

A

Seminar report

On

Location Based Service

Submitted in partial fulfillment of the requirement for the award of degree
Of Mechanical

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Preface

I have made this report file on the topic **Location Based Service**, I have tried my best to elucidate all the relevant detail to the topic to be included in the report. While in the beginning I have tried to give a general view about this topic.

My efforts and wholehearted co-corporation of each and everyone has ended on a successful note. I express my sincere gratitude towho assisting me throughout the preparation of this topic. I thank him for providing me the reinforcement, confidence and most importantly the track for the topic whenever I needed it.

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Acknowledgement

I would like to thank respected Mr..... and Mr.for giving me such a wonderful opportunity to expand my knowledge for my own branch and giving me guidelines to present a seminar report. It helped me a lot to realize of what we study for.

Secondly, I would like to thank my parents who patiently helped me as i went through my work and helped to modify and eliminate some of the irrelevant or un-necessary stuffs.

Thirdly, I would like to thank my friends who helped me to make my work more organized and well-stacked till the end.

Next, I would thank Microsoft for developing such a wonderful tool like MS Word. It helped my work a lot to remain error-free.

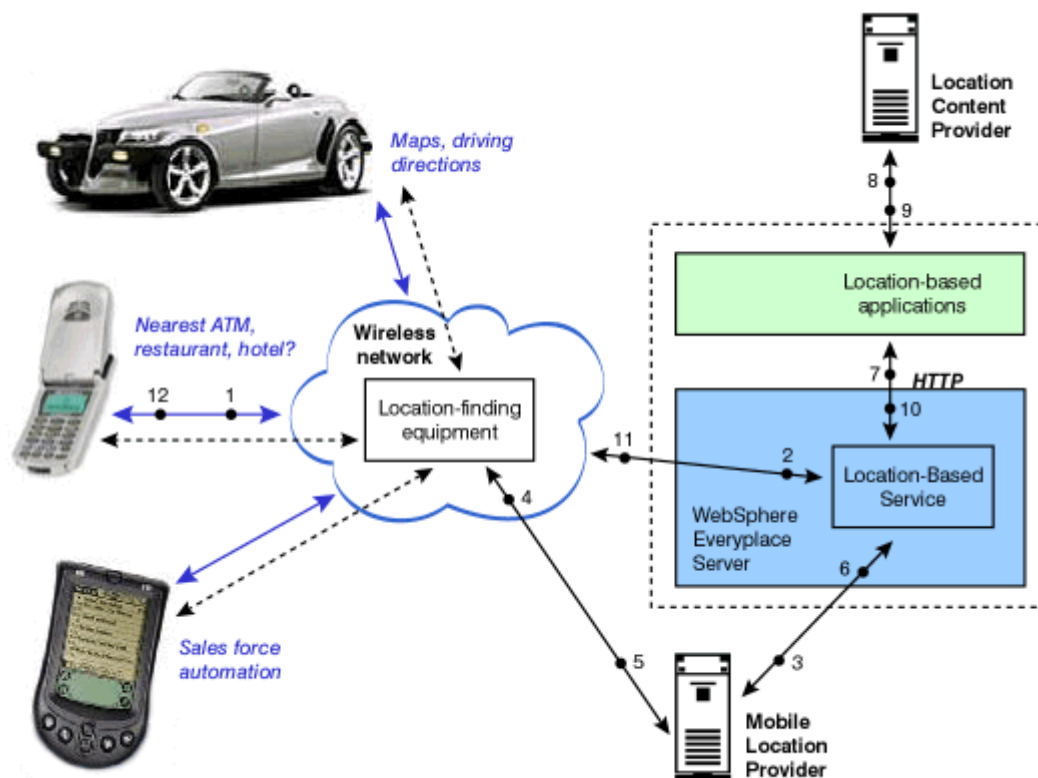
Last but clearly not the least, I would thank The Almighty for giving me strength to complete my report on time.

Table of Contents

Introduction.....	3
Positioning Technology.....	5
LBS Value Chain.....	5
Business Models.....	7
Players.....	7
LBS Usage in Android & iPhone.....	9
Forecasts for the LBS Industry.....	11
Porter's Five Forces Analysis.....	15
Sources of uncertainty.....	16
LBS Strategy Framework.....	17
Conclusion.....	18
References.....	19

Introduction

Location based service is a technology which utilizes the ability of a mobile device to track its own location to provide information and entertainment services. They give people the ability to share where they are with friends and with businesses around them. Some of the most popular examples of location based services are finding out the nearest business or service such as a restaurant or theatre and driving directions and traffic updates. Other examples include personalised weather forecasts based on one's location, or the ability to play mobile games against people in one's locality. A typical technology configuration of location based services would look like



An LBS requires five basic components

1. Service provider's software application
2. Mobile network to transmit data and requests for service
3. Content provider to supply the subscriber with location specific information
4. A positioning component, most likely a GPS
5. Subscriber's mobile device

Location based services can be categorised into three groups

1. Emergency services – A cellular operator can track the location of a mobile user. Such information becomes very important in emergency situations. Countries such as US and Japan have enacted laws which makes it compulsory for all carriers to be able to provide the information if it is available. No such law has been enacted in India.
2. Consumer services :
 - a. Navigation – Using navigation software, a user will be able to get the most optimal route from one place to another. Modern navigation systems take into account traffic congestions and provide routes which take the least time.
 - b. Location based advertising – This is push advertising in which a user is alerted of discounts or coupons from businesses in the vicinity of the user.
 - c. Family and friend finder – It allows users to keep track of the location of other users. It requires consent of the subscriber being tracked.
 - d. Location based reminders – A user updates a to-do list and each item in the to-do list is tagged to a specific location. When the user nears a location, he is alerted of the to-do items tagged to that location. For example, a user may have tagged a market to a to-do item called “Buy vegetables”. Whenever the user is in the vicinity of the market, he will be alerted that he needs to buy vegetables.
 - e. Location based search – It allows users to search for products and services within a specific geographic area. Examples include searching for speciality restaurants in the city or movies playing in the city theatres.
3. Enterprise Services – Location based services can help firms in fleet management, asset tracking, route and delivery optimization and mobile workforce management.

Location based services can also categorised into pull and push services based on whether the information is delivered on user interaction or not.

Pull services are services which deliver information to the user based on user requests. Pull services can be further divided into functional services, like ordering for a taxi or informational service like searching for the nearest fish market.

Push services deliver information which either has not been requested by the user. Such push services are activated when a particular event occurs like a user enters a particular area. An example of a push service is discount coupons offered when a user enters a shopping mall.

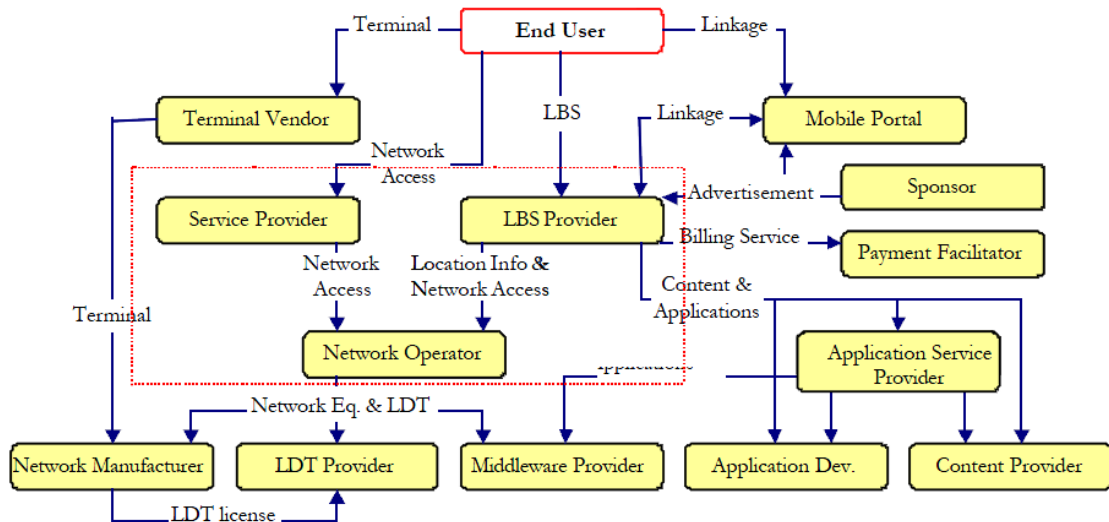
Positioning technology

Over the years, various technologies have evolved to locate a mobile subscriber. We take a look at some of these technologies

1. Cell of origin – This is the most primitive method of locating a user. In this method, the base station to which a cellphone is connected is assumed to be the location of the user. It has the least accuracy among all the known methods.
2. Time of arrival – This is a location determination technology which uses the time it takes for the signal to reach the base station from the cellphone. It is a refinement of the cell of origin method and provides a relatively better accuracy.
3. Angle of arrival – The angle at which signal from a cellphone arrives at two base stations is calculated and then triangulation is used to pinpoint the location of the user.
4. Enhanced observed time difference (E-OTD) – Handsets having this capability measure the time difference between neighbouring synchronized base stations. Accuracy of 100 to 300 metres can be achieved using this method.
5. Standalone Global Positioning System (GPS) – The United States Department of Defence started the system of 24 geosynchronous satellites. A satellite sends a signal to a GPS receiver to determine its location. A minimum of 3 satellites is needed to accurately find out the position of the user.
6. Assisted GPS (A-GPS) – This system gives an accuracy of 5 to 10 metres. It fixes position within seconds, has better coverage and can be used indoors. The only disadvantage of this system is that the handsets are relatively expensive.

LBS Value Chain

Location based services provides opportunities for a large number of players. Apart from the mobile operators, application developers, location determination technology (LDT) and graphical presentation are some who stand to benefit from the proliferation of location based services. The value chain of LBS is best described by the diagram below



Here the roles played by the various entities are denoted by the rectangles, the revenue streams are denoted by the arrows and the text on the arrows denotes the way the revenue is generated. The red dotted line denotes the current sphere of influence of a mobile operator. Today a mobile operator plays the role of network provider, service provider and LBS provider. But this may change in the years to come.

The end user may get location based services from a LBS Provider. The LBS Provider gets location information and network access from a network operator. It gets content and applications from three sources – either directly from an application, from a content provider or from an application service provider. The application service provider in turn sources from application developers and content providers. A sponsor pays the LBS provider for advertisements. The LBS provides pays to a payment facilitator for enabling payments. On the other hand, the end user pays for accessing the network through the service provider which in turn pays for using the network of a network operator. A network provider purchases networking equipment from a network manufacturer and gets the location determination technology from a LDT Provider. Sometimes an end user, instead of a cellphone, may use a terminal from a terminal vendor who sources it from a network manufacturer. In this case, the network manufacturer buys LDT license from a LDT Provider and uses the technology to provide location based services to the end user.

Business Models

1. Location aware offers – In this scheme, the advertiser pays the LBS Provider for pushing discount coupons and offers whenever the user enters a particular area. It is very useful for shopping malls and highway restaurants.
2. Claim and sponsor – It is a hybrid of the direct advertising and freemium models. In this scheme, businesses pay the LBS Provider for claiming a particular location. In turn, the LBS Provider helps the businesses with additional promotion opportunities.
3. Sponsored game elements – Here some of the gameplay aspects of the LBS Provider are sponsored by the business. For example, in the case of Foursquare, partners pay Foursquare for creation of branded badges which are given to users when have an accomplishment. A hypothetical example may be Café Coffee Day paying Foursquare for creation of a badge called “CCD Fan” for users who frequently visit CCD outlets.
4. Virtual goods – In this model, virtual goods are displayed whenever a user is near a business. The user is given discounts if he checks in and buys the real goods.
5. Collective buying space – Companies like Groupon negotiate steep discounts with local businesses in return for volume guarantees. These deals can be pushed to users in a certain location.
6. Mobile Advertisement networks – Location based services which do not have their own advertisers bank upon mobile advertisement networks to feed them with location based advertisements. The revenue generated from such advertisements are shared between the LBS Provider and the ad network.
7. White Label Model – This is a B2B2C model in which application developers create applications for enterprises which the enterprise then allow the users to use.

Players

Facebook Places

“Who, What, When, and now ... Where”. This is how Facebook Places describes itself. It allows users of Facebook to update their location on a real-time basis. If the user is at a place which he likes, like a restaurant, he announces to his friends about the place. Status updates can be tagged to a place. For example, if someone is attending a



concert, he checks in to the concert and sends a status message. He would also be able to see some of his friends have also checked in to the same place.

Although it was a late starter in the LBS field, it enjoyed a huge captive audience of 500 million users. Detractors say that out of this 500 million, only 50 million are mobile users and even out of these, only a miniscule percentage use Places.

Foursquare

Foursquare is a location aware application launched in March 2009. It has more than 6.5 million users. It is based on checking into various locations. The various concepts used with Foursquare are



- a. Badges – Badges are created by the administrators and assigned to users based on specific accomplishments within the Foursquare ecosystem. The badges earned by the users are displayed on the user's profile.
- b. Mayorship – Mayorship of a location is given based on frequency of visit to a location. If a user checks into a venue more than anyone else in the last 60 days, he is crowned the mayor of the venue. In order to increase competition, Foursquare notifies users of the number of days left before he becomes the mayor of a venue.

Gowalla

Although Gowalla is similar to Foursquare, there are important differences. First, users don't have friends on Gowalla. It is more of a game. Users go around the city, checking into different places and in the process collect "stamps", "icons" and "pins of glory". A stamp is similar to passport stamping. One gets a stamp whenever one visits a place. When one checks into a place, various icons may be available. For example, if one checks into a pub during happy hours, a Happy Hours icon may be picked up from the pub. Pins of glory are icons that represent significant achievements such as completing a trip. A trip can be made by checking into at most 20 different venues of the same category such as shrines or nature hikes. Second, Gowalla is more precise in geolocating than Foursquare.



Yelp

Yelp runs a local search and review capability for its users. For example, when a user searches for a Chinese restaurant in Park Street, he is shown all Chinese restaurants in that area, people who have visited those restaurants and the reviews they have written. All business sites registered with Yelp contain address, hours open and other details such as parking. Yelp also has a social aspect.



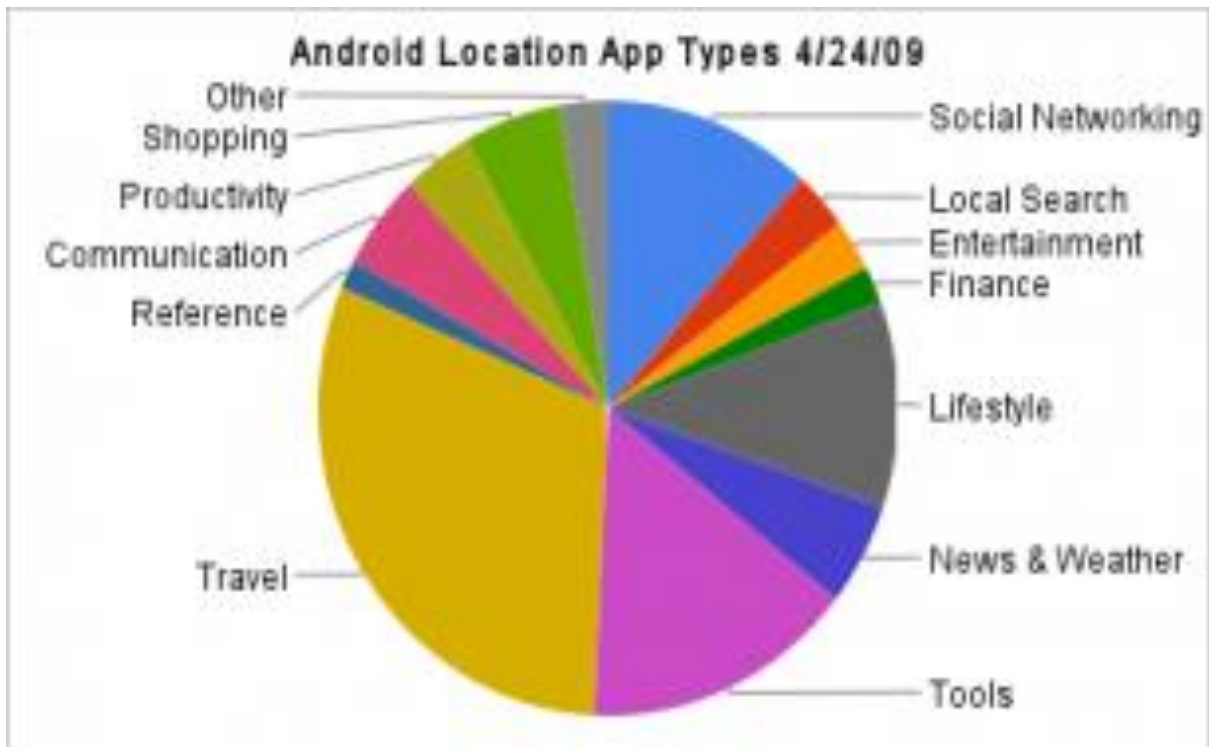
Google Latitude

Google Latitude is a location aware mobile application developed by Google. With Google Latitude a user can allow certain people to view their current location. Users can opt into the GPS feature or allow only specific friends or family members to follow their travels. Once an agreement is reached, users will be able to see their friends' profile pictures appear on a map through their mobile device or desktop computer. What differentiates Latitude from other services is that it can be used to contact other users with SMS, Google Talk or Gmail.

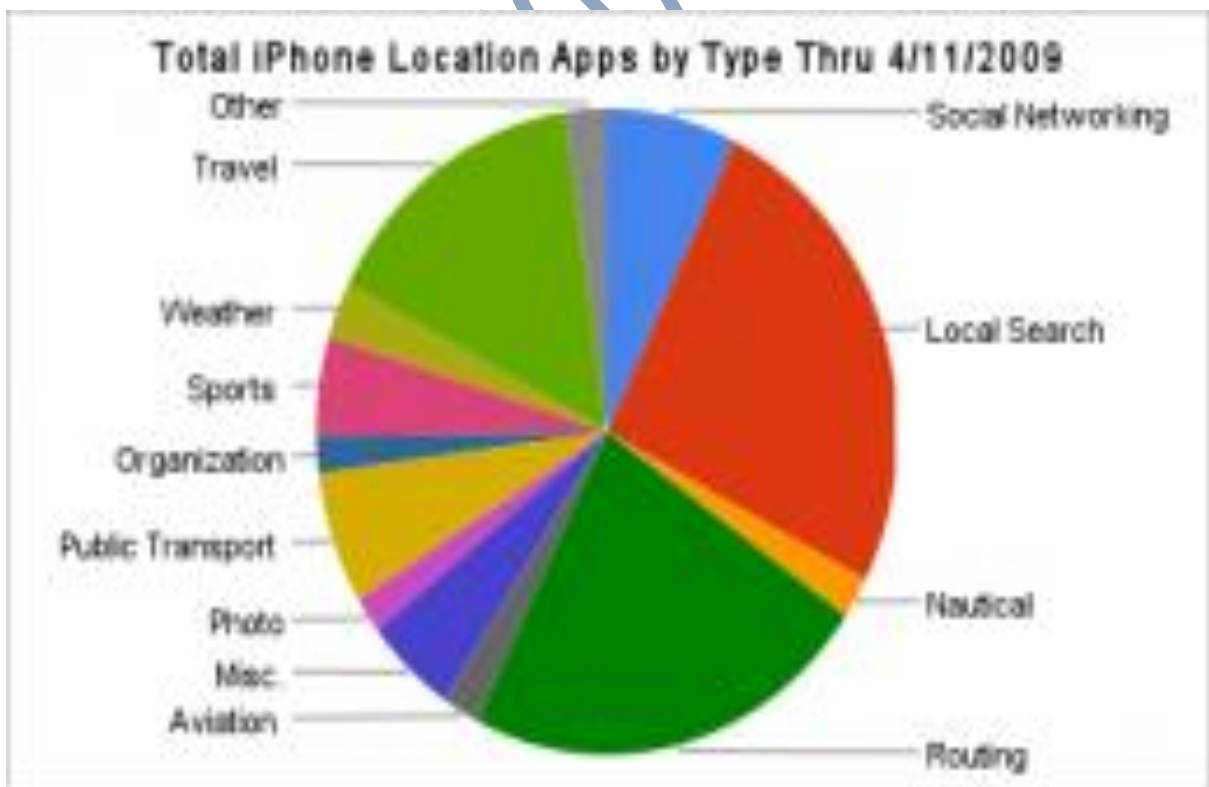


LBS Usage in Android and iPhone

Android and iPhone form a large portion of the current operating systems on which LBS applications run. It is important to understand that users of Android and iPhone have distinct tastes and this is reflected in their usage of LBS applications as well. Any LBS application developer will have to take into account this difference before he designs an LBS application. First let us look at the most popular LBS categories in Android and iPhone.



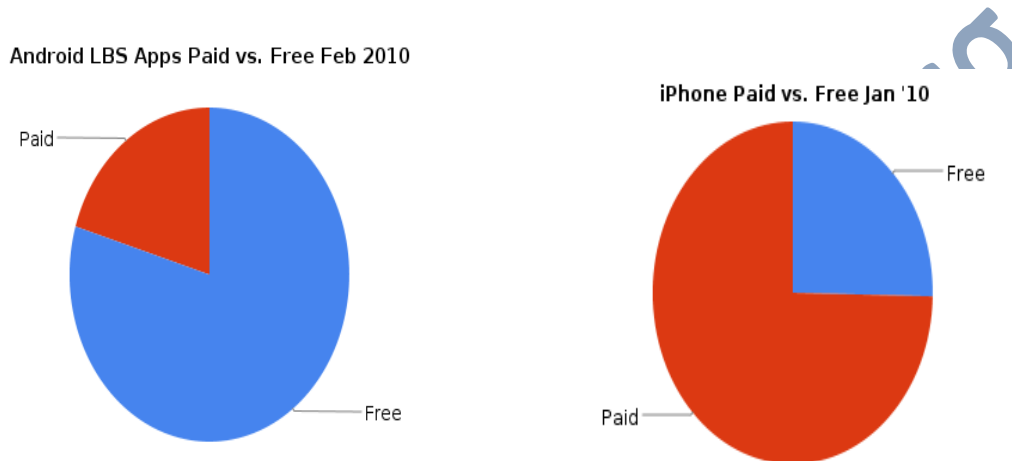
The above diagram depicts the different application types and their popularity in the Android ecosystem. We note that travel is the most popular, followed by tools, lifestyle and social networking.



The above diagram depicts the usage of LBS on the iPhone platform. Notice that the usage is considerably different from what it is in the Android platform. Here local search forms the bulk of the usage, followed by routing and travel.

So depending on the target platform, you would have to create applications which are most popular on that platform.

Let us now look at the free and paid applications on both these platforms.



Even in terms of paid versus free application, the Android and iPhone platforms differ significantly. Around 80% of the applications in the Android platform are free and the rest 20% are paid. Quite the opposite is seen in the case of iPhone. Here 75% of the applications are paid applications while only 25% are free LBS applications.

Forecasts for the LBS industry

Gartner predicts that location based services will be the 2nd most popular consumer mobile application for 2012. According to the agency the top 10 consumer mobile applications are

1. Money transfer
2. Location based services
3. Mobile search
4. Mobile browsing
5. Mobile health monitoring
6. Mobile payment
7. Near Field Communication services
8. Mobile advertising

9. Mobile instant messaging

10. Mobile music

In its report, the agency says “Location-based services (LBS) form part of context-aware services, a service that Gartner expects will be one of the most disruptive in the next few years. Gartner predicts that the LBS user base will grow globally from 96 million in 2009 to more than 526 million in 2012. LBS is ranked No. 2 in Gartner’s top 10 because of its perceived high user value and its influence on user loyalty. Its high user value is the result of its ability to meet a range of needs, ranging from productivity and goal fulfilment to social networking and entertainment.”

Forrester believes that location based application users are

- Influential - Geolocation users are 38% more likely than the average US online adult to say that friends and family ask their opinions before making a purchase decision.
- An interesting target group - They are typically young adult males with college degrees.
- Heavy mobile researchers - They are also far more likely to search for information about businesses and products, as well as read customer ratings/reviews of products and services

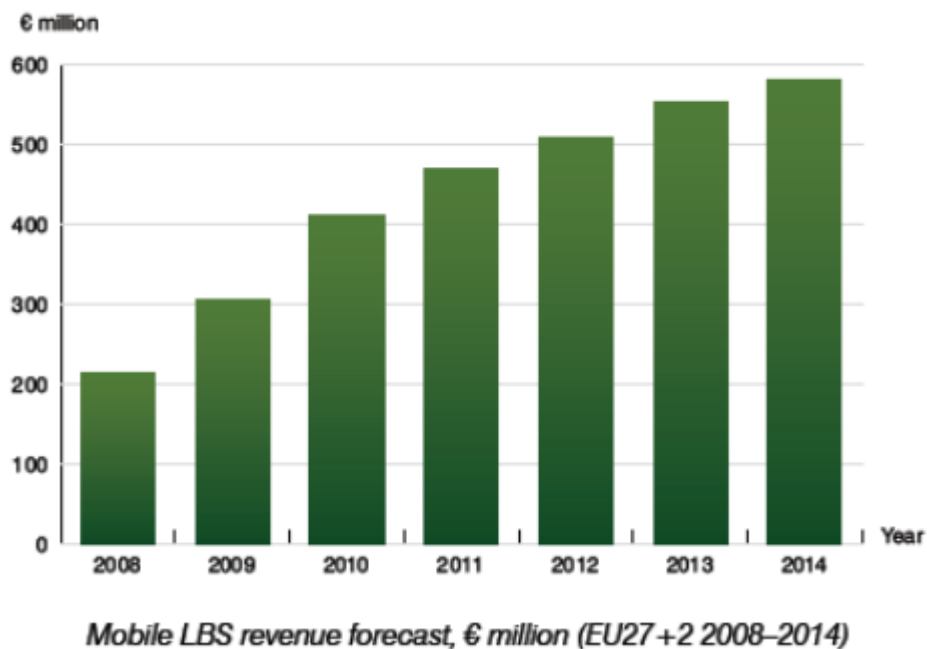
In terms of generation and demographics, the LBS users can be broken down as follows

		US	Location-based application users*
Generation	Gen Y (18 to 29)	22%	44%
	Gen X (30 to 43)	25%	42%
	Younger Boomers (44 to 53)	16%	9%
	Older Boomers (54 to 64)	26%	5%
	Seniors (65 and older)	12%	0%
Demographics	Average age	44	32
	Percentage female	51%	22%
	Average annual household income	\$79,500	\$105,000
	Earned a college degree or higher	51%	70%

Base: US online adults
 *Base: US online adults who use geolocation applications

Source: North American Technographics® Interactive Marketing Online Benchmark Recontact Survey, Q2 2010 (US)

Total LBS service revenues in EU 27+2 (27 European Union countries and two candidate countries) was Euro 214 million in 2008. Berg Insight forecasts LBS revenues to grow to about Euro 580 million in 2014.



E-Marketer estimates that there were 63 million location based services users world-wide in 2008 and that this number is going to rise to 486 million in 2012.

Year	LBS Users, mn	% Change
2007	18.9	
2008	61.3	224.1%
2009	134.0	118.8%
2010	215.3	60.7%
2011	329.0	52.8%
2012	486.0	47.7%

The overall mobile search and mobile advertising market will be growing exponentially as shown in the graphics below. Along with it, will grow the LBS revenues.



Porter's five forces analysis

Threat of new entrants: High

The threat of new entrants is very high in this industry. This is because very little investment is required to set up an ecommerce business based on LBS. The time to market is low. A business can be set up in less than 3 months. The entry and exit barriers are also very low.

Bargaining power of buyers: High

The bargaining power of buyers is high because there is availability of competing products in the marketplace. Each of them provide very similar features. Switching cost is very low. Users can very easily switch from one LBS application to another.

Threat of substitutes: High

The number of products fulfilling the same need is very high. There is very high uncertainty over future technologies. Disruptive future technologies may make the current crop of LBS applications completely redundant.

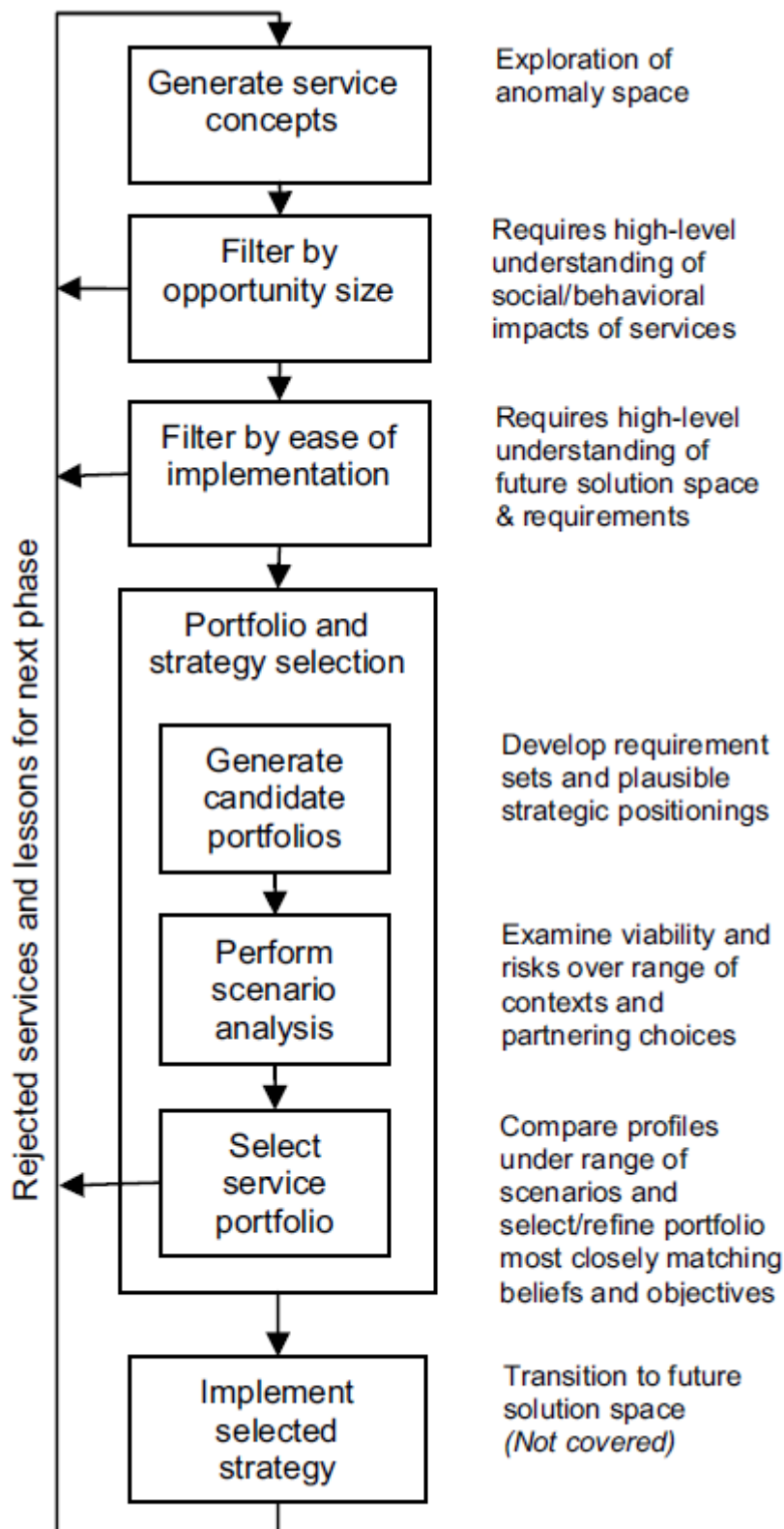
Rivalry in the industry: Moderate

The rivalry in the industry is moderate because each player in the market is trying to position itself in a niche area.

Threat of suppliers: Low

Here telecom operators, handset manufacturers and mobile OS developers act as facilitators. Since LBS application developers do not directly interact with any of these entities, threat from these suppliers to interrupt the business is low.

LBS strategy framework



Conclusion

Location based services is one of most promising business opportunities in the Web 2.0 sphere. A major chunk of advertising revenues in the future will be spent on location based services. There are a few major players in the market but unlike the search market, there is no clear leader in this space. Companies are still jostling for space, coming up with new and innovative ideas. There still is scope for some more players in the market. Like in any other business, it is important to satisfy customer needs in this industry as well. The key is that here the needs are local and the solutions have to be local as well. Unlike the search market, revenue generation in the location based services industry is rather easy. As explained in our report, there are various avenues through which revenues can be generated. Before entering the location based services industry, one must use the LBS strategy framework given earlier to find out the suitable business model.