, which is the new LBS market, is formed and developing very rapidly. The author is a heavy LBS user and also very curious about LBS and wants to know what is the situation of LBS now in China and how it will go in future.

In this thesis, the basic concepts of LBS and research on what the situation is in China LBS market are introduced. With the comparison of Chinese and American LBS companies, some conclusions are drawn. Advice and suggestions are given by the author as well as the strategies in the future. The research method in this thesis is the qualitative research method. The literature view part shows the general situation of LBS. In-depth interviews with staffs in the case company, heavy or enthusiastic users of mobile LBS, experts in related fields, and different channels helped to collect data about different experiences. Interview contents were memoing and coding to analyze the useful information.

After researching the author finally found out what the situation of LBS market is in China and also summed up some suggestions and strategies for LBS companies and telecom operators.

Key words: China LBS, Location-Based Services, E-commerce

CONTENTS

1 INTRODUCTION

LBS (Location Based Services) are information services accessible with mobile devices through the mobile network and utilizing the ability to make use of the location of the mobile device (Virrantaus, 2001). It is convenient for users to send and get information and get into social activities at anywhere and anytime. Also, the LBS have a huge development in North America, Europe and East Asia among business users and a large number of personal users. It is becoming a very important profit model for mobile E-commerce and in the next stage of E-commerce and m-commerce development, LBS (location-based services) are expected to play an increasingly important role in helping to differentiate one service company from another (Fielt, et al., 2000; Van de Kar and Bouwman, 2001).

Search "Location-Based Services" with Google Scholar and you will find around 64,200 results and check the results that uploaded after 2009 there are 18,700 results. The numbers of the articles are increasing rapidly. With the interaction between Internet services, development of GPS technology and LBS, many experts and organizations predict that this area will have its very important rising period in recent years. And also the situation in global market shows the heat of it.

Thanks to the wireless and 3G technology and the unique feature of real time locating using the mobile devices, the LBS market is booming rapidly and many authors and research firms believe that the demand for LBS technology will skyrocket over the next five years.

From the year 2009, based on the traditional LBS, LBS companies re-defined and developed new applications of the LBS, which were centered the "check-in" services. Foursquare is one of the most famous and representative companies and it developed rapidly. From the year 2010, LBS companies that imitated Foursquare came out in China and also had a rapid development at the early phase, however, the situation became complicated after 2010 and also some new situations occurred. The motivation of the study is that the researcher is curious and interested in LBS in China. The researcher notices that, the LBS was introduced into China for several years and the LBS market has a huge development explosion in recent years but the increasing of it slows down little by little. And the activity of the users is not as high

as people's expectation. All in all, the researcher thinks that people may overrate the status and development of the LBS in China market and the author wants to research out his own result. Also, with these researches the author wants to conclude the strategies for its future development.

The situation is that, the research of theories about LBS is still developing and, at the same time, the main study is focus on technology but not too much on utilization in different markets. To develop an application which integrates the LBS function and the online-business is not only a technological innovation, but also providing massive flexibility to both the user and the business. Many applications are still stuck on the check-in services and virtual stimulation and many users are tired and boring with these services. If new profit models and services are not studied out and applied, many LBS companies would fade away from market.

2 RESEARCH APPROACH AND LITERATURE REVIEW

> *"There is nothing like looking, if you want to find something. You certainly usually find something, if you look, but it is not always quite the something you were after."*
>
> *(J.R.R. Tolkien, The Hobbit, 1937)*

2.1 Research Questions

There are two research questions:

What are the main problems that affect the Mobile LBS in China market and the future strategies of LBS companies?

What are the main reasons that affect the user viscosity of the LBS?

- From E-business side

- From technology view

2.2 Research Framework

The research involves two major areas, the Location-based service and the E-business.

LBS (Location-based Service) is an emerging service which can be integrated with diversity of platforms, and provides information concerning the current geo location, in nowadays, this technology is mostly been used on mobile devices, like smart phone and PDAs, where locating technology and wireless network connection is highly developed. (Yin, 2003) Compared to the time that LBS was first introduced to public and only few application and service implemented it, the LBS is getting increasingly popular these days, since the gathered location data are becoming more and more accurate while the supporting business is booming on the daily basis, like geo advertisement, social network tracking and updating, check-in service, finding the nearby business and etc. (Cartou, 2005)

E-business can be simply referred to handle the business transaction online, basically, it provides customers and companies an extra and easier way to finish the order, make inquire, browse ideal product and etc. Coming from the first version of E-commerce where transaction and advertisement are mainly operated inside the

local area network, for example, order tracking within the different departments of the company; to nowadays massive online stores and sales chains, like eBay and amazon, a huge and stabilized online market have been created, it brings ordinary business a fresh opportunity and make more and more new businesses appear. (Sadeh, 2002)

In the interest of finding the technologies been used to implementing LBS on E-business, a study of relationship between the two areas has to be made.

In the developer's point of view, as long as integrating two individual functions together to develop a new application, there must have some re-considerations on the technologies and methodologies behind the development. As to the topic of this paper, the LBS application and the E-business application, each of them have its own system and technology supporting, for example, for the LBS, in order to get the real timing data, the instant data retrieving should be the core technologies to ensure the functional running, while for E-business, data encryption and security must be the fundamental support since the application dealing with money transactions and billing orders.

Charles Steinfield 'research paper (Steinfield, C. (2006)) shows that researchers exploring m-commerce often point to its ubiquity and convenience as the primary sources of subscriber value (Anckar and D'Incau, 2002). The stationary nature of PC and Internet based e-commerce connections limit usages to those moments when a consumer is at home or at work in front of their PC. Potential buyers who are away from their PCs are unable to access information and services, or complete transactions. The anytime-anyplace potential of commerce through wireless devices can overcome this limitation, allowing information to be disseminated and transactions completed when the need or desire arises, even when buyers are in transit and away from their desks or home PC connections. In this conception of m-commerce, the location of buyers and sellers is irrelevant. Rather, a key motivation is to enable access to goods and service regardless of the location of either buyers or sellers. Indeed, providing access to distant sellers has often been heralded as an important benefit of e-commerce. The lower search costs and electronic access afforded by the network allow connections to non-local sellers as

easily as to local ones, giving rise to such clichés as the 'death of distance' (Bakos, 1997; Cairncross, 1997).

2.3 Research Method

2.3.1 Research Purpose

The research purposes of this thesis are explanatory and descriptive.

Descriptive research aims to describe the phenomena accurately, through narrative-type descriptions, classification, or measuring relationships. In other words, it tries to "portray an accurate profile of persons, events or situations" (Robson, 2002). Explanatory research aims to provide causal explanations of the phenomena. It emphasizes on studying a situation or a problem in order to explain the relationship between variables. The purpose of the research can be mixed among those categories, depending on research questions and research 5 objectives. (Douris, 2002; Blanche, Durrheim, & Painter, 2006; Saunders, Lewis, & Thornhill, 2009)

The research purposes of this thesis are explanatory and descriptive. The combination of these allows the author not only to describe a phenomenon but also to explain why it happens, and to explore factors that influence and interact with it (Douris, 2002). In this thesis the author will describe and talk about the situations of the adoption of the mobile LBS in China market and also explain why some situations occur and exist, furthermore, the author will explore the future strategies and suggestions for LBS companies and telecom operators in China market.

2.3.2 Qualitative Research Method

The purpose of this study is to research the situations of mobile LBS market in China and future strategies for services companies and telecom operators. The whole research process is complicated and fuses into one so the author needs a method that is suitable for understanding the whole process thoroughly, not only the factors influencing that. Therefore, this study utilizes the qualitative method,

which enables people to study individual/organizational behaviors, the phenomena within their environments and reveal rich and complex processes.

The reason to choose qualitative research methods is also that the research of this paper does not concern too much about numerical data, in order to find out what are the problems and future strategies in the development of LBS application integrate with E-business, few case studies need to be done, and the in-depth interviews and participant observations will be implementing in order to get the data for the analysis of the research.

Qualitative research is a method of inquiry employed in many different academic disciplines, traditionally in the social sciences, but also in market research and further contexts. Qualitative researchers aim to gather an in-depth understanding of human behaviors and the reasons that govern such behaviors. The qualitative method investigates the why and how of decision making, not just what, where, when. Hence, smaller but focused samples are more often needed than large samples (Dentin, N. K., & Lincoln, Y. S. (2005)).

The author chooses qualitative research method for this topic because the author has a complete and detailed described objective, which is to find out the problems of the LBS in China market and to research the strategies for LBS in the future. Also, the author is the data gathering instrument and his data is the form of words, pictures and objects.

2.3.3   Research Strategy, Case selection and Data collection

There are various research strategies such as surveys, histories, experiments, archival analyses, action researches, grounded theory, case studies etc. Based on the research questions and the research purposes, the research strategies of this thesis are case study and in-depth interview. Case study is an appropriate approach in order to gain a better understanding of the research area and in-depth interview is a tool to get more detailed information. Except the case study and the in-depth interview, the research strategy also involves observational, personal experience and perspectives, introspection, life stories, cultural texts and productions, historical, interactional, and visual texts.

Interviewees are: staffs in the case company, heavy or enthusiastic users of mobile LBS, experts in related fields, different channels. For different interviewees there are different forms open-ended questions to explore participants' experiences about the related fields of mobile LBS. Also, the researcher has his personal relationships to get contact with some experts.

From Robson's (2002, p. 178) definition, case study is "a strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence". There are several qualitative research methods and this research applied the case study combined with in-depth interview method, basically, the research chooses a company which was currently developing a third-party application by implementing LBS on area of E-business as the case for collecting the research data, the reason to select this case was that the on-going developing could provide more accurate data and more objective opinions to the research questions.

Also there will be a case about telecom operators because they are the one who provide networks to support the mobile LBS. Mostly, there are cases about third-party development organizations, which are LBS Provider Companies in China market.

A case of a LBS application in China market: Jiepang

A case of one China telecom operator: China Mobile

2.3.4   Data Analysis Methods

Coding and memoing are preliminary data analysis methods in this thesis.

After the in-depth interview, the records were replayed and analyzed, and the data were summarized and categorized into a metric, which was built upon on the variable between different developers/users/experts and what were their opinions about the problem of the LBS in China. Also, because there will be analysis of American market so the comparison analysis could be used in this study as well.

3   LITERATURE REVIEW

3.1   LBS in China

The researcher researches some previous work about those research questions. In the previous research work, it shows that the whole market is developing very fast (Shu Wenqiong, 2009) and there are over 30 million LBS users in China (iimeadia China, 2011). However, some LBS websites/applications are losing their users which means their user viscosity is declining. The main reasons here are first, they don't have any new functions other than the 'check-in'. The 'check-in 'service is the basic of the LBS, it is far away from enough if the ' check-in' was the only service. Second, some companies have foundation problems that the researches show there is not too many financing plans for LBS operating agencies last year. Third, users worry about their privacy. Fourth, Users don't have good user experiences. (Zhu Xudong, 2011). According to the survey, users that use LBS for more than 3 times occupy 12.7%, one to three times occupy 23.5%, users that occasionally use the service occupy 33/6%. The frequency of LBS using is actually very low and users are not very active as well. (iimeadia China, 2011)

3.2   Emerging LBS Market

The LBS market as the new emerging market appears really strong in trend of growth, according to the statistical analysis, the total LBS service revenue in the EU in 2008 was € 214 million (Berg, 2010) while forecast states that more than 100 million mobile subscribers in Europe will use location-based services by year 2012 (Berg, 2010), compare to the growth of the E-business, LBS service market seems to have more power in terms of revenue and customer.

3.3   Requirements ensures the LBS function

In order to develop a well performed LBS application, ones need to get familiar with the basic requirements which ensure the LBS to function in the proper way. Basically, the LBS system is consisting of three parts, the positioning system, the network system and the end-device application (Aphrodite & Jari, 2006). For the

positioning system, in nowadays technology, it contains satellite positioning, network-based positioning and local positioning, (Steinfield, 2006) among those positioning channels, satellite positioning usually provides the most accurate location data, however, it appears slow to connect and transfer data when comparing to the network-based positioning, which locating is fast but accuracy level is on the mercy of the network station, local positioning is fast and accurate, but working only within certain area, so not very applicable for public use. (Aphrodite & Jari, 2006). As to the network system, it generally means the wireless network connection, for the mobile device user, the network are Wi-Fi connection, 3G connection as well as 4G data transfer, all of them are stable to deliver the locating data, but have drawbacks on the accessibility (Cartou, 2005) . In terms of the user devices, as the marketing booming recently, smart-phone are getting increasingly popular, like iPhone, Android phone which are integrate with the locating function are the best suited device for locating, other device like PDA and Handheld which usually been used in the business area are also emerged as the locating device nowadays. (Louise & Anind, 2003)

3.4　Privacy issue

According to the Can Spam Act published in United States in year of 2005, it is becoming illegal to send any message or data to any user without offering option or warning, so this turns to be a big challenge for LBS in terms of the privacy issue. (Louise & Anind, 2003) (Cartou, 2005) One of the biggest concerns about the LBS is that if user carry on a locating wireless device, the movement and the tracks of the user can be potentially leaked by some illegal party, (Sadeh, 2002) this kind of information abuse can cause problem range from small issues like let some people know where you are, to big issues for example user profile been disposed since most of the mobile phone contains valuable personal information. (Steinfield, 2006)

3.5　Technical issue

Generally, in order to retrieve better geo-locating data, few existing technologies should be implementing in the LBS application to ensure that the application will

get the real-timing, protected and valuable data. (Steinfield, 2006) Basically, the common used technologies are push notification, data encryption, location management system, GPS alert. (Sadeh, 2002).

4 GENERAL SITUATION OF MOBILE LBS

4.1 Definitions and classification of LBS and the "Check-in" service

4.1.1 Definitions of LBS and the "Check-in" service

Firstly, the LBS refer to the Location Based Service. It is an information or entertainment service, accessible with mobile devices through the mobile network and utilizing the ability to make use of the geographical position of the mobile device (Virrantaus, 2001). It is also a wireless-IP service that uses geographic information to serve a mobile user and any application service that exploits the position of a mobile terminal (OGC, 2005).

These definitions describe LBS as an intersection of three technologies (see Figure 1). It is created from New Information and Communication Technologies (NICTS) such as the mobile telecommunication system and hand held devices, from Internet and from Geographic Information Systems (GIS) with spatial databases (Shiode et al. 2004).
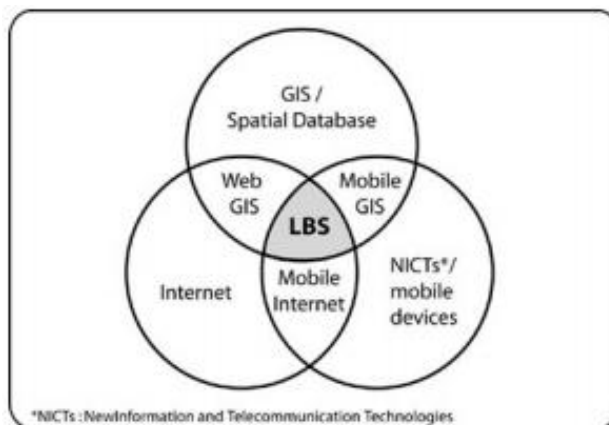
Figure 1. LBS as an intersection of technologies (Brimicombe 2002).

Secondly, the "Check-in" service is that you tell a LBS website where you are. You can check in from parks, bars, museums, restaurants, libraries...really anywhere. When you check in, you are sharing where you are and save the data on the LBS website then your friends will know where they can find you. "Check-in" services

often offer users virtual stimulate (virtual badge, virtual title), local services (information and coupons in reality), SNS, online games and other scene services.

From the author's point of view, there are three characteristics of LBS in the modern time and also future.

Firstly, it should include the "check-in" services that are provided by LBS companies. The services offer users data about their locations through GPS and other pointing technics. In this way users can make the integration between the applications on their mobile phones and their own location information. On the other hand, the LBS companies provide virtual stimulation and titles for users to make them check-in on their own. In this way, close connection between the applications and reality can be made to show the binding of user behaviors and geographic information.

Secondly, LBS companies offer users the integration of the Internet and real life information based on the users' check-in. In this case, the user viscosity would be increased and also users can get applicable information based on their location information. The local business and retailers can be also connected with users more tightly.

Thirdly, common users always use smart phones as the platforms to get the location information and services, which are always provided by LBS companies based on the users' check-in.

4.1.2 Classification of LBS and the "Check-in" service

Based on the difference of the target groups, LBS business could be classified into two types. One is individual application business and the other is industry application business.

Firstly, the individual application business is generally about positioning the users' location, checking the location information, checking the daily life, transportation, public facilities information related to location and having entertainment or game based on location services.

Location information: provide the users' their location information and also different services they need nearby. For example, banks, restaurants, hospitals and gas stations.

Transformation information: provide users the lasts information about the transformation situation based on users' location. Also it helps to find the most rational route that the users can follow.

Advertisement: there will be different advertisements for users based on their location information.

Entertainment: Mostly it is about SNS (Social Networking Services) and games. Users can make friends online and communicate with them based on their location and there are games or coupons offered to them based on their location.

The industry applications are generally about more professional applications for specialties. For example, rescue nursing, assets tracking, logistics etc. In this field there are few individual users so it is not the main research point in the author's study.

4.1.3   Key elements of the development of LBS & Check-in

From the analysis and the study of the users' experience and in-depth interview, there are some key elements can be summarized out.

The first element is that the LBS companies need to have the qualifications of using legal Internet map and related resources. This is the foundation of providing LBS to the users. Also integrating and updating geography information and enriching the POI (Point of Interest) information will affect the accuracy of Check-in and using services. Therefore, these are competitive scope of different LBS companies.

The second element is the user viscosity and the number of the users, especially active users. Initiatively check-in from users is one of the most important signs of using LBS. Briefly speaking, the more initiatively and actively check-in from the users, the more popular the application is. The amount of the check-in per day is kind of criterion to measure the user viscosity and activeness and also the advantage

to develop the derivative services. The major way to improve the user viscosity now is offering virtual stimulation and holding brand marketing events

The third element is about the brand promotion. If one LBS company can promote their application and extending business very well, it's much easier to success. Here comes the question that how to promote the mobile LBS applications? At present companies always promote through SNS websites and some traditional media like television. Also LBS companies cooperate with other big companies or brands and local business to develop the LBS.

The fourth element is the user experience and innovation of the applications. Generally, the LBS at the moment are based on mobile/ smart phones. Making remarkable user interface, creating outstanding user experience, optimizing functionalities and innovation of local services can help to develop the application and promote it a lot. Also, in these ways, user viscosity can be increased and more active users would be coming out.

4.2   Related technologies

The check-in services are based on LBS, through mobile internet (GSM/3G), using positioning techniques to get terminal users' location information, integrated with GIS (Geographic Information System) to confirm the users' location information in reality and providing services through mobile phones. The technologies that needed to fulfill these are positioning technologies and geographical location information collection technologies. There are some positioning techniques like GPS, WiFi, Cell ID and AGPS etc. The positioning techniques are in network operators' hands. The figure below shows the accuracy of different positioning techniques.

Accuracy of positioning	Indoor positioning techniques	Outdoor positioning techniques
10 meters	-	GPS
10-50 meters	AGPS	
100 meters	WiFi	-
500 meters	Cell ID	

Figure 2. The classification of positioning techniques (iResearch Inc. 2010).

GPS: GPS is Global Positioning System and it is the most widely used positioning system all over the world. Users can get accurate location information with GPS very easily. However, there are also some problems, for instance, in areas that full of tall buildings, GPS may not positioning that accurately and the first time of positioning is very long.

Cell ID: This is a technique that based on the location of Base Station (BS). It relies on the number and the service scope of base station built by network operators.

WiFi: Based on WiFi signal and positioning according to check the database of WiFi addresses, in these way users can find the addresses in reality.

AGPS: It is Assisted Global Positioning System and positioning with GPS and base stations. It can transfer the data that got from GPS to networking and the server can compute out the result to check in the database about the users' location information. After these operations users mobile phones would get the feedback from severs. AGPS is a very good technique because it uses mobile networking to compute and uses GPS to get data.

In the future, using smart phones is the tendency of all the world and AGPS will be used more and more widely. Also there are some excised techniques that can help to improve the accuracy of positioning like NFC (Near Field Communication), NFC is developed from radio-frequency identification (RFID) standards and it is more like Bluetooth and it can help to improve the accuracy of positioning effectively.

One of the most important things in geographical location information collection is the POI (Points of interest). POI or Geographical Information Systems (GIS) databases provide useful geographical knowledge about important landmarks or points of interest (Steven C. H. Hoi, Jiebo Luo, Susanne Boll, Dong Xu, Rong Jin, Irwin King, 2011). POI is widely used with GIS and GPS and every POI includes information about name, classification and longitude and latitude. It is very important for LBS companies to have enough numbers of accurate POI to fulfill the expectation of users and provide qualified Location Based Services.
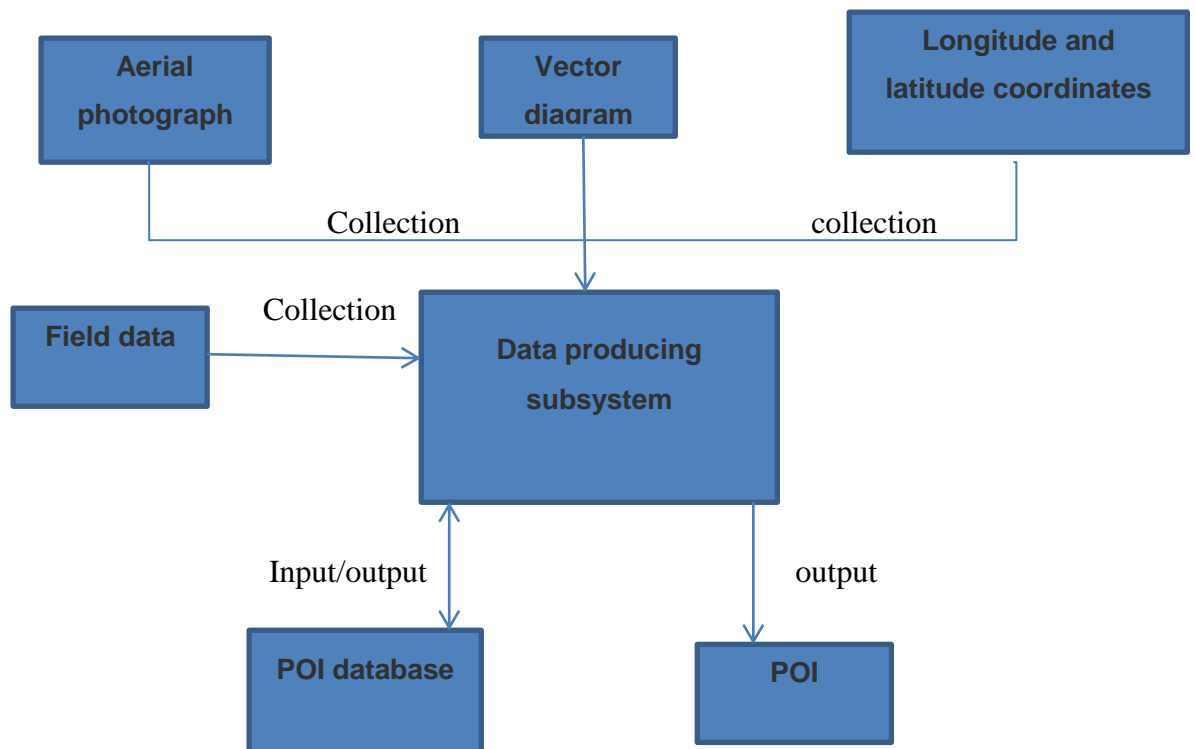

Figure 3. The processes of POI clloection (iResearch Inc. 2009).

5   LBS RESEARCH IN USA

I would like to first introduce and research how LBS developed in USA because the USA market is always the No.1 all over the world and there are many representative cases and experience, and then many things can be summed up to use in other market in the world. From the in-depth interviews of the experts in related fields, there are three phases in the development of LBS in America.

5.1   LBS development history in USA

First phase: LBS centered on SNS (2000-2009)

In 2000, a very small company was founded in New York by two university students. Maybe nobody paid attention to it but actually it started a new era of one kind of services. The company is called Dodgeball. They made location based social networking software for mobile devices. Basically, the Dodgeball was based on SMS; users set up the software and then can send their location by SMS to the services and at last get interesting and friends' information nearby. The Dodgeball was firstly famous in New York and after that many big cities in US.

Even though the company was acquired by Google in 2005 and discontinued in 2009, replaced by Google Latitude, but it really started a new era and created a new model of LBS that is centered on SNS. In 2009, one of the founders of Dodgeball, Dennis Crowley started a company named Foursquare and it is one of the representatives of the second phase.

Second phase: LBS centered on Check-in (2009-2010)

There are many obvious disadvantages in the first phase as we can see, and the reasons are more about technologies. Because of the functionality of mobile phones and the mobile network was still in 2G or 2.5G, the LBS was provided by the users' request through SMS. In this way, it is very limited to offer services and stimulate users.

In 2009, Fouraquare was founded and it is centered on the check-in services. It redefined concept of LBS. It realized the interaction between the location in reality,

user behavior and SNS. From the view of E-business, the local services based on location enhance the interaction between the local business and individual users. The author would research more about Foursquare in this study later.

Third phase: LBS in the future (2010-)

The LBS is now developed into a phase that LBS companies encourage users to share what happened in reality or what they are focus on at the moment. For example like GetGlue and Miso, they offer services that users can use SNS while they are watching movies, TV, or listening to the music. In this case, the location information is somehow not that important as the real-time user behavior.

5.2   Current situation and future tendency of LBS in USA

The LBS market develops very fast in America and the competition is getting more and more intense. Except companies like Foursquare, SNS websites, internet companies, local information providers, mobile phone manufactures and telecom operators are all involved in the market.

The vertical Check-in companies now are leading the market. About the concept of vertical, Paul A. Argenti explained: the vertical is defined that in a distribution channel, manufactures, wholesalers, retailers have been regarded as a single system (Paul A. Argenti, 1994). If one E-commerce site has conformities different manufacturers, wholesalers, retailers business, and directly faces customers, this single system as a trading paltform is called a vertical website. The vertical Check-in websites always have high brand awareness and big number of users. In America there are Foursquare, Loopt, Gowalla etc.

Almost all SNS websites are now cooperating with LBS companies. Also they now have their own functionality based on location. For instance, Facebook, Twitter, Myspace, Digg etc. They have quite lot users so it is easier to popularize their services. Internet enterprise like Google and Microsoft are following and they also have same kinds of services. Local information providers are doing integration online and offline resources. Telecom operators are cooperating with different companies to find new profit models.

5.3   Analysis of representative LBS in USA

5.3.1   Advertisement services

Based on the integration between users' real locations and users' check-in or other behaviors, advertisements are showed to users.

The first type is brand advertisements on webpages. They are trying to get users' attentions by introducing related events that about the brand while users are visiting LBS company webpages.

Figure 4. One advertisement on the webpage of Foursquare

The second type is badge advertisements. After Check-in, users can get different badges from different brands and companies. Users can meet individual requirements in this case.

Figure 4.Badges of interface of Foursquare on iPhone

The advertisements can help LBS companies get more users and let them get into the events that held by companies, it also helps to build customer loyalty, find potential customers and promote brand influences.

5.3.2   Services for clients

Generally, LBS companies have two groups of clients, one is individual users and the other one is organizations and enterprises. To provide services to other enterprises, LBS companies always integrate users' check-in and local information. They cooperate with local business to promote their brands and products. LBS companies also analyze users' check-in and other behaviors and offer the analysis result to clients. In the author's opinion, in the future, more and more local services providers and local business will play important roles. The reasons are that many local services providers and local businesses have big numbers of users and LBS advertisements can help them promote to the market in a better way since the cost is lower than traditional way and also LBS would be known by more and more people.

6   LBS RESEARCH IN USA

6.1   Factors that effect LBS in China

During the in-depth interviews with the experts in E-business and LBS, the author summarized out the overview of the situation of LBS at the moment in China.

6.1.1   Political factors

In China, the program named Digital China is now held by government, and it is for applying Information technology and constructing the digital map system that related to mapping and geography information systems. Government also encourages different telecom operators to construct and develop 3G and 4G networking.

6.1.2   Economic factors

From the figures of National Bureau of Statistics of China, in 2009, the service industry grew 8.9% and it's still growing rapidly. In this case, Chinese people's consumption level is getting higher and requirements and demand are also increasing. LBS are a new method of services that centered on people's daily life and now it has a very good environment to develop.

At the same time, the GIS (Geography Information Systems) industry is developing fast in China market. Form the figures of State Bureau of Surveying and Mapping, it shows that during 2006 to 2010, the GIS industry grew 25% every year, and the total value was around 100 billion RMB (12 billion euro) up to 2010. Until 2015 the total value might over 24 billion euro so it is a real big market.

Also, the emerging LBS market in America and the success of Foursquare stimulate Chinese LBS companies to develop faster. A lot of VC (venture capital) are watching China market and pay attention to it. They are helping many organizations to lower their capital pressure.

6.1.3 Sociocultural factors

From the repot of China Internet Network Information Center (CNNIC), until the year of 2010, the number of mobile internet users in China is around 0.277 billion and the number of 3G users is more than 40 million. In this case, with the completing of the networking and popularizing of the smart phones, more and more people will use mobile network and LBS. Also, more and more people get accustomed to use mobile internet and related services. Using mobile networking is becoming a routine in people's daily lives. Many big internet enterprises are now get into LBS market and their users will form the habit to use these kinds of services in the near future.

6.1.4 Technological Factors

From an interview with the staff from one telecom operator, there will be more and more investment from telecom operators in 3G constructing and the 3G network covers almost all the major cities and towns in China. At present, China is becoming one of the most important markets of smart phones and applications. More and more people will choose smartphones and try different applications on them. So the environment of using mobile networking and related services are becoming better.

6.2 LBS development history in China

After the interview I summarized out the three phases of the LBS development history in China.

First phase: LBS provided by telecom operators (2001-2009)

Compared with the first phase of LBS history in America, the early time LBS were provided by telecom operators. In 2001, China Mobile started one service about location. In these 9 years, many people in the related field noticed the concept of LBS and also the industry chain was developing.

Second phase: Check-in & SNS & other services (2009-2010)

After the success of Foursquare, many LBS companies were coming out with the same style. Some of them died and some are alive. For example, Jiepang is one successful company. This kind of LBS companies provides virtual badges, virtual titles etc. to make the LBS more interesting. In this phase, users were very curious about virtual stimulation and they were easy to be satisfied to get the titles.

Third phase: Future LBS (2010-)

After many Foursquare's similar came out, many problems occurred. LBS companies in China were lack of innovation and I find it out that even though users of different levels have the same feeling that using LBS in China is getting boring. The reason are that, users felt curious at first when they started to use the services, however, check-in every day is becoming monotonous and few local business and services can be found. So, the situation at now is that users are rational and the user viscosity is getting down, more and more innovation in developing applications and business models is needed. LBS companies need to find more local business to cooperate with and more services to offer to users.

In conclusion, from the comparison of LBS development in America and China, we can easily see that, LBS have a longer history in relative terms and the services are starting and developing by individual companies. In China, the services are starting by telecom operators and the related services developed slowly. After the emerging of Foursquare China LBS started to accept and looking for new business model more locally.
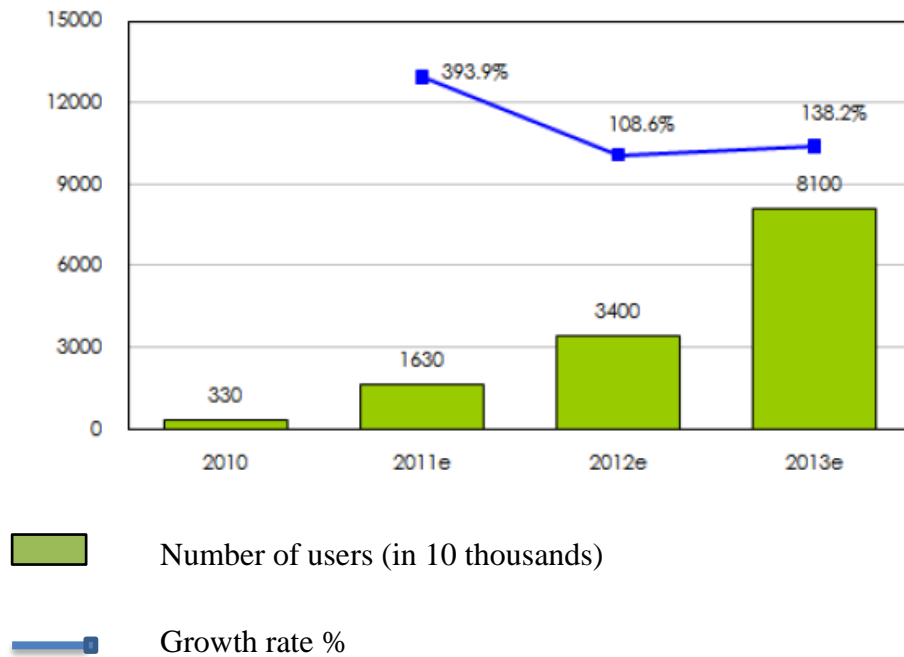
6.2.1   Number of LBS users

Number of users (in 10 thousands)

Growth rate %

Figure 5.LBS users 2010-2013 Users (iResearch inc. 2010)

The figure is offered by an expert in one business consulting company named
iResearch. From the figure we can see that there are about 16 million LBS users
now in China. However, the growth rate is reduced and it tells that the user viscosity
is not stable in recent years.

6.3   Different parties involved in the market

The LBS include many elements. For example, map information providers, LBS
companies, third party developers, Local business, SNS, users etc.

Map services providers include POI collection companies and map services
providers. They are companies that provide map information and other data to the
LBS companies. LBS companies are in the center of the whole industry because
they provide services to users by integrating GIS, POI information and other related
data. The third party developers are people who develop applications that centered
on LBS. In this case LBS companies can get more users and also make profit. Local
businesses are local business, companies and other services like local media, local
restaurants, amusement companies and commercial performance companies that

intend to cooperate with LBS companies. Local business can provide coupons and discounts to LBS users and also promote their business through LBS. Some public institution like governments, hospitals and banks can also serve people through LBS. Users may use LBS and synchronize the data to other SNS to share information with their friends. In this way SNS can advance the user experience and get more potential users.

All in all, all the parties that involved in the whole industry are developing and looking for new and innovated way to success. They are now integrate different resources and improve services to enlarge the scale of users and increase user viscosity. On the other hand, users are study and forming habit of using LBS and they will become more and more hypercritical.

6.4   Case of one Chinese LBS company: Jiepang

Jiepang is one Chinese LBS company that founded in 2010, now it has over 1.3 million users (Adaline Lau, 2011). It is centered on LBS that on different platforms like iPhone, Android, WP7, Symbian etc. They are partnered with more than 300 brands, such as HTC, Starbucks, McDonald's, and Nike. Even luxury companies such as Louis Vuitton, BVLGARI and Burberry have used its platform for check-in campaigns.

Figure 6.The user interface of Jiepang application on mobile phones

Users can check-in with Jiepang application on mobile phones in different places like restaurants, cafés or cinemas and in this way users can share information with friends. They might get badges in different check-in places and badges may change real coupons to get discounts. One example in Macau is mobile users who check in to the casino Galaxy Macau and share their location on Sina Weibo or other social networking sites will win a Galaxy Macau branded badge. They can bring the badge to the registration counter to redeem a HK $50 voucher and get a chance to win free accommodation at the resort. Also they may get Starbucks' coupon when they check-in their and to change one cup of coffee. Users can get credits while they are using services on Jieang and there is rank of credits on the application. Users can add or check tips about different places or information nearby with Jiepang as well.

Figure 7.Badges on Jiepang

From the case of Jiepang, there are some points that can be drawing out: firstly, the company is very reliable so many other companies cooperate with it. Secondly, Jiepang is focus on big cities market because not many businesses in small and medium places have the sense of E-commerce. Thirdly, the core service is check-in, centered on check-in other services are providing.

After the interview with different users of Jiepang, some conclusion can be made out. The first one is a heavy user of Jiepang, he is a young white collar worker in Shanghai. He used Jiepang every day as his routine. Every time he went to restaurants, cinema or some art shows he will check-in on Jiepang through his mobile phone. Because he is in a big international city, which is the most valuable market of Jiepang, he can get quite a lot coupons and information from different

local business and he is very happy for that. The second user is still in Shanghai but she is a student and she doesn't have too much time to visit other places in down town because her university is in suburban district and it is for away from then down town. She used Jiepang sometimes but she found it kind of boring because she went to the same places every day like classroom, refectory and dormitory. Also there is no other function that can attract her other than check-in. The third user is in a small city and he is working for government. He likes using Jiepang but there is not too much local business that he can find on it and he is very sad about that. He uses Jiepang and synchronizes to his SNS every day so that his friends know every place that he visits.

It is not hard to see the situation and find out the problems that after the interviews. In my opinion, with the development of the mobile internet, more and more people are getting used to use different services based on that. Many people are willing and eager to share where they are and what they are doing on SNS. They are forming the habit that look for coupons and information through LBS. In the field of LBS, many of them face same problems. First, the services are monotonous. Many users are bored with check-in, getting badges and titles and they want new services. Second, users in small and medium cities they need more POI (Points Of Interest) and services from local businesses, in that case they may use LBS more . All in all, innovation and development are needed in LBS.

6.5 Case of One Chinese telecom operator: China Mobile

China Mobile is the largest telecommunication company in China. As of 2010 China Mobile controls the vast majority of its domestic mobile services market with a 70% market share (morningstar.com, 10-22-10). In this case, it is very important that it provides good networking to users because it is the needful environment to have LBS.

According to the annual report 2010 of China Mobile, the 3G users reached 20.70 million, and, in 2010, the 3G business of the Group developed steadily in customers, network, terminals and applications. Meanwhile, the Group continued to assist its parent company in the development of its post-3G technology, TD-LTE and had

achieved breakthroughs in technology research and development, network testing, industry advancement and international development.

In October 2010, TD-LTE Advanced was chosen by the ITU（International Telecommunication Union）to be one of the candidates for the 4G standard. TD-LTE's convergence with LTE FDD became an industry consensus, and had ascertained compatible conditions for convergence in chipset, platform and scale. TD-LTE gained overall recognition and support from governments, industry chains, international operators and international standards organizations and had notably expedited the progress of commercialization (Annual Report 2010 of China Mobile Limited).

The Group continued to operate its TD-SCDMA based 3G network by leasing wireless network capacity from its parent company. The Group continued to step up in technological innovation and network optimization, which had effectively resolved some of the key technical issues, and provided a high quality network. As can be seen in the report, the company was supported by the government and it was constructing its 3G and 4G networking in a very high speed. So it won't be a worry about the networking. However, the leading possession in LBS was changed from telecom operators to LBS companies, so China Mobile should face the situation and make transformation. The advices are that first, China Telecom should hold the big consumer. China Telecom is a big company and has advantages in many fields other than small private LBS companies so it is easier for them to make appropriate services for big consumers and clients. Second, China Telecom can find some individual departments or purchases existed company to develop LBS, since they have advantages in technology and marketing, they may get market share that lost previously.

6.6   Analysis from Cases: Foursquare, Jiepang and China Mobile

After the cross-analysis between America and China market, Foursquare and Jiepang, also China Mobile, there are some conclusion can be made out.

Firstly, the increasing of users and the habit forming need a long time, LBS companies couldn't expect users increasing in a very high speed and even though there are many users, it takes time to form habit to use LBS.

Secondly, even though telecom operators like China Mobile is constructing its mobile networking, China is a developing country and the basis and conditions need to be improved, for example, the mobile networking services are not very good, the cost is not low enough and many people don't have smart phones yet.

Thirdly, innovation is required urgently. As the author researched in the study, the LBS at the moment is very monotonous, there are not many services that can meet users' developing requirements. To satisfy users, LBS companies should research and study more about the local market and try to make innovation business model to serve users.

Fourthly, the profit model is actually not clear to LBS companies in China. How to earn money to balance the payment and income? The author thinks this is one of the most important problems that most LBS companies have. Almost all LBS companies rely on investments from VC. The advertisements and incoming from local businesses are not enough and far away from making profits.

Fifthly, the privacy issues are not taken into consideration. As the author researched in the literature part, the small problem is that other people may know where you are, the big problem might be that the user may lose valuable personal information. From the technical point of view, LBS companies should make good protections for users' personal data and also help users to form the right usage habit. From another point of view, LBS companies should notify and advise the Legislative Branch to make related laws.

7   CONCLUSION

The main problems that affect user viscosity in LBS are first, more POI and local businesses are needed so users can find more information while using LBS. In one word, it makes the Internet world connect to the reality; Second, more services should be created and innovation is always the core concept. As time moves forward, users will become mature and experienced; and the competition will be fiercer.

The LBS market in China is huge and it has a bright future. This is true but it's also hard to survive in the competition. The mobile networking services in China are now becoming better and LBS companies should make innovative business models and services to win the game. There will be some time for market growth and LBS companies are becoming more important than telecom operators. All the parties that are involved in the market construct the whole industry and they are all developing. However, the profit model is still not clear. They need to open their eyes and be careful to cooperate with others. For LBS companies, they should make the positioning more accurate and collect more POI. User interfaces of applications should be improved as well to attract more users. Also it is important to find local businesses to cooperate with, in this way more services can be provided and users will be more loyal. For telecom operators, they should face the situation that the leaders in LBS are not themselves but other vertical Check-in companies. They can play their strengths to hold big consumers and look for their differences of competitive advantages. Also, they might enter the emerging market and fight with LBS companies in existing fields.

The limitation of the research is that LBS related services and LBS companies are booming in recent years, there is a huge number of technologies and services existing, and it is impossible to cover all the available services and companies within the limited time. For this paper, the research was only concentrated on the core services that have been provided, which are highly related to the area of LBS implementation in E-business like brand promotion and local business services. Data accurate and privacy are not taken too much into consideration in the research.

Secondly, the theory generated by this research is only based on the author's interview target groups; other available resources are hard for the author to find. For the further research, more company cases and interviews will be analyzed and hopefully the research will come up with more accurate data.

For the reliability of the research, because of the time constraint and shortage of resources, the data is only collected from the author's interview targets, their ideas and experiences about the LBS. The research question might lack in terms of accuracies and objectiveness. However, the whole research process and research outcome is valid. The reason is that the data is collected from real situation companies and people who are related to LBS and the companies are currently developing the LBS application integrated with E-business.

LBS are becoming more and more popular and it is changing and developing all the time, so further study and research are obviously needed. Because of the limitation of the author's research, more accurate data could be collected and more related people could be interviewed to help to predict the development tendency and make more logical estimation. The industry chain is very complicated and the author couldn't describe it all. Further research may focus on the industry chain and the analysis of it. In this way, many more problems can be found and more suggestions and strategies can be worked out.

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