

An investigation of implementable location-based services for Gauteng

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Abstract

South-Africa is a country filled with opportunities for those blessed with an entrepreneurial spirit, especially in the field of technology. South-Africa's uptake of technologies tend to lag behind of those of developed countries due to various technological constraints currently experienced, such as the high cost of bandwidth and relatively high cost of computing devices. Such constraints can be expected to have a negative impact on the consumption and use of online services within South-Africa arguably due to the scarcity.

The situation is improving as bandwidth becomes more affordable and as computing devices, specifically handheld devices such as smartphones, become more widely used. It can therefore be expected that popular online services will also start to be consumed by South-African users as the scarcity of resources slowly becomes a thing of the past. The delay in online service uptake, caused by scarcity of resources, may create various opportunities within the South-African market for technology companies to create services that will have the capability to grow as the South-African market grows.

The purpose of this study is to identify service concepts and ideas that have already been implemented by companies in other countries and that could easily be adapted to the unique demands of the South-African market to create a competitive advantage. The definition of the study and the objectives are discussed in more detail in the first chapter of this dissertation.

A thorough literature study is conducted in chapter 2 to gain a better understanding of the concept of cloud computing, its advantages, disadvantages and other areas of concern. Various ways in which online businesses manage to generate revenue online are also discussed to help the reader to gain an understanding of the complexities involved with the management of online businesses. Location-based services are also discussed in more detail in an attempt to discover if opportunity exists for the provision of location-based cloud services.

An empirical study is conducted in chapter 3 to identify service delivery companies that created services that could be adapted and implemented in a South-African context. Various recommendations are also discussed to advise South-African technology start-up companies on possible service ideas.

Chapter 4 presents a summary of the entire dissertation in addition to recommendations based on the study. The recommendations include providing location-based family tracking services, location-based scavenger hunts and location-based gaming services in South-Africa using cloud computing technologies.

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Background information and study objectives

1.1. Introduction

The way in which software is provided to the client has undergone a considerable evolution over the last few years. Traditionally software could be installed on the client's machine as part of a manual or unattended installation procedure performed by a computer technician. Once installed, the software would typically be used by one or more end-users on the machine.

Cusumano (2008:21) confirms that software vendors seem to be moving away from this method of software delivery and adapting a service delivery method, typically referred to as Software as a Service (SaaS). Various business models and tools can be employed to obtain financial benefit from the use of service delivery methods; some of the models perform well at generating revenue while others will yield only average to below average results.

A plethora of software service has already been created by software developers to solve problems of all shapes and sizes. One category of software services that has gained a considerable amount of attention is location-based services. Location-based services take a user's location into account as part of the service to provide information related to the current environment in which the users may find themselves (Khan & Light, 2012:2).

The purpose of this study is to determine what types of location-based services are currently provided on the internet and how the service providers generate revenue through the provision of these services. The information gathered by the study will assist a South-African location-based start-up to gain a better perspective on the competitive environment in the location-based software industry and which opportunities can be pursued in a South-African context.

1.2. Background

The traditional way to deliver software to a customer is to develop a software package that would run on the client's computer system. A copy of the software solution would be delivered to the customer that would run on hardware supplied and maintained by the customer. There would therefore be no need for the customer to install the software package of interest as the software vendor will take care of the setup and installation of the software on its infrastructure.

The customer would typically pay a once-off (or recurring) fee to purchase the rights to use the software while the software vendor retains the ownership of the software. This method of supplying software to the client is known as Software as a Package (SaaP) (Popp, 2011:27).

As computers, networking technology and software development practices evolved over the years it became more feasible to change the way in which software is provided to the client. Instead of providing software in the form of a package it could be provided to the client as a service. This method offers distinct benefits from the software vendor's perspective as well as the client's perspective. The following subsections will describe three service delivery methods, namely:

- Software as a Service;
- Platform as a Service;
- Infrastructure as a Service.

The combination of the three methods is generally referred to as cloud computing. Sharma & Sood (2012) mentions that other service categories, such as Database as a Service (DaaS), Desktop as a Service (also DaaS) and Business as a Service (BaaS) originated due to the absence of a standard taxonomy. For the purpose of this dissertation it will be assumed that cloud computing consists of Software as a Service, Platform as a Service and Infrastructure as a Service. The characteristics of each of the service delivery methods that form part of the cloud computing concept will briefly be discussed to enable the reader to understand some of the more technical parts of this dissertation.

1.2.1. Software as a Service

Software vendors that make use of Software as a Service to provide software to their clients would typically develop a software solution designed to run on hardware infrastructure that they purchased or hired from another provider. The client would be granted access rights to the operational software system running on the vendor's infrastructure (Liao & Tao, 2009:62). The client in turn would pay a monthly or yearly subscription fee for access rights to the system (and the maintenance of the hardware and software system would be the responsibility of the software vendor).

1.2.2. Platform as a Service

The Platform as a Service (PaaS) software provision method can be seen as more general version of SaaS. PaaS can be described as the publishing of services provided for use by other products or services (Gonçalves & Ballon, 2011:17). PaaS could therefore allow third-party development houses to create their own SaaS offerings based on the provided platform offering (Gonçalves & Ballon, 2011:17). This integration would not only add value downstream in the value chain, but it will also help to reduce development time as some functionality can simply be

used without having to develop those capabilities in-house (Gonçalves & Ballon, 2011:14). It should therefore be clear that PaaS can offer considerable advantages to the platform developer, down stream software vendors and the end-user.

1.2.3. Infrastructure as a Service

Mell & Grance (2011:3) also named a third service method, namely Infrastructure as a Service (IaaS). Infrastructure companies would typically purchase storage solutions, network infrastructure and other computing resources which would then be leased to clients. Clients would be able to configure and use the resources as they wish without actually having to own and maintain the physical equipment.

1.2.4. Service method implementation challenges

On-line service delivery has some distinct challenges that were brought forward by the nature of service businesses. From a service provider's perspective, there may exist new risks in terms of security, availability, billing, customer data usage metering, support and service provision which may only be present in the Software as a Package method to a limited extent (Gonçalves & Ballon, 2011:14). This means that online service providers will need a lot more business processes and business skills to keep a service operating and profitable.

1.2.5. Online service delivery topics

The following subsections will briefly describe some of the key challenges that should be focussed on to keep an on-line service company running.

1.2.5.1. Security

Service providers may store the data generated by their customers, using their own storage hardware, or they can simply outsource their data storage to cloud-based storage services, such as Amazon S3 (Amazon.com, 2011). This in itself may introduce various security risks as more points of attack are introduced as the length of the value-chain increases. Security should therefore form an integral part of any online business as on-line services are unlikely to succeed if the safety of their user information cannot be guaranteed.

1.2.5.2. Legal issues

One can argue that the development of a platform will be a large investment, and the vendor that initially invests in the development of such a platform should be able to protect its

investment in some way or another. It may therefore be of value to investigate patent and intellectual property laws in an attempt to discover how intellectual property can be protected in South-Africa and other countries.

1.2.5.3. Marketing

Start-ups would generally have to spend a lot of their funds on the development of their service offerings which implies that very little funds would be available for marketing efforts. Some effort will have to be devoted to finding ways to promote products by spending the least amount of money possible. A possible solution to the marketing issue may be a process known as viral marketing.

Viral marketing can be seen as the process of getting customers to pass on a company's marketing message (Laudon & Traver, 2001:381). This type of marketing strategy has the distinct ability to take advantage of the credibility of those that pass on a message (Dobele *et al.*, 2007:292). This implies that the recipients are more likely to respond to the message (as it was recommended by someone in their circles of contact). It may also be useful to consider the use of viral marketing when advertising online services for an increased exposure to potential users.

1.3. Study Objectives

Ruokolainen & Igel (2004:673) made a very interesting remark on technology start-ups, namely that in many cases the founders have the skills and knowledge to create magnificent software solutions but lacks the business knowledge that would help them succeed in developing their businesses.

The study will collect publicly-available information about well-known location-based service companies and start-ups to identify the services that these companies provide along with ways in which these companies manage to generate revenue. The information was requested by the founders of Tagmia.com to help them form ideas of location-based products that could be a hit with the South-African consumers. A study providing the required information could not be found at the time of writing and the study could therefore be of benefit to local location-based service start-up companies.

The objectives of the study can be divided into primary and secondary objectives.

1.3.1. Primary objective

The primary objective of the study is to identify the key players in the location-based services industry in an attempt to discover services that can be duplicated and adapted to the needs of South-African users.

1.3.2. Secondary objectives

The following objectives will have to be realised to reach the stated research objective:

- Theory evaluation:
 - Perform a literature study to uncover the concept of cloud computing and other concepts relevant to online service delivery.
 - Discover the benefits and challenges associated with online service delivery models.
 - Determine which business models are used by on-line service providers and how these methods work. Also determine the type of strategies that can be employed to make the business models work.
 - Study some well-known examples of online companies and determine which approaches worked and did not work.
 - Determining how a service offering can be marketed to end-users by taking the initial financial constraints that IT start-ups have to work under into account.
 - Provide an overview of security in the context of service delivery models.
 - Provide an overview of intellectual property laws.
 - Study recent location-based service literature to define the concept of location-based services.
 - Identify some of the key reasons why people use location-based services.
 - Determine how popular location-based services are.
 - Determine what the issues are with location-based services.

Empirical research:

- Identify the major players in the location-based services industry.
- Determine the type of revenue generation tactics used by industry players (where possible) that are already in the location-based industry.
- Identify some of the services provided by the industry players.
- Identify opportunity areas that can be exploited by South-African location-based services start-ups.

1.4. Research methodology

A literature study will be performed in an attempt to uncover some of the key issues surrounding the objectives of this study. The dissertation will be based on the knowledge acquired through the study of accredited journals, textbooks and other acceptable sources. The information gathered through the literature study will be used as a basis for the empirical study.

Quantitative and qualitative approaches will be followed to gather information for the empirical study. All information about online location-based services companies will be gathered from public sources. Data will be collected, analysed and discussed. Key opportunity areas will be identified after the discussion and ways to take advantage of the mentioned opportunities will be identified.

1.5. Scope of the study

A South African location-based IT start-up named Tagmia.com is slowly starting to gain popularity in this country and throughout the world. Tagmia.com offers location-based Software as Service products to the end-user and downstream software vendors. Tagmia.com experienced a less-than-expected level of success with their latest product in terms of usage patterns. The company requested this study to help it create products that are more likely to attract larger amounts of users.

Only well-known and widely-used location-based service companies will be studied as they are more likely to shape the competitive environment of the location-based software industry.

1.6. Division of chapters

This dissertation is divided into four chapters. The focus of each of the chapters will be described below.

1.6.1. Chapter 1

The purpose of Chapter 1 is to describe the concept of on-line service delivery and to identify key issues surrounding the use of service delivery methods. This is done in an attempt to aid the reader in understanding some of the more technical aspects of the software service industry. The method of research, scope of the study and importance of the study will also be discussed.

1.6.2. Chapter 2

Chapter 2 contains a thorough literature study on online service delivery methods and how these methods can be utilised to generate revenue. Other key aspects, such as security, the development of a community around a service offering and viral marketing will also be discussed. This will be done to identify key issues associated with service delivery.

The chapter will also contain a discussion on location based services. A short description of location-based services will be provided with an explanation of why people are using them and what people like and dislike about them. This information would help to confirm that location-based services are in fact in popular demand and that some problems exist that hinders users from taking up location-based service offerings.

1.6.3. Chapter 3

Chapter 3 will contain information about the empirical study. Information about location-based service companies will be gathered and presented in this chapter. The collected data will be interpreted and the results will be discussed.

1.6.4. Chapter 4

The final chapter will contain the recommendations for location-based services start-ups. A short summary of the entire dissertation will be provided followed by a list of recommendations based on the knowledge obtained through the study.

1.7. Conclusion

Cloud computing has the potential to improve the software industry for software developers and end-users. It could therefore be of value to study the concept of cloud computing to determine how the concept can be applied to generate revenue.

1.8. Chapter summary

The concept of on-line service delivery was discussed in this chapter. A short literature study was conducted in an attempt to discover some key aspects surrounding on-line service delivery. A research proposal has been constructed with the purpose of identifying location-based service ideas that can be implemented within a South-African context.

The research would be of value to location-based service delivery start-ups that would like to address opportunities in the South-African market. The discussion in this dissertation should be

enough to help location-based service start-ups to choose the current exiting niche market opportunities in the location-based services industry that they would be able to address best within South-Africa, given their internal strengths and weaknesses.

2. Literature study on cloud computing

2.1. Introduction

The first chapter discussed the basics concepts linked to cloud computing. This chapter will focus on the various questions raised in the first chapter. More specifically this chapter will discuss the concept of service delivery and business models (as applied to service delivery). Some of the advantages and disadvantages associated with online service delivery, as indicated by literature, will also be discussed.

Well-known examples of online service successes and failures will also be discussed to stress the importance of choosing the correct business model for an online business. A discussion on strategy, online marketing, community building and the protection of intellectual property will also be conducted to ensure that important topics relating to online service delivery is addressed.

This chapter will furthermore describe will study the concept of location-based services. A literature study will be performed in an attempt to define the concept of location-based services. Recent studies on online services usage will also be discussed to in an attempt to identify which location-based services are being consumed and why they are being consumed. Related concepts, such as location-based marketing and location-based service issues will also be discussed.

2.2. Service delivery and cloud computing

The definition of cloud computing given by Vilegas *et al.* (2012:1) states that cloud computing can be seen as strategic, on-demand outsourcing of computing resources as commodities. Another definition for cloud computing is provided by Luoma (2011:1), which states that cloud computing can be seen as a model to organise software development, deployment and operation in an efficient manner. In addition it allows customers to outsource their software related activities. Subashini & Kavitha (2010:2) mentions that service delivery models are at the heart of cloud computing. The concept of cloud computing can therefore be seen as the description of online service delivery, whether it be software service delivery, hardware service delivery or a combination of both.

Online service delivery methods discussed previously, namely PaaS, SaaS and IaaS all form part of a concept known as cloud computing. Cloud computing for the purposes of this document will describe the use of IaaS, PaaS and SaaS to deliver services to customers.

Cloud computing is an extension of a concept that gained considerable traction in the 1990s called Application Service Provider (ASP). The concept was based on five principles as described by the IDC White Paper (IDC,1999:3), namely:

- The service should be application-centric;
- Access is provided to its users without ownership which means that the user cannot own a physical copy;
- The service should be centrally managed;
- One service will be provided to many clients(one-to-many);
- The services provided will be delivered on contract.

The application was generally hosted by the application provider on hardware that it maintained for its customers (Sääksjärvi, Lassila & Nordström, 2005:178). This model has been adapted and extended to ultimately help to create and define the concept of cloud computing.

2.3. Benefits of cloud computing

Cloud computing can be seen as an assembly of different building blocks that work together as a cohesive unit. The building blocks of cloud computing, namely IaaS, PaaS and SaaS show attractive characteristics like rapid elasticity and on-demand self-service (Subashini & Kavitha, 2010:2). Mell & Grance (2011:3) contributes to the list of defined positive attributes by mentioning that cloud computing promotes availability and scalability, which makes it advantageous above other models when faced with high traffic loads.

These characteristics are valuable in a service-oriented environment, largely due to service load fluctuations. Service usage may increase at peak times (e.g. office hours for business software users), while decreasing during non-peak times. Cloud computing therefore makes it possible to scale service resource requirements to ensure that the resource capability exists to manage high loads at peak times while scaling-down resource capabilities, and therefore decreasing the cost of running the service offering, at non-peak times. Scalability therefore offers a cost-effective way to manage fluctuating service demand without having to purchase expensive infrastructure that would generally idle in times of little or no traffic.

Gonçalves & Ballon (2011:14) mention that cloud computing could offer hardware benefits to end-users, as most of the actual work is performed on the cloud infrastructure. This implies that companies would be able to invest in cheaper hardware as the performance requirement of end-user workstations drop considerably as a result. Upgrade cycles would therefore be more infrequent and it may even be possible to access the service offerings on machines running

open-source operating systems and software packages, thereby saving money that would generally have been spent purchasing operating system licenses.

One of the many ways that the software developer can benefit from cloud computing is through increased software usage and decreased distribution costs (Sääksjärvi, Lassila & Nordström, 2005:180). Sääksjärvi, Lassila & Nordström (2005:183) also mentions that on-line service providers will have the advantage of more predictable cash flows and improved economies of scale. It is argued that the nature of cloud computing makes it possible to reach more customers, at a better price, as a result of economies of scale. This would ultimately ensure that the service would be more accessible and more affordable when compared to traditional packaged software products.

The software user will also enjoy certain benefits from cloud offerings as online licenses tend to be cheaper than licences for packaged software offerings. In addition, the customer will also benefit from continuous updates provided by service providers. Data management and back-up services would typically be provided by the service provider, as part of its service (Sääksjärvi, Lassila & Nordström, 2005:180), which means that some of the key aspects of running a software system are already taken care of. The customer does not need to continuously update software running on his/her computing device as the updates are done directly on the service provider's infrastructure – this is another big advantage for large corporations as fewer staff members will be required to maintain and update software and also perform backups on corporate networks.

Cloud computing may be beneficial to online service providers due to the way in which online services are structured. An online service can be created by combining the services supplied by the service provider with various other services provided by third party vendors. This would allow the service provider to focus only on the core benefits that it intends to provide. Anything else (such as infrastructure or a development platform) can simply be outsourced to other vendors.

From a business perspective this characteristic is extremely beneficial due to the fact that non-core capabilities can be outsourced. A service provider specialising in Customer Relationship Management (CRM) software could for example decide to outsource its infrastructure requirements to Amazon.com. The provider can also decide to outsource its call centre requirements (such as help and support) to companies in India or Ireland. The company could also choose not to manage anything but contact details. Sales record management, data mining and other CRM-related features can simply be outsourced. Through the use of Web 2.0 technologies, it would be possible to compose a service consisting of services provided by

others in a transparent manner which means that the composition would not be visible to the end-user. The service composition would therefore look like it originated from one service provider although its components may originate from several providers.

The company could therefore in theory create services composed entirely from services provided by others and still earn an income. However, the company that chooses this path will have to compose the service in such a manner that the composition provides more value to the customers than the value that each of the separate services would have provided by themselves.

2.4. Challenges associated with cloud computing

Maslow (1966:15) made a very famous statement in his book entitled *The Psychology of Science*, namely: “It is tempting, if the only tool you have is a hammer, to treat everything as if it was a nail”. Before accepting cloud computing as the final solution to development problems, one must first also investigate some of the key deficiencies that some users may already be experiencing in an attempt to determine under which circumstances one can derive the most benefit from online service delivery.

The mere act of starting a business would not necessarily lead to sales. Sales will only take place if the business has proven to potential customers that it can solve a problem, or address a need better than its competition. It can also be said that offering cloud services does not automatically lead to service contracts just like starting a business would not necessarily lead to sales. Talebifard *et al.* (2010:553) argue that the mere fact that a company invests in infrastructure or technology to provide online services, would not necessarily lead to the generation of revenue. The services would have to be developed and marketed in a similar way in which a start-up is developed and marketed. Initial investment to raise awareness of a company's online services may therefore be high.

Another cost that should be taken into account when marketing cloud services would be the cost associated with changing the mind-set of the general public from one that is used to, accepts and requires a SaaS offering, to one that utilises and endorses cloud services. This transition may be costly and unlikely to be quick. This mind-set change may even be more costly in developing countries where internet infrastructure is less-developed and more expensive to gain access to when compared to developed countries.

Sääksjärvi, Lassila & Nordström (2005:184) managed to identify four challenges to the provision of on-line services, namely:

- The difficulty in managing on-line service value chain;

- On-line services produce a reduced turnover compared to packaged software;
- Scalability and performance may be an issue when systems are designed poorly;
- High initial investment is required to provide on-line services.

Managing the online service delivery eco-system can be tricky, especially in situations in which a service provider relies on a few other service providers to provide upstream services that it requires for its own products and services. This is largely due to the fact that upstream failures can easily be noticed downstream, potentially all the way to the end-user, if no provisions are made to combat such failures.

Cloud service providers may experience service down-time from time-to-time (Gonçalves & Ballon, 2011:16). An online service delivery company would therefore also need a dedicated support team to handle customer complaints and queries. Traditional software companies also need support teams, but the difference is that the sense of urgency experienced by users of an online system (that is not available) would be much different from those of user with queries about software running on their personal computers. As stated previously, this requirement can be outsourced, at an additional cost to the service provider. Since a customer contact management facility will have been provided, the operating cost associated with service delivery will dramatically increase as a result.

On-line service delivery companies will also need to grow its customer base to compensate for the decrease in turnover commonly experienced by service companies. It should therefore come as no surprise that economies of scale would ultimately be the key to survival in the world of cloud computing.

Sääksjärvi, Lassila & Nordström (2005:185) mentions that some companies may be required to lock-in customers to obtain the amount of customers needed to provide a profitable service. Gonçalves & Ballon (2011:19) warns that vendor lock-in may drive developers and potential customers away. Dubey & Wagle (2007:7) adds to this view by stating that software developers that are moving from producing SaaS solutions to producing SaaS solutions may find themselves in a situation in which they need to supply current customers with guarantees and favourable subscription pricing while making it painless to move from one solution to the next. It should therefore be noted that service delivery companies should closely monitor their customer base, but it may be dangerous and careless to resolve to lock-in strategies to achieve economies of scale.

Scalability in terms of cloud computing generally refers to the way in which a service is able to scale to meet client demands in terms of server load. A system is known to be scalable when it is possible to seamlessly add more computing resources as a system's processing

requirements increases. Systems that scale poorly are generally seen to the user as unresponsive to his/her request under heavy load. The reason why scalability is so difficult to achieve is that it will have to be a key requirement in the development of a service as systems will only be able to scale easily if they were designed to do so.

High initial investment costs refer to the costs that are associated with the development of an online service. This will include the cost of purchasing or hiring machines on which the solution should run as well as the total man-hours spent developing, testing and deploying the solution. Software development projects are generally considered to be very costly due to the amount of time required to develop a working system. More complex systems will take longer to develop and would therefore be more expensive as a result. A company that would like to provide online services should therefore have enough capital to drive development for months without generating any revenue.

2.5. Study on on-line business models

The concept of cloud computing was discussed to allow the reader to understand its key characteristics. The next question to ask is how revenue can be generated from the provision of on-line services. This section will discuss ways in which revenue can be generated from on-line service delivery.

Teece (2010:185) claims that entrepreneurs generally fail to take advantage of their technological offerings largely due to the fact that they fail to create viable business models to drive the technology at hand. This situation can be very problematic, as technology cannot be improved and refined without the proper financial backing supplied by a viable business model. It is therefore of the utmost importance that the entrepreneur understands how to choose and apply business models in a manner that will ensure sustainability of his/her business. The reader will first have to grasp the basics concerning business models to understand more about the choices that exist with regard to business models.

A business model explains how a firm intends to generate revenue (Luoma, 2011:1). Teece (2010:191) adds to this view by stating that a business model should reflect what customers want, how they will pay for what they want, and how an organisation can meet the needs of the customers (Shafer, Smith & Linder, 2005:203). A good business model helps to craft value propositions that are beneficial to customers while maintaining a balance between cost and risk when delivering a product or service (Teece, 2010:174). It should therefore be clear that a business model choice may help ensure the success of a company, or contribute to its demise. A good business model would therefore guide a company towards financial success in the same way in which a map guides travellers to their destinations. A company that applies a poorly

conceived business model is likely to get lost along the way, just like a traveller with an incomplete or incorrect map would get lost due to decisions that were made based on incorrect information and assumptions.

Different revenue generation techniques can be applied to online service delivery to generate revenue. Sääksjärvi, Lassila & Nordström (2005:180) managed to identify five different models that can be applied for revenue generation, namely:

- Subscription-based revenue generation;
- Usage-based revenue generation;
- Transaction-based revenue generation;
- Value-based revenue generation;
- Fixed-fee models.

Subscription-based revenue generation describes the method in which a customer pays a monthly or yearly fee to obtain access to an online service. The customer's right to access the service will be terminated when the customer chooses to terminate his/her subscription.

The usage-based revenue generation model is used to charge customers as services are consumed. This method can be beneficial to customers in a sense that the customer only pays for the services that are consumed, in a similar way that electricity users only pay for electricity that they consumed during a month. The usage-based model is widely used by IaaS providers to allow their customers to pay for resources that they have used when they actually consume them. This model can also be beneficial to infrastructure, platform and SaaS providers due to the fact that the providers could potentially charge a premium for spikes in traffic and sell unused computing resources to other customers during times of low usage.

Transaction-based revenue generation can be seen as payment linked to the value of online transactions. An online auction house could for example ask a fee of 10% of the total transaction amount, thereby taking a piece of the financial profit generated by the transaction. This method is very similar to the way in which value-added tax (VAT) is generated through the execution of a transaction, just like a percentage of the transaction total will be paid to the Revenue Service, a percentage of the transaction will be paid to the service provider.

Value-based revenue generation addresses the concept of perceived value by the typical client and adapts service prices accordingly. This model would make it possible to generate even more revenue from certain groups of people that understand the value of being able to work anywhere, being able to have safe back-up without having to purchase back-up equipment and constant service improvement without having to pay a whole IT team to maintain a system.

The last method is in all likelihood the simplest one to implement and use. The fixed fee method simply requires its customers to pay a fixed fee to obtain access to the service provided. This method may be useful for start-ups with only a handful of administration staff members due to its ease of implementation.

It should be noted that the right business model is seldom obvious when starting a business, which means that entrepreneurs will generally have to adjust their business models as they go along (Teece, 2010:28). Referring back to the map example it can be said that start-ups will generally have to explore and conquer uncharted territories and create a map as they progress. Unfortunately, like the traveller, the business might get lost along the way due to poor decisions or unplanned circumstances.

The incorrect choice in business models can be seen as extremely risky and should therefore be avoided where possible. Unfortunately this may not always be possible which means that some start-ups are bound to change their business models as they evolve. Attention should therefore be given to the creation of procedures that evaluate and test business models for their validity from time to time. This would ensure that non-functional business models can be identified and replaced as soon as possible, thereby minimising the risk associated with the incorrect business model choices.

Some identifiable patterns can usually be observed when an incorrect business model is being used by a company. These patterns should serve as tell-tale signs that a business model should be re-evaluated and possibly replaced. Shafer, Smith & Linder (2005:204) managed to identify some of the common problems associated with the use of business models, namely:

- Invalid assumptions used to make decisions;
- Invalid perceptions of value perception and value capture;
- Invalid assumptions about the value network.
- Evaluating only a few strategic choices.

The problem indicators can therefore be summarised by saying that a lot of the problems linked to business models can be traced back to invalid assumptions. Proper research should therefore be conducted to ensure that the assumptions on which underlying decisions of business models are based are correct.

It would also be wise to generate as many strategic choices as possible to ensure that only the best choice is selected. It may happen at some time that a strategic choice that once looked like a good idea turned out to be a poor choice. In such a scenario it would be possible to retrieve a list of strategic choices and use the strategy on the list that is better suited to the current

business environment. Of course this may not always be feasible which means that a large part of the business model creation process will have to be re-done.

Teece (2010:189) suggests a few questions that should be asked when evaluating business models, namely:

- How will the product or service deliver value to the consumer?
- How will it be used?
- What do the targeted consumers really value and how does the offering address that?
- How far is the industry in its evolution, and is there a generally accepted solution to the problem experienced most?
- What contracts should be in place before the producer can start delivering its products or services to its customers?
- How much will it cost to provide the product or service?
- How would the costs change as volumes change?

Answering these questions may help to determine beforehand if a business model (and therefore the resulting business) is flawed. The knowledge that a business model is flawed would help the business stakeholders to decide if the model should be re-worked or simply dropped completely.

To understand how service delivery business models work we first need to understand what the information technology landscape looks like. The information industry is different from other industries, in a sense that it is very difficult to determine the value of information, as there usually exist ways to obtain access to information without paying for it (Teece, 2010:178).

Cusumano (2008:21) mentions that the margins for IT services may be as little as 30% or lower. Since the margins are relatively low a lot of online business models would have to rely on volumes to realise a profit. Obtaining paying customers, however, may be a rather challenging task. A number of online services started to give a part of their service away free in an attempt to attract paying customers by relying on a key Web 2.0 principle, namely that an online-service company can give away part of its service for nothing, as long as it does it in a way that helps to expand the business (Shuen, 2008:120). This principle also forms the grounds on which a strategy, known as freemium, is based. Companies using the freemium business strategy generally give a standard version of their product away for free, but supply a premium version of its software to its users for financial compensation (Teece, 2010:179). The general idea is to get users to adopt and use the free version of the package. If these users should discover that they require more functionality, then they can simply pay for the premium services.

There is also another strategy that manages to generate revenue by giving valuable items away for free. Jansen *et al.* (2011:5) mention that it can be beneficial to online service delivery companies to open up their systems by distributing freely the source code to their technology. The reasoning behind this statement is that this would allow developers from all over the world to contribute to the service offering, thereby improving its quality. Making the source code to software available is known as “open-sourcing” the system.

Open-source software describes privately produced public products, for which the source code can be downloaded from the internet free of charge (Harison & Koski, 2010:251). Firms that make use of an open-source business strategy tend to use a hybrid business model that supplies open-source, as well as additional proprietary software built on top of the open-source offering. Value is created through mass customisation and the opening-up of business processes (Jansen *et al.*, 2011:1).

The use of open-source software may be beneficial in certain situations but it has a very distinct drawback in a competitive environment. It can be argued that if the source code to a system that supplies a competitive advantage to a service delivery firm is freely available, then other service delivery companies would jump at the opportunity to absorb the freely available code for their offering, thereby nullifying the competitive advantage that was created in the first place. The use of open-source strategies should therefore be planned and managed with great care to ensure that the value-generating components of open-source software are protected and capable of generating revenue.

There are also various opportunities that can be exploited in the provision of niche services in the online service delivery market. Sääksjärvi, Lassila & Nordström (2005:180) state that even large software firms may not always be able to provide all components needed to successfully offer SaaS services. This implies that partnerships between vendors in the on-line value-chain would therefore be of great importance to ensure the success of service offerings. Shuen (2008:113) adds to this view by stating that this situation creates opportunity for syndication, in a sense that providers could focus on providing niche services that will be consumed by other providers. One provider could, for example, create an electronic shopping cart, credit card facility or any other piece of functionality that could be used in other SaaS provider offerings. A company could therefore devote all of its time and effort in the development of a certain niche service product and achieve economies of scale by supplying the same service to enough paying service customers.

Similarly opportunity may exist for the provision of white-label software. White-label software can be described as a finished software product that is customised to the needs of its paying

corporate customers by simply adding their branding or labels to the finished product. The use of white-label software can be extremely beneficial to companies that need applications, but do not have the skills to develop such applications in-house due to the fact that the companies can simply have another company develop and manage software solutions for them.

2.6. On-line service examples

The 1990's saw the appearance of a plethora of on-line businesses; some extremely successful while others failed miserably. One of the crippling mistakes of the dot-com era was that companies assumed that having a portion of a business model worked out would be good enough to start and keep a company running (Shafer, Smith & Linder, 2005:205). The so-called "missing" parts would be filled into the business plan as more details become clear as the business operates.

This approach can be compared to that of a person that is going to explore unknown territory with only a partial map that the person plans to fill in as he/she is travelling. The approach may work under certain conditions, but it may also help a person to get lost, and in a worst case, lose his/her life. It should not be difficult to see why this approach to navigation is risky. In similar vein it should also not be difficult to see why it would be incorrect to operate a business venture with an incomplete business plan.

Arguably the biggest failure of the dot.com boom would be a company called WebVan. WebVan was a company that sold groceries through the internet (Glasner, 2001:1). Back in the 1990's, the idea of doing one's grocery shopping over the internet seemed like a great idea, but has later proven to be flawed in several ways. In 2001 the WebVan was shut-down after wasting millions of investor dollars (Glasner, 2001:1).

The provision of online grocery services proved to be more difficult than it seemed at first largely due to supply problems and the managing customer perceptions and expectations (Boyer & Hult, 2006:125). On-line grocers had an extremely challenging task in terms of delivering goods to its customers. Deliveries that are in close vicinity of distribution centres could be done in a cost-effective manner but orders far away from distribution centres would take longer to complete and would therefore happen more infrequently as a result (Boyer & Hult, 2006:127).

Boyer & Hult (2006:128) also mentions that the sale and delivery of a standardised item, such as a bottle Coca-Cola, is different from that of a fruit such as an apple. A bottle of Coca-Cola is a standard product, irrespective of the location of purchase. An apple on the other hand is not standardised in a sense that no two apples are alike. Buyers would expect that the online grocer deliver the same non-standard items to them that they would have selected themselves in the

store. If the online grocer would supply items that are perceived to be of inferior quality then the overall perception of the service will suffer as a result.

It should therefore be evident that customer services expectations can play a big role in the success or failure of an online business. Mitra & Fay (2010:185) supports this view by stating that user expectations are not well-formed in new markets and that certain consumer buying or problem signals may not be observable over the internet. These factors combined creates a challenging business environment for business that would seem to make sense at first sight.

Using the list of common problems identified by Shafer, Smith & Linder (2005:204) we can argue that WebVan had based their business model on invalid assumptions and perceptions. Analysis of the challenges facing an online grocer, such as high delivery costs and difficulty in managing user expectations and service perception (as explained by the fruit example) clearly illustrates that it would be rather challenging, if not impossible, to get the business model to produce revenue under the current set of constraints. A thorough analysis may have revealed this beforehand to the entrepreneurs responsible for WebVan's creation and would possibly have guided them to try a different approach to generating revenue.

One of the success stories of the dotcom bubble is Google. Google started as an online search engine in a time in which search engines were slow and inaccurate. It outperformed all of its rivals by making use of advanced ranking and indexing systems, notably the PageRank algorithm. By utilising its technologies Google managed to create better search results than its rivals.

Google generates revenue in various ways. Its primary revenue generation strategy is to display sponsored links with search results in a non-obtrusive manner. Google decided not to improve the rankings of paying customers as this choice might influence the integrity of their search results. This decision ultimately helped Google to enhance the search experience for its users, as the search results are not biased towards paying customers, which ultimately leads to better search results (Teece, 2010:181).

Today Google provides various popular online services used by the general public and businesses, ranging from email, geo-location services and even operating systems. Google's size, wealth and power has made it a threat to various service delivery companies in the service sector due to the fact that Google can afford to provide just about any service that is generally free to use for the end-user. Competing with a service provider giving away a service for free would indeed be rather challenging which means that the business models of such companies will have to be rather creative to accomplish this.

Google's key competency is the creation and provision of search services. Google constantly innovates and improves its technologies to ensure that it remains the best at what it does. One thing that can be learnt from Google is that a company constantly needs to innovate and improve to stay relevant.

Netflix is another example of a well-known service business operating in North-America. Netflix allows its subscribers to rent as many movies they would like from its online catalogue (with a limit on how many movies can be rented on a daily basis). Users would typically pay a monthly membership fee to obtain access to the movies provided by Netflix.

What makes the Netflix example so compelling is that Netflix managed to find a way to get a competitive edge above the existing competition by delivering a service in a way that is difficult for already existing competition to imitate without cannibalising their businesses (Teece, 2010:183). The traditional video shop on the corner would not be able to compete with Netflix without destroying its existing business, which means that the business model behind Netflix supplied it with an extraordinary competitive advantage. Netflix is still the market leader in online movie rentals, even though competition has entered the market that copied its business model.

The Netflix example clearly illustrates how a business model can create real value for its investors. The difference in business models used by Netflix and brick-and-mortar companies in this case clearly gave Netflix a competitive advantage. It would therefore be of great value if a business could create and implement business models that would be relatively difficult to copy for already-established businesses, as this would obviously create a competitive advantage.

A few well-known examples of online businesses have now been discussed. What is important to note, from the few examples, is that the choice of business models were the catalysts that made the difference between magnificent success and miserable defeat. The examples should therefore help to illustrate just how important it is that a chosen business model is suited to the task at hand, that the model is difficult to copy and that its assumptions are based on realistic and accurate data.

2.7. Online strategy

Teece (2010:180) mentions that strategy analysis should be performed to ensure that a business model is financially viable. It is therefore crucial to understand some key concepts with

regards to strategy. Before discussing some generic strategies, we first need to discuss some key aspects that will definitely have an impact on online business strategy.

The first aspect is pricing. Pricing is extremely important when conducting business online, as price will be the key determining factor used by customers to exhibit their service level expectations (Mitra & Fay, 2010:186). Customers that are willing to settle for a lower level of services would generally like to purchase items at a lower price than those people that wishes to receive a high level of service.

An online shop that charges higher prices would therefore signal to its customers that it is providing superior service, while an online shop that charges a lower price will signal that the customer can expect a low level of service. Setting high service expectations would therefore attract service-sensitive customers, while setting low service expectations would attract price-sensitive and multiple-purchase customers (Mitra & Fay, 2010:187).

Mitra & Fay (2010:186) informs us that the average price for goods purchased online is generally lower than those found in traditional brick-and-mortar stores. This also implies that the general level of service expected by online buyers would be lower than the level of service expected from customers shopping at brick-and-mortar stores. Barnes and Noble, for example, charges about 19% higher prices on average for its best sellers, compared to Amazon.com, which may reflect the increase in service level that Barnes and Noble customers would likely receive (Mitra & Fay, 2010:196).

It is important to identify some generic strategies that can be utilised to create a competitive advantage. Thompson *et al.* (2012:184) managed to identify five generic strategies, namely:

- Low-cost provider strategy;
- Broad differentiation strategy;
- Focussed low-cost strategy;
- Focussed differentiation strategy;
- Best-cost provider strategy.

The low-cost provider strategy seeks to provide the lowest overall cost for a product to a broad range of users. A company using a low cost strategy would obviously have to achieve economies of scale to be able to achieve profitability.

The broad differentiation strategy helps to distinguish companies from the competition by supplying features that would appeal to a broad range of customers. This strategy would therefore supply features to the market that a lot of people would need.

The focussed low-cost strategy aims to focus on a narrow niche and outperform rivals on price. It can be argued that the company in the example of the online credit card service would use the focussed low-cost strategy due to the fact that it focuses on a very narrow niche and out prices its competition. This strategy may also be suited for companies that provide other niche cloud services.

The focussed differentiation strategy focuses on the needs of a small market segment and aims to provide better service than other companies in the same segment. An online credit card service that provides tailor-made reporting or country-specific language packages could for example be using a focussed differentiation strategy to attract customers.

The final generic strategy is the best-cost provider strategy. The ultimate goal of the strategy is to provide an upscale product at a lower cost than rivals. The purpose of this strategy therefore is to provide real value to its customers.

2.8. On-line service delivery topics

This section will discuss various topics that are of interest to online service delivery companies. The topics include online marketing, online security, community building and intellectual property.

2.8.1. On-line marketing

We have discussed cloud-computing, business models and generic business strategies. An online service should be marketed once created to attract users to the service offering. The rest of this section analyses some choices with regards to online marketing to help the reader understand how service products can be marketed on the internet.

Various ways exist to market products and services online. A company delivering online services can market its services, using various paid-for or free methods. The paid-for methods are generally effortless, in a sense that the company delivering the advertising service is expected to take care of the advertising hassles at a pre-determined fee. A company that wishes to advertise with another company, such as Google, would generally fill in a short online information form and send Google some form of payment, based on the services required. Google will then continue by performing the services as required, until the service is terminated. The paid-for method of advertising is generally relatively easy in comparison to other marketing approaches, but the benefit of increased traffic will likely wear out shortly after the service with the advertising company has been terminated. Other large companies, such as Yahoo and

Facebook also provide their customers with paid-for advertisements, and other online promotional tools that can be used to market products and services.

One free approach to marketing that generally takes a relatively long time to yield results, but with a longer-lasting effect, is link building. To understand how link building works the reader first needs to understand the basics behind how Google and other search engines determine the ranking of their search results. Google uses an algorithm known as PageRank to determine the ranking of its search results (Page, Brin & Motwani, 1999:2). The PageRank algorithm works in a similar way in which researchers determine what sources are considered to be the best for a specific topic.

It is widely accepted in the academic community that good academic publications will generally be referenced more than poor academic publications. All that a researcher therefore needs to do to determine which publications are generally considered to be of value for a specific topic is to visit the bibliographies of articles written on the topic and keep track of all the articles referenced. The articles that are referenced more frequently would generally be regarded as more valuable as opposed to those articles that are referenced less frequently.

The Page Rank algorithm basically works in the same way in a sense that websites that are referenced more than other websites and are considered to be of greater value than those that are referenced more infrequently. A website on digital forensics, for example, would be ranked much higher than a similar website on digital forensics, but with fewer websites linking to it.

The reader should now possess enough knowledge about search engine rankings to understand how more traffic can be generated for online sites. In theory it would be possible to attract more users to a website if there are a lot of websites linked to the site in question. One strategy to achieve this would be to get other websites to link to the website in question. This however is not as straight forward an exercise as it may seem at first, due to the fact that all website owners would generally like others to link to them.

Fortunately there is a simple way to get other sites to link to the site in question by simply making use of online directories. An online directory can be seen as a listing of websites, with a short description of the content provided on the website. Most web directories accept submissions for free, although some may require the website owner to link back to the directory (to in turn increase the directory's page ranking). By submitting a website to directories on the internet, it may lead to an improved PageRank, and a better search ranking which in turn will generate better traffic as a result. This approach, however, may take months to deliver results as directory webmasters may take anywhere from a few days to a few months to process a web directory submission request.

There also exists a much quicker approach to online marketing called viral marketing. Viral marketing is a term that was originally used to describe Hotmail's marketing strategy in which Hotmail added a link to every e mail that was sent by account holders to invite potential users to join for free (Wiedemann, Haunstetter & Pousttchi, 2008:76). Viral marketing has since then been used as a marketing tool by various companies with varying degrees of success.

Laudon & Traver (2001:381) define viral marketing as the process of passing a message to family, friends and colleagues. Jansen *et al.* (2011:3) adds to this by stating that messages coming from family and friends generally have more credibility than those of advertisers.

The success of viral marketing has to do with the way in which it relies on peer-to-peer recommendations to get a message across, and when done correctly, can create an instantaneous buzz about the product or service (Dobele *et al.*, 2007:292). Jihua (2011:325) noted that effective viral marketing campaigns generally have the following characteristics:

- The product or service provided should be considered to be valuable;
- A way is provided to easily communicate information with users;
- The possibility to expand the range of information currently in existence;
- The campaign is taking advantage of public enthusiasm;
- It utilises communication networks;
- It utilises other's resources.

Viral marketing can therefore be summarised as a way to market a product or service by using the resources of others. Viral marketing would therefore be attractive to companies with little resources to spare for marketing efforts as the resource requirements for the distribution of a viral marketing message is reduced considerably from the company's perspective.

Viral marketing is also more effective in groups of people of a certain age and gender. Wiedemann, Haunstetter & Pousttchi (2008) indicate that younger people are more likely to forward viral messages to friends and family. Wiedemann, Haunstetter & Pousttchi (2008:78) add to this view by mentioning that females are more likely to pass along viral messages than males. This implies that viral marketing would be more effective when targeting products that are aimed at younger consumers, particularly females. From the perspective of a service provider, any part of an end-user service that is aimed at younger users could potentially be marketed in this manner.

Theoretically viral marketing sounds like the ultimate solution for a start-up company's marketing requirements. It should however be noted that it may be difficult to motivate others to pass along viral messages which means that some viral marketing campaigns will inevitably

suffer horrendous defeats, due to the fact that no-one is circulating the marketing messages in question.

The next logical step would be to determine how to persuade people to pass along a viral message. Dobeles *et al.* (2007:292) mentions that a viral message must be unique and powerful enough to encourage people to pass it on. In terms of viral messages, this means that the message should stir up some emotions within the reader. The more successful the message is at imprinting powerful emotional feelings into the reader, the more a person would be encouraged to pass the message along. A message containing an extremely funny joke on the one end of the spectrum, or perhaps a photo of a starving child in Africa on the other end of the spectrum may stir up enough emotions in the reader to encourage him/her to pass the message along. This would also imply that self-serving marketing emails would generally be unable to invoke such emotions in individuals which mean that it is unlikely that they would be able to be distributed in a viral manner.

An example of a viral advertisement that stirred up some emotions, particularly among males is an advertising campaign created by Honda to market its Accord vehicle range. Honda recently launched a viral marketing promotion through the creation of a two minute film that provokes a feeling of fun and excitement by utilising the element of surprise (Dobeles *et al.*, 2007:297). Dobeles *et al.* (2007:297) mentions that that a part of the film has shown how a Honda Accord is constructed. The campaign started with only a handful of emails. Within a question of three years, more than 4.5 million people saw the short film (Dobeles *et al.*, 2007:292).

The Honda example illustrates how viral marketing can be applied to create a message that others would willingly pass along. The video did not at any stage focus on the direct needs of the Honda (in other words, to generate sales), but it focussed on providing video watchers with something that they could talk about to their friends and colleagues. The sales associated with the marketing campaign would result from the product awareness created in the target group watching the video.

It has now been determined that a viral message distributed should invoke an emotional response within the reader. It can be assumed that some people may simply lack the motivation to pass along viral messages. One way to motivate people to pass along viral messages would be to include them in a special group that received product information before the general public. This may motivate them to pass along information that others do not have access to yet as this act would prove their status within a social structure (Wiedemann, Haunstetter & Pousttchi, 2008:82). The readers would therefore be more likely to pass along the viral message if the act helps them to promote themselves in a social structure.

Viral messages will not be distributed if no cost-effective and easy way exists to do so. An efficient way to communicate the viral messages to others should therefore be made available to allow users to communicate the newly found knowledge with others (Jansen *et al.*, 2011:5). This will also help the proliferation of viral messages. A feature on a site that allows users to send invitation messages to their friends could for example help to attract new users using the reputation of the sender as the primary driver for user attraction.

2.8.2. On-line security

Attracting users through marketing is not enough to motivate users to join and participate in online service consumption. Some form of end-user data protection will also have to be supplied by the service provider to ensure the confidentiality of the end-user's personal information. Security is therefore a big concern for any company or individual that would potentially make use of online service offerings (Dubey & Wagle, 2007:1).

Subashini & Kavitha (2010:3) mention that studies performed by the Cloud Security Alliance indicates that business experience the need to take advantage of online service offerings but the perceived risk of using such an offering far outweighs the added benefit (Subashini & Kavitha, 2010:3). This means that security will have to be given some thought to ensure the safety of enterprise data.

From the perspective of enterprise data storage and access the use of the service model does pose some interesting challenges. Traditionally enterprise data would be stored on-site or on hardware designated for the exclusive use of the enterprise. This situation however is much different in the service environment. Subashini & Kavitha (2010:4) mentions that enterprise data would typically be stored outside the boundaries of the enterprise using cloud computing, which means that online service vendors will have to implement additional security measures to ensure the confidentiality and availability of their customer data to make such an offering attractive for enterprise users.

To understand why this is needed we need to refer back to the cloud computing model. Subashini & Kavitha (2010:3) explains that IaaS can be seen as the foundation of cloud services with PaaS built on top of it. SaaS will be built on top of PaaS. What is important to note is that much of the capabilities of SaaS is inherited from its underlying layers. Just like the positive attributes are inherited, similarly the weaknesses are inherited as well, specifically the security weaknesses (Subashini & Kavitha, 2010:3). This means that it is crucial that a service delivery company investigate the potential dangers associated with its chosen infrastructure and platform when developing a service offering to minimize the security risk exposure of its customers.

One of the security-related problems linked to IaaS (and therefore PaaS and SaaS) is the fact that the same infrastructure may be used by various companies at once to host their platforms and services. This implies that it would be possible to access some of the intellectual property of other companies using the same infrastructure without their permission if the infrastructure is not configured correctly, or if a security breach occurred. Subashini & Kavitha (2010:3) supports this view by saying that the infrastructure provider must ensure that its users cannot see each other's information.

In addition, it may also be difficult to guarantee that a user will be able to obtain access to a service when he or she needs it (Subashini & Kavitha, 2010:3). Servers are hit with thousands to millions of requests per second from time to time. The sheer magnitude of the amount of requests may simply cause some requests to be processed and others to be placed on a queue. Under normal conditions this should not be a problem but it may happen that the queue length increases so rapidly that it may take too long for the requests at the back of the queue to be processed. This leads the client's request to eventually "time-out". This phenomenon would generally cause some legitimate users not to obtain access to services that they are licensed to access. Another related problem with regards to availability is linked to server failure. If only one server exists to host various platforms and services and the server should go offline due to hardware or software issues, then all the platforms and services hosted on the server will be unavailable to legitimate users.

Server overload and downtime can generally be combated through the introduction of additional computing power to process user requests. Fortunately some IaaS vendors also allow its customers to purchase additional computing power for certain time periods which means that a SaaS provider would be able to scale its available computing power to match its server load. Availability would therefore be taken care of in this example by the IaaS vendor.

Amazon is currently the undisputed leader in IaaS services. We therefore need to look at what Amazon.com is currently offering in terms of security to understand how security is generally managed in the cloud. The data stored by Amazon S3 is not encrypted by default, and it is therefore up to the user to encrypt the data (Subashini & Kavitha, 2010:7). This decision can easily be justified due to the fact that not all information needs to be confidential. Some websites for example will only serve public data. To protect data that would be available to anyone would therefore be senseless. It is therefore up to the customers to decide his/her data requirements and act accordingly.

Amazon S3 offers data protection to its customers with Secure Socket Layer (SSL) end-point encryption (Subashini & Kavitha, 2010:4). This means that eaves-droppers would not be able to listen in on communications between Amazon and its customers, if SSL is enabled by the customer.

A rather technical problem with SSL is linked to way in which security certificates, used to validate the authenticity of websites, are managed. Ghosh & Swaminatha (2001:52) describe an attack on SSL that relies on a common mistake made by various SSL implementations in which the SSL certificate is only checked once when the connection is authenticated. The reader may refer to Ghosh & Swaminatha (2001:52) for more information on SSL attacks.

The security-related topics discussed so far generally dealt with technical issues. It should be noted that some legal issues may also have to be addressed. Subashini & Kavitha (2010:5) highlights an interesting problem with regards to jurisdiction. Certain types of information may not leave certain countries which raise a simple issue namely under which jurisdiction data would fall that is stored in the cloud (Subashini & Kavitha, 2010:5).

To illustrate the problem one can look at the example of a file sharing company. Let us assume that a file sharing company stores files that are uploaded by its users in the cloud. Since the files would be stored on an IaaS provider's infrastructure, it would be possible that the systems that are storing the actual files could potentially be anywhere in the world. This may create some problems for online service customers as well as law enforcement officers due to the fact that the rules governing the acquisition of data by law enforcement officers may differ from country to country. IaaS provider should therefore structure their offerings in a way to allow its customers to specify where they want their information to be stored.

2.8.3. Community building

It may be of great importance to some service companies to attract and sustain a thriving community of software developers. This would be especially true for PaaS providers due to the fact that they provide a way to make it easy for others to build their own solutions. Without a developer community a PaaS provider would therefore find it very hard to exist.

Apple's developer community and Google's Android developer community are some great examples of thriving developer communities that continually develop new and exciting software solutions that would help to attract more paying customers to the cellular phones running the platforms. The Apple and Google example should clearly illustrate how it can be beneficial to the service provider if other developers consume and extend its services to attract an even larger user base.

Quayle (2008) managed to identify several topics that should be considered when building a community around a platform offering, namely:

- Platform providers should know their audience;
- Plenty of examples and development tools should be supplied to allow the developers to easily develop software for the platform;
- Developer success stories should be marketed to attract others;
- Performance metrics should be aligned to the platform's business goals;
- The platform's business model should be taken in to account when developing the exposed services;
- The developer's community should be integrated into the provider's marketing process to allow the developers to benefit from the initiative.

The work done by Quayle (2008) can therefore be summarised by saying that the platform offering should be structured in a way that would make it beneficial to the community to produce software based on its offerings. The benefits enjoyed by the community would to some extent be dependent on the service offering at hand. A service provider would therefore have to look at its offering and how such an offering can be structured to benefit the developer community while balancing profitability.

2.8.4. Intellectual property

Intellectual property covers a wide spectrum of “creations of the mind” ranging from trademarks, copyright, patents, designs and performance rights (Hannabuss, 1998:187). Another definition for intellectual property is given by Smith (2009:1), namely that intellectual property can be seen as the technical subject matter that enjoys contractual or government-granted protection.

A patent in a country protects the patent owner from imitations of his/her work (Kumazawa & Gomis-Porqueras, 2012:4757). A patent can be infringed directly and indirectly. Direct infringement relates to the act of producing items using patented technology without the consent of the patent owner (Beresford, 2001:258). Indirect infringement would relate to the manufacturing of all components needed to putting the invention into practice within the territory of the patent (Beresford, 2001:258).

It should be noted that not all forms of creation can be patented. For an intellectual property item to be patentable it should make some form of technical contribution (Beresford, 2001:258). Placing a logo of a beaver on a metal cup for example would not make any technical contribution to the working of the cup which means the creation would therefore not be patentable even though some may value the creation.

Before discussing the patentability of software we first need to discuss what software actually is. Software can be seen as a very precise description of a way to solve a problem. The software solution would generally be structured in a way that makes sense to the computing device. It could therefore be said that software can be seen as a recipe that a computer follows to solve problems. The creation of such recipes is obviously very technical in nature and extremely time-consuming. For this reason it would be wise to see how such creations can be protected.

Fourie (2011) mentions that, according to the Patent Act No. 57 of 1978, only certain types of methods or techniques can be patented in South Africa. A method for performing a mental act, such as playing a game or doing business is not considered being an invention for the purpose of the Act. Since software can be seen as a description of a way to perform a mental act it also means that software cannot be patented in South-Africa.

It seems however that software patents are granted in South-Africa due to the fact that the South-African patent system can be described as non-examinatory. Patents are therefore not inspected for patentability before they are granted (Vally, 2010:24). Pouris & Pouris (2011) mentions that software firms, such as Microsoft and Novell, have registered various software-related patents in South-Africa in the past. This however does not mean that these patents would be enforceable as they would in all likelihood be found invalid if the matter should be taken to court.

Software does enjoy copyright protection under the South African Copyright Act No. 98 of 1978 (Pouris & Pouris, 2011). Copyright supplies the creator of a certain work the exclusive right to control the reproduction of its work. It does however not stop anyone else from creating a similar product. Unfortunately the protection provided by copyright is extremely limited (Beresford, 2001). The benefit that a service provider would enjoy under copyright laws would be minimal as the provision of services is already under the control of the provider.

Duplication and distribution of an online service code would be highly unlikely since the finished product is not delivered to the customer, but is used in an environment, controlled by the provider that would make it impossible to duplicate and re-distribute verbatim copies of such a system. It therefore seems that the legal protection that would be enjoyed in South Africa by a service vendor would be minimal.

The way in which the South-African patent system is managed may also be discouraging to inventors. Pouris & Pouris (2011) mentioned that foreign inventors can easily patent their inventions in South-Africa due to the low costs involved. South-African inventors however, may find it very difficult to patent their inventions overseas due to the high costs involved with the registration of foreign patents. In addition, since inventors will have to disclose their inventions

to patent them in South-Africa, they also run the risk of foreigners “borrowing” their inventions and patenting them elsewhere (Pouris & Pouris, 2011).

2.8.5. Location-based services

This section will focus on location-based services and will start off with an introduction to the concept of location-based services. Core issues surrounding location-based services, such as service usage, marketing and location-based service issues will be discussed. This section will establish that opportunity does exist for the provision of location-based services and that the market size for location-based services will increase as more and more users start to use smartphones.

2.8.5.1. Introduction to location-based services

Tobler’s first law of Geography states that everything is related to everything else but things that are nearer to each other are more related than things that are further apart (Li *et al.*, 2008:2). Tobler’s law can be applied to social media due to the fact that people that are located close-by and generally visit the same places are likely to share similar interests (Li *et al.*, 2008:2).

It can be argued that a person’s co-ordinates can be mined over time to uncover a person’s interests. A person that visits a university five times a week and visit the rugby stadium on Saturdays is likely to either work or study at the university and could potentially play or support rugby. A person’s various interests can be combined over time to build a profile. The profile can also be fine-tuned over time to accurately describe a person by simply observing the person’s position in relation to known locations at different time intervals. What makes this concept exciting is the fact that people with similar profiles could potentially be informed of places that they would be interested in, based places others have visited with similar profiles.

The example illustrates one of the many potential uses of technology that takes a user’s location into account. In its simplest form location-based services can therefore be seen as services that take the location of their users into account in some way or another to produce meaningful information.

Khan & Light (2012:2) define location-based services as a social, entertainment or information service that allows a company to engage with its users by using their physical locations to supply services that may be geographically more relevant to them (Khan & Light, 2012:2). Typical location-based services supply their users with up-to-date information about places they are visiting, navigation services, traffic services and similar services that take a user’s location

information into account and derive information that is of value to the end-user (Federal Communications Commission, 2012:3).

2.8.5.2. Location-based service usage

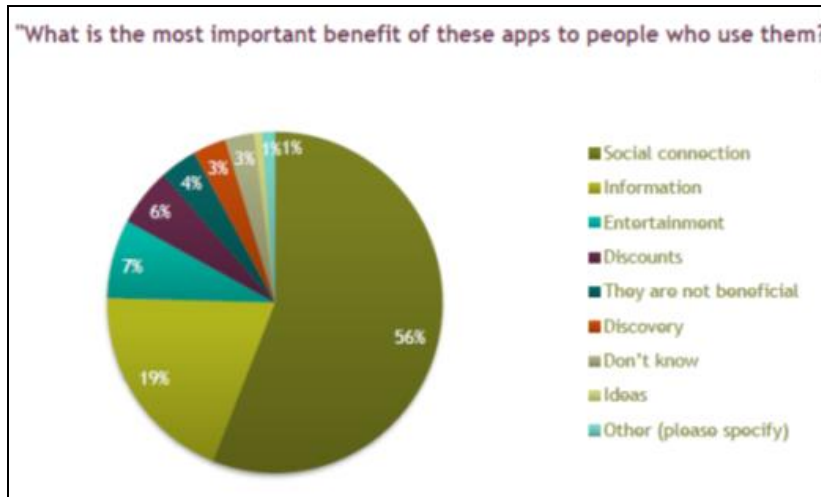
A recent study conducted by Zickuhr (2012:1) has shown that 74% of smartphone users also make use of location-based information services. The Information Security and Control Association (ISACA) also conducted a study on the popularity of location-based social networks. It was found that 58% of smartphone owners use location-based applications (ISACA, 2012:1). ISACA (2012:2) also found that one third of the study participants use location-based applications more than what they did a year previously. The two studies produce results that are relatively far apart from each other. However, even 58% of all smartphone users would be enough to supply the location-based industry with enough users to survive. It can therefore be said that location-based services are in fact widely used.

A recent study was conducted by JiWire (2011) in Canada to determine why people use location-based check-in services. More than 500 respondents between the ages of 15-34 were surveyed and the following findings were obtained:

- 1) Discounts and coupons were their primary motivator for check-ins;
- 2) Contributors generally did not care about sharing their information with their friends;
- 3) An opportunity exists to provide location-based services that go beyond simple check-ins.

A study conducted by Reese & Beckland (2012) on location-based service applications delivered slightly different results. There may be several reasons for this of which one of the reasons is that the study was much broader in a sense that it focused on all location-based services and not just check-in services.

Figure 1: Perceived service delivery benefits.



Source: Reese & Beckland (2012:7).

A total of 56% of the respondents indicated that they use location-based applications for social connections while 19% indicated that they use it to gather information. The study clearly revealed that the user's social and information needs were primary drivers of location-based service usage.

A study on international location-based service usage indicated that about 16.7 million users make use of location-based check-in services (ComScore, 2011). It can therefore be said that the market for location-based check-in services alone is relatively large and other opportunities may exist for more sophisticated location-based services.

Sutton (2012) states that navigation services are currently the highest in demand (estimated at about 52% of location-based service usage) while location-based check-in services are used by about 13% of respondents in a study. Combining this information with the information as discussed by (ComScore, 2011) it can be said that the location-based service industry is massive with various opportunities for the creation of new and innovative services.

Another interesting study was conducted to determine the behaviour of mobile device users when shopping. JiWire (2011:3) found that 39% of mobile device users between the ages of 25-34 are likely to do comparison shopping in-store. In addition a total of 13% of these users will rather purchase the item from their mobile phones than in the actual store. The study also revealed that mobile shoppers are also four times more likely to search for reviews as opposed to searching for recommendations of friends (JiWire, 2011:3). It can therefore be argued that a relatively large part of mobile users use their equipment to do comparative shopping. Such

users may also enjoy shopping platforms that offer comparative shopping, reviews and the option to purchase all in one place.

2.8.5.3. Location-based marketing

Knowing the places that a person has visited in the past along with a generated interest profile could be extremely valuable to marketers. The information would make it possible to perform precision target marketing in a sense that it would be possible to target individuals that fit the profile of a marketer's target audience that are generally located within a certain area.

The value of location-based marketing lies in the opportunity to engage with the customer at the right place at the right time (Khan & Light, 2012:11). A location-based system that tracks cinema attendance records of its users would for example be able to determine the favourite genre, cinema and viewing times of each of the users that it monitors, given that it has access to the movie listings database of each of the cinemas (and assuming that indoor location-based tracking systems are used). This information can be used to suggest upcoming releases to each of the users based on their movie-going patterns. The marketing is therefore much more personalized as it takes the patterns of its users into account when displaying ads.

The concept can even be refined further – it would be possible to activate advertisements if a user should find him/her at a location of interest, as chosen by the marketer. The cinema advertisement example can be extended by stating that the advertisement should only be shown to the target audience when they are either near rival cinemas, DVD shops or possibly stuck in rush-hour traffic on the highway. The possibilities are endless and since the advertisements can address the direct needs of the target audience (possibly when they have those needs) and may lead to greater advertising success. Location-based marketing is therefore very appealing to the retail industry as it allows marketers to customize their messages to more accurately match the needs of their chosen target markets (Khan & Light, 2012:14).

2.8.5.4. Location-based service issues

It may be relatively easy to forget that certain location-based services may be active on computing devices as these services can potentially collect data while running in the background (Ozer *et al.*, 2010). This can be problematic from a privacy perspective as location-based services could potentially record any sensitive information, such as the home address or even current whereabouts of its users.

One example of this problem can be illustrated by simple image geo-tagging (Ozer *et al.*, 2010). Images taken with smartphones can be configured to store the GPS coordinates of the location where the photo was taken inside the digital photo. This feature may be extremely handy for tourist travelling through the country, but it can also be dangerous, especially if photos are taken of places that can be regarded as sensitive. A simple example would be a photo taken of the family pet. A photo of a dog or cat seems harmless enough, but it may in actual fact reveal more information than what may be desired. The photo may contain information about the camera it was taken with, the time it was taken, and more importantly, the location where the photo was taken. This may not be dangerous if the photo was only to be accessed by trusted family members and friends, but this may not always be the case as one has little control of information once it is placed on the internet.

High-tech robbers could for example use Google Images to search for a simple search term such as “latest flat screen TV” in the hope of finding digital photos containing geotags. The robbers in this example could potentially find out when a photo was taken (in other words how recently the TV was acquired), where the photo was taken (if a geotag is present) and possibly how secure the building is in which the TV is kept (by studying the photo). The information would therefore be more than enough to help robbers to easily identify and rob victims by using their information against them. It is therefore crucial to understand how the information can be controlled to minimize the threat associated with location-based services.

Another issue that is highly relevant to location-based services is privacy. A recent study revealed that consumers feel that privacy risks outweigh the potential benefits of location-based services (Federal Communications Commission, 2012:19). One of the reasons why consumers feel strongly about privacy is that they are concerned about the information that is shared with third parties.

The protection of user privacy can be rather challenging when taking into account that the user's location-based information may be accessed by various parties at once. For example, it would be possible that a user's location information is accessed by the wireless carrier, the operating system and the application developer (Federal Communications Commission, 2012:27). What makes the issue of privacy even more worrying is that the amount of parties that could potentially access the information increases even more if cloud services are utilised. This means that the infrastructure provider, platform provider and other service providers in the SaaS value chain could also potentially have access to the location information of a user. It can therefore be said that it may be extremely challenging to guarantee user privacy for location-based service users as various external parties may be involved in providing a service.

There are various ways to address the issue of privacy. One mechanism is to utilise data minimisation to decrease the risk of leaking location-based information (Federal Communications Commission, 2012:30). Data minimisation describes a data reduction technique that will only keep information for as long as it is required. Information that is not needed anymore will simply be removed. This would help to decrease the risk associated with the storage of information on the location-based service provider's infrastructure as the information cannot be exploited by mischievous users after the information has been removed by the service provider. One approach to manage the threat of unwillingly leaking out information with digital photos would be for the service providers to simply strip all additional information from images before making the images available on their services for display and download. Another method would be to inform the user if sensitive information is present and allow the user to determine how the situation should be managed.

The Federal Trade Commission (FTC) developed a privacy framework to address the privacy-related issues with location-based services. The framework should assist service providers in building location-based services that protects the user's privacy better. The Federal Communications Commission (2012:32) recommendations are:

- 1) Privacy by design;
- 2) Simplified consumer choice;
- 3) More transparent data practices.

The privacy by design recommendation is concerned with the design of a service that is secure to begin with. Privacy should be an important focus point in the design of any system that captures and processes sensitive information.

Simplified consumer choice describes the situation in which a user explicitly gives consent to a third party to personal information in a manner that is acceptable to him/her.

More transparent data practices describe the act in which companies are more open with regards to their data usage practices. A company should allow its users reasonable access to the information that it has captured about them. In addition the FTC recommends that privacy notices should be clearer, shorter and more standardized.

It can therefore be said that security and privacy concerns need to be addressed properly by location-based service providers in order to maintain the trust of its users.

2.9. Conclusion

Cloud computing offers various advantages to software developers and software users. Various business models and strategies can be applied to generate sustainable revenue streams from cloud computing.

It can be expected that the demand for location-based services will grow as more users switch to smartphones. It could therefore be worthwhile to provide cloud-based location-based services. A study on the current location-based service competitive environment is therefore recommended to identify niche opportunities in the market.

2.10. Chapter summary

This chapter discussed some key concepts surrounding cloud computing and service delivery. From the discussions conducted in this chapter it should be clear that a company's choice in business models would have a great influence on the success of the company. The dotcom boom of the 1990 taught us that starting and running a business with an incomplete business plan is clearly the incorrect way to approach online business.

A discussion on online marketing revealed that viral marketing may be a good way to market new products and services. Viral marketing messages should focus on the needs of the receiver and will have to invoke certain emotions in the reader to be effective. Viral messages that conform to these requirements will have a higher chance to be distributed.

South-Africans enjoy a very low level of intellectual property protection for software as software cannot be patented in South-Africa. Fortunately software is protected by copyright which means that software cannot simply be copied without the consent of the owner.

This chapter also studied location-based services in closer detail. A discussion on location-based services and the popularity of those services revealed that a large percentage of smartphone users are using location-based services, and that location-based service usage will increase as smartphones become more prevalent.

This chapter revealed that location-based marketing can be very beneficial to retailers largely due to the fact that it allows them to very accurately pinpoint, target and customise their marketing campaigns to fit their target market.

This chapter also uncovered some of the issues that are currently being experienced in the location-based services market. One of the biggest problems with location-based services is the protection of privacy. There are various reasons why it is difficult to protect the privacy of

location-based service users, but implementation of the guidelines as defined by the FTC could help to decrease the risk associated with the use of location-based networks.

3. Empirical study

This chapter will discuss the study performed on already-existing location-based service to uncover location-based service opportunities that can be implemented in South-Africa.

This chapter will start off describing the way in which the research was designed to extract information from public sources. The research design is followed with a discussion on the results produced by the quantitative and qualitative parts of the study.

3.1. Research design

This section will describe the design of the research instruments that will be used to study location-based service companies in more detail.

3.1.1. Information sources

It is a reasonable assumption that no company would voluntarily give up information that could be used as ammunition against itself in battle. Sending questionnaires to location-based companies would therefore be a poor choice as no reasonable employee of any of the already-existing location-based service companies can be expected to divulge sensitive information about their companies. More creative ways of acquiring information about the competition is therefore required to successfully perform the study on location-based service providers.

Fortunately a lot of information about online companies are already available online, most of which can usually be found on the websites of companies under observation. Information, such as the company address, employee information, technology usage, founding dates, provided services and various other pieces of information can easily be obtained through the careful study of competitor websites.

More sensitive information, such as user demographics, daily visits, common search phrases and global website ranking may not easily be published by a company under observation, unless the details are superior to that of the competition in some way or another. Fortunately various web analytics companies exist that gather web usage information from third parties to calculate various interesting figures used to describe the usage characteristics of websites around the world.

Alexa.com is one of the web analytics companies that provide accurate web usage statistics for the most popular websites on the internet. Alexa.com is extremely useful to determine the typical age, education level, location and gender of the typical user of various websites. This information may be helpful when determining the audience that show interest in various

location-based services. Such knowledge could help location-based start-up companies to devise ways of more accurately winning over users of competing location-based service companies.

Another source of information is online company databases. These databases contain information about various companies, such as the company website address, funding sources, employee count and physical addresses. The databases usually serve as good starting points when studying companies as these databases frequently contain links to other relevant sources. Two well-known examples of such databases are Crunchbase.com and BuzzSpark.com. Yet another source of company-related information is LinkedIn.com. LinkedIn contains a wealth of information about company employees and the skills that they possess.

Other information, like patent ownership and intellectual property ownership may be harder to track down due to the fact that a company is not required to make public which patents they own. Fortunately patent search engines, like PatentBuddy.com exist to help determine to some extent which patents belong to the location-based service companies. Patents are also frequently mentioned in court cases which mean that it would also be possible to track down patents that were used in court battles.

It should therefore be clear from the discussion in this section that it would in fact be possible to find out a lot about competitors by simply tracking down and documenting publicly-available information about competition. It can even be argued that the information could be accurate enough or in some cases even more accurate in comparison to information gathered through interview or questionnaire from the competition due to the fact that the competition may try to conceal information that they deem sensitive. Fortunately pieces of the so-called “sensitive information” are scattered all over the Internet. Researchers would in theory simply have to locate the information and compile it into a report.

Some may argue that such a report will only paint a rough picture of a company due to the fact that not all information would be available. This would however be acceptable as the primary purpose of this research is to identify the competition, determine what they do, how the competition makes money and which services they provide to help identify services that can possibly be provided locally. Publicly-available information should therefore be more than sufficient to help answer these questions.

3.1.2. Methodology

A quantitative study combined with a qualitative study was conducted to determine how the players in the location-based industry are doing business and how they are managing to

generate revenue. Some of the concepts discussed throughout this document were also featured in this study. The information type, primary information source and a description of the gathered information for each competitor is presented in the following table.

Table 1: Information to be collected for each location-based service company.

General information	Primary Source(s)	Description
Competitor name	Competitor website	The name of the competing company.
Website address	Competitor website	Web address of the competing company.
Supplied services	Competitor website	The type of location-based services that are supplied by the company.
Estimated amount of employees	Company website, Crunchbase, Buzzspark, LinkedIn.	A rough estimate of the amount of people working at the company. A smaller number could indicate that a company is new or that it has grown very little (if the company was established a few years ago).
Primary office location	Company Website, Crunchbase, Buzzspark, WHOIS website registration database	The physical location of the competitor's offices. In some instances it's rather difficult to determine where the company is located as no physical address is published by the company (and there is no reference to the company's location on the internet). In such instances the WHOIS website registration database will be queried for the address of the person that registered the address as it can be assumed that the person that registered the website would have done it as an employee of the company, thereby supplying the company's

		physical address as a result.
Business		
Revenue generation strategy	Company website	Describes the way that the companies make money. Some websites (especially subscription services) will have dedicated sections covering an explanation of their operations. Other websites may be more candid about their money-making mechanisms. A lot of information about a company's revenue generation can usually be found in its terms of service and privacy policy documents due to the fact that a user will have to agree to what the company in question is doing beforehand.
Geographical areas of operation	Company website	The areas in which the service can be used. Some services will only focus on a specific geographical area while others can be used anywhere in the world.
Supported platforms	Company website	The platforms on which the service can run.
Funding sources	Company website, Crunchbase, Buzzspark, TechCrunch, Internet search	Companies or individuals that supplied the companies with the capital they needed to start operations.
Pricing (if available and applicable)	Company website	Determine the fees charged for the services that the companies deliver (if possible).

Existing partnerships	Company website, Internet search	Any strategic partnerships that may be of value to the company.
Notable customers	Company website	Notable customers using the company's services.
Technology		
Intellectual property	PatentBuddy, Internet search	Any intellectual property that the company may possess or any intellectual property-related legal battles that the company may have been involved with. The legal battles are also important as start-ups with similar ideas may also find themselves in the same legal battles in the future.
Cloud service usage	Company website	Cloud services used by the company to deliver its own services.
Cloud service supply	Company website	Could services supplied by the company that can be used by other companies.
Security	Notable security features	Security is extremely important in the provision of location-based services. All websites were checked to see if they possess any notable security features. Some websites used SSL while others used no encryption whatsoever. Some services didn't even validate user email addresses upon registration.
Privacy	Company website	Privacy is arguably the biggest concern of the location-based service user. The privacy policies of each location-based service company were studied to determine how the companies intend to

		safeguard the information of their users.
Community	Company website	Determine if a third party developer community exists that utilises the services provided by the company.
Website metrics		
Global website ranking	Alexa	World-wide website popularity score.
Website reputation	Alexa	Amount of counted links to company website from external sites.
Page views per user	Alexa	Amount of page views per user. This is measured over a three month period.
Percentage of single clicks on a page (bounce)	Alexa	The single clicks per page, or bounce, indicate that the user only clicked once (to visit the site) which means that the user did not click on anything other than the link to the website. A high number could indicate that users did not find the websites that they were looking for.
Traffic coming from search engines	Alexa	The percentage of traffic that was brought to the site by search engines.
Top search terms	Alexa	The keywords that were used the most frequently when searching for the site.
Traffic by region	Alexa	The geographical areas in which the site was used the most.
Browsing location	Alexa	Determine the most frequent place that people were browsing from. Options are home, school and work.
Most active age group	Alexa	The age group that visited the site the most frequently
Most active gender	Alexa	The gender that uses the website the

		most frequently.
Do the users have children?	Alexa	Determine if the users of the company's services have children.
Education level	Alexa	The general education level of the company's users.
Sites visited before visiting website	Alexa	The websites visited before visiting the company's website.
Sites visited after visiting website	Alexa	The websites visited after visiting the company's website.

The business and technology section of the information gathering instrument will form part of the qualitative study while the website metrics will form part of the quantitative study.

The collected information will help to determine what location-based services companies are doing, the types of services that they provide that have some form of competitive advantage and the types of location-based service types that are over- and under- supplied. All of this information will describe the state of the industry at a specific point in time, which means that location-based service companies will have to use the information within a reasonable amount of time to actually derive benefit from it.

3.1.3. Sample size

The previous section discussed the questions that will have to be answered for location-based services as part of the quantitative and qualitative study. It would be possible to statistically describe a population by studying a sample of the population. The suggested sample size can easily be calculated if the population size is known. Determining the population size in this specific instance may be more problematic than it may seem due to the fact that virtually anyone could start a business or release software claiming it to be related to location-based service delivery.

Another factor that also complicates the matter is the high failure rate associated with technology start-up firms. Start-up companies can only keep going until their funding is depleted. Companies that featured in literature a few years ago may therefore not exist anymore. A simple methodology is therefore needed to calculate a rough estimate of the amount of location-based service companies that currently exist.

For the purpose of this exercise it will be assumed that location-based service companies will have an active and functional webpage. The actual service provided by the company should also be up and running. The study will only focus on location-based service companies that target the consumer. A location-based service company for the purpose of the study should provide a service that is in some way related to various coordinates or places and should have a social focus. Websites of companies should also be in English or be easily translatable. The reason for this decision is that it is extremely difficult to extract and validate information from a source that is written in another language.

The following process will be followed to identify the current location-based services companies:

- Identify location-based service companies mentioned in peer-reviewed research articles;
- Identify location-based service companies registered in the BuzzSpark and Crunchbase company databases;
- Search the internet for location-based service delivery companies;
- Visit the website of each of the location-based service companies and determine if they do in fact qualify for the study;
- Calculate the number of location-based service companies that do indeed qualify.

Please refer to Appendix A for a complete list of identified and qualified companies.

A total of 195 location-based service companies were identified of which 123 qualified. A total of 16% of all the 195 identified location-based companies were not in business anymore, indicating that a relatively high failure rate does indeed exist in the location-based service industry, considering that most companies are only a few years old.

A formula to determine an acceptable sample size is defined by Krejcie & Morgan (1970) as:

$$s = \frac{X^2 NP (1 - P)}{d^2 (N - 1)} + X^2 P (1 - P)$$

The variables used in the equation is summarised in the following table:

Table 2: An explanation of the sample size variables.

S	The required sample size.
X^2	The table value of chi-square at the desired confidence level.
N	Population size.

P	The population proportion.
d	The desired degree of accuracy (expressed as a proportion).

The study should be able to deliver a general answer to what the location-based service provider competitive landscape currently looks like. A sampling error of 9% and confidence level of 95% should therefore be more than sufficient to produce sensible answers. The following table shows the calculation for the required sample size:

Table 3: Sample size calculation.

Population size (N):	123.00
The table value of the 95% confidence level (X)	1.96
Population proportion (P)	0.4
Degree of accuracy (d)	0.09
Sample size:	59.02

A total of 60 samples will be collected to produce sensible results. Popular services will receive priority while less popular services will be selected on an ad-hoc basis. The reason for this decision is that a few services on the internet tend to enjoy considerable popularity while the rest will attract relatively few users. It would therefore be of more value to study the more popular services to identify what the best in the business are doing.

3.2. Discussion

The pieces of information gathered through the study of 60 location-based service delivery companies were analysed by applying descriptive statistics. The qualitative information was also studied and compared. The results will be discussed in the following subsections.

3.2.1. Quantitative study

The descriptive statistics revealed very interesting information about the location-based service companies and their users using the measuring instrument defined in section 3.1.2. A complete

analysis of the location-based data (including the calculated Cronbach Alpha coefficient of 0.79) can be found in Appendix B. A short summary of the analysis will now be presented.

- Most location-based services will experience an average amount of usage while only a few will manage to attract an exceptional amount of users.
- Most location-based service companies will have applications through which its users will access the supplied services. The basic web usage pattern and search engine referrals clearly point to this pattern as users would presumably visit a location-based services company website to find information about the service and download the application. Most of the content will be available within the application and little would be visible to search engines.
- A high percentage of users would find location-based sites by accident and close the location-based service provider's webpage without clicking on any links.
- Location-based service providers are far more likely to provide SaaS services without PaaS or IaaS support (for developers).
- Most sampled location-based service companies target the entire world and not just certain regions.
- Privacy is still a big concern in location-based services. Some companies do have measures in place to protect the privacy of their users, but not all companies have managed to implement such measures.
- Most location-based service delivery companies generate revenue through advertisement, premium services and the provision of white-label software.
- Most location-based services make use of passwords and some also secure communications with SSL. Some location-based service companies are not concerned with security and do not even perform validation of email addresses upon registration.
- The general location-based social network user would be childless, well-educated males between ages of 25-34 browsing the services from work.
- A statistically-significant relationship exists between global website rankings and the amount of backlinks on a site for the studied sample of companies. Website owners are therefore encouraged to increase the amount of web pages linking to their sites to improve their rankings. This confirms the research in section 2.8.1 of this document that states that more backlinks lead to better search engine rankings and increased usage.
- A statistically-significant relationship also exists between the website rankings and the amount of employees on the company's payroll. Companies that have more popular products are likely to earn more money which could in turn be used to hire more employees.

- A statistically-significant relationship also exists between the amount of page views and the amount of single views (bounces) per user. More popular sites may experience less bounces while less popular sites are more likely to experience more bounces. This may indicate that more popular sites may have content that could potentially be of more interest to the user as opposed to content found on less popular sites.
- A relationship also exists between the percentage of traffic brought by search engines and the percentage of traffic that consists only of single clicks. The amount of bounces will increase as the traffic brought from search engines increases. This makes sense due to the fact that search engine results are not always extremely accurate. The amount of traffic coming from people that were actually looking for something else would therefore increase as traffic originating from search engines increase.

3.2.2. Qualitative study

The technology industry is very interesting in the sense that competitors generally compete on a global scale. To compete locally a technology solution will have to address a need unique to the country that it is targeting to make the solution more appealing to its target market. In terms of location-based services the service should provide some kind of feature linked to a physical location that addresses the unique needs of users in a country that is not addressed by other competitors; in other words a local niche strategy could be followed. There are a few issues with this approach of which arguably the most prominent is that the provision of a niche service would decrease the size of the market for the specific product.

Products focusing purely on South-African needs would have a smaller market than products that make no distinction based on location (and therefore usable everywhere). This can be problematic in situations in which volumes are required to produce revenue (such as advertisement-based revenue generation) as the maximum amount of revenue that can be generated is relative to the amount of users using the service. It would therefore be advisable not to pursue advertising-based revenue generation tactics when addressing South-African niche markets due to the fact that size of the market would be relatively small compared to the global market and might not be large enough to produce a sustainable revenue stream.

As discussed previously, South-Africa does not recognise software patents (although it is possible to file software patents). Services focusing on the South-African market are not threatened by patents filed in other countries (assuming that care has been taken to ensure that people from other countries cannot use the service). It would therefore make sense to borrow ideas from other location services and adapt the ideas to fit the needs of the South-African market.

This following subsection will present an analysis of various location-based niches in an attempt to identify niches that could be adapted for the South-African market. Each of the service companies were assigned to one or more categories for the purpose of the study. The categories are:

- Check-in services;
- Coupons and discounts;
- Location-based information;
- Location-based gaming;
- Message sharing;

- Location-based photo sharing;
- Niche location services.

The each of the categories will be analysed using Porter's five forces model (Porter, 2008). A summary of the analysis and findings for each category will be presented in the following subsections.

3.2.2.1. Check-in services

This section will describe the environment in which providers of check-in services currently find themselves. Please refer to Appendix C for a summary of companies providing check-in services. By studying the information in the appendix it should be clear that a relatively large amount of companies already provide check-in services. Some of these companies have been acquired by larger ones during the last few months while others went out of business.

Check-in services are more or less similar in the sense that they allow users to share their current locations with their friends. The only difference between each of the services would be the context in which the check-in services are used. Some services will use the check-in information to alert nearby friends while others will alert people when their friends are visiting certain stores.

A five forces analysis will now be performed to attempt to describe the current macro environment for location-based check-in services.

3.2.2.1.1. Rivalry among competing sellers

- Switching costs are low as most check-in services are provided free-of-charge to the end-user.
- The ways to differentiate one check-in services from another are very limited due to the simplicity of the concept.
- A lot of competitors are already supplying check-in services, as the technical simplicity of the service make it very easy for companies to implement and provide them.
- The overwhelming amount of check-in service providers are located in America, but this does not mean that opportunity exists for localised spin-offs as check-in services can generally be used anywhere in the world.

- Demand for check-in services has grown considerably over the last few years and may also continue to grow as more users are moving to smartphones. This may cause even more competitors to enter the market.
- One large check-in service provider has the majority of users.

Summary: a lot of competition already present in the market, switching cost is low and product differentiation difficult.

Rivalry between competing sellers: strong.

3.2.2.1.2. Buyers

- The power of the end-user is very high due to the fact that is relatively easy to switch from one service to another.
- Check-in services are relatively simple in concept which means that check-in services are relatively standardised.
- End-users are well-informed about the offerings of competitors.
- A lot of end-users in relation to the amount of industry players.

Summary: there are a lot of end-users using check-in services and these users are well-informed about various service offerings and can easily switch to those offerings.

End-user power: strong.

3.2.2.1.3. Suppliers

- Google is one of the dominant suppliers with regard to online services. Google Maps and Google Analytics are in relative high demand.
- Suppliers of map services provide services that are conceptually the same. However, there are some switching costs involved as the ways in which the services are accessed are different between suppliers.
- Suppliers of infrastructure services hold relatively little power as it is relatively easy to switch infrastructure providers.
- Facebook can also be seen as a supplier of social services to complement check-in services provided by some companies. This could create a problem as Facebook also

offers check-in services and could easily implement or clone novel check-in differentiation concepts for their own use.

Summary: suppliers of services used by check-in services are very important to check-in service delivery. Fortunately various service providers already exist that provide services that are conceptually the same. Check-in service providers can therefore easily switch service providers if required.

Supply power: moderate.

3.2.2.1.4. New Entrants

- Various established location-based check-in services are already active in the market.
- A lot of location-based patents already exist that will make it difficult for location-based service providers to enter the market. This would fortunately not be a big concern for truly South-African check-in services (as discussed previously).
- Industry members cannot contest the entry of newcomers (apart from filing restrictive patents) in the check-in service arena, but it can make it much more difficult for non-established players to gain a market share.
- A lot of location-based start-ups are entering the market.

Summary: a lot of established industry players already providing check-in services. Various check-in related patents registered to make it harder for companies to enter the market. It is therefore unlikely that a newcomer would be able to become the dominant player in the market.

New entrant power: weak.

3.2.2.1.5. Substitute products

- Substitute products for location-based check in services would have to be able to inform others of an individual's arrival at a place. Using this broad definition it can be said that anything from social network feeds to cellular phone messages would qualify as substitute products.
- Vast amount of substitute products are available.
- Some substitutes could be used free of charge while others will have some sort of service fee attached. Switching costs to some substitute products are therefore low.

Summary: various substitute products are already available and switching costs are relatively low.

Substitute power: strong.

3.2.2.1.6. Summary

Rivalry for check-in services can be described as relatively strong. There are already a lot of established players which makes it rather difficult for newcomers to enter the market. Various location-based patents also exist which makes it increasingly difficult for newcomers to enter the market. Suppliers of upstream location-based services have some degree of power as they control some of the information used by location-service providers to provide their own services. Fortunately the power of these providers is limited as various competing free and non-free alternatives exist. Taking all the factors into account it can be said that the location-based check-in service industry may not be extremely attractive for newcomers to enter.

3.2.2.2. Coupons and Discounts

Location-based coupon and discount services help to track down discounts and coupons that may be of interest to its users based on their locations. Please refer to Appendix D for a summary of the various location-based coupon and discount services.

A five forces analysis will now be conducted by using the company information found in the appendix and the data collected as part of this study.

3.2.2.2.1. Buyers

- There are a lot of location-based deal services available which means that end-users can easily switch to other services if they choose to do so.
- End-user will have to use deals application that contains deals of partners and locations in which they are interested.
- The end-users are well-informed about other location-based deal offerings and the deals that they managed to offer to their users.
- End-users are likely to be price sensitive.

Summary: the end-users are well-informed about alternative products and are likely to be price sensitive.

Buyer power: strong.

3.2.2.2.2. Suppliers

- The suppliers for location-based deals can be seen as their partners or corporate customers as they supply the deals and discounts that the users desire. The power of the suppliers in this instance is relatively strong as more popular partners may be able to leverage their brand image and brand awareness to negotiate better deals for themselves.
- Suppliers/sponsors of deals can easily create their own deal pages for their mobile applications effectively by-passing the service companies.
- Suppliers of deals and discounts can easily move their deals to other location-based deal service providers.

Summary: the suppliers of deals can easily move their deals to other companies or offer the deals themselves.

Supplier power: strong.

3.2.2.2.3. New Entrants

- Deal and coupon applications are limited in usefulness in locations due to the fact that the deals that they offer will be bound to certain locations. It would therefore be possible to start local deal services by simply negotiating and signing deals with partners that are not involved with deal programs yet.
- Patents and trademarks (such as those possessed by ShopKick) may make it harder for new entrants to launch their products in America. Such patents may pose little threat to regional services in other countries as those patents are unlikely to be valid there.
- Existing location-based or traditional deals providers may choose to create competing services.
- New entrants will have to secure deals with well-known organisations in order to offer users deals that might be of interest. This may be a harder task to perform as new service companies are likely to have to prove to the established organisations that they have the capability to reach the crowds that are of interest to them.

Summary: it may be possible to provide deals for places that have not been targeted by other companies yet. Some patents have been registered that are relevant to the industry, but the patents may not necessarily deter companies focusing on other countries.

Threat of entry: moderate to strong.

3.2.2.2.4. Substitute products

- Deal applications can easily be replaced by locally printed and online advertisements.
- Location-based deals and coupons are provided by multiple service providers as part of various service offerings. It should be rather easy to substitute one service for another.
- Most substitute products are well-priced or even free.
- Low switching costs are incurred by users when switching to competing services.

Summary: substitute products are readily available and switching costs are high.

Substitute power: moderate to strong.

3.2.2.2.5. Rivalry among competing sellers

- A lot of competitors in the market, but due to the fact that the service is tied to geographical locations the rivalry among competitors is relatively weak on a global scale.
- Competitors that secure deals from different companies would be able to co-exist since they are providing users with a larger variety of deal options.
- Firms in the industry will have relatively high fixed costs to keep computer infrastructure up and running and would likely need to have large advertising budgets to promote their services.
- Low switching costs.

Summary: a lot of established service providers already exist. However, it would be possible for service providers to co-exist as long as they provide unique deals.

Rivalry between competing sellers: moderate.

3.2.2.2.6. Summary

From the analysis it should be clear that providing location-based deals to end-users may be rather risky when looking at the current environment due to the fact that the deal companies rely so much on deal supplier companies to supply them with deals. The end-users can also easily switch from one provider to another, which is rather risky as location-based deal companies need to attract users in order to attract companies that would supply them with deals and discounts.

It should however be noted that various deal services can co-exist as long as they all manage to secure deals from different service providers. Location-based deals are also bound to physical locations. It can therefore be argued that some opportunity still exists in areas that have not received location-based deal service coverage (this is also true for South-Africa).

It can also be argued that opportunities exist for white-label location-based service providers to supply deal sources with the applications and software they need to offer their deals directly to their target markets, thereby eliminating location-based deal providers completely. However, it would be advisable to include other location-based services in the offering as well, such as check-in services or photo sharing services, to attract potential customers to use the applications more often. The use of the services could also be tied to rewards in a sense that higher discounts are given to those that use the services more often.

3.2.2.3. Location-based information

Location-based information services provide users with information that could be considered relevant to the locations at which the users may find themselves. Please refer to Appendix E for more information on location-based information companies.

The section is devoted to the discussion on location-based information services. A five forces analysis will now be conducted using the company information found in the appendix and using the data collected as part of the study.

3.2.2.3.1. Buyers

- The end-user can easily switch between offerings, but the quality of information will differ from service provider to service provider.
- Users seeking high-quality information will find it harder to switch between companies as only a few companies have strict guidelines and practices in place to ensure the quality of their information. It can therefore be argued that the end-user can easily switch between low quality offerings while it may be harder to switch between high-quality offerings.
- It is interesting to note that a large number of location-based information services are primarily used by females. A future study could possibly be conducted to determine the difference in service preferences for males and females.

Summary: A lot of information services exist for users to choose from. Users can therefore choose the services providers that they need and possibly switch to other service providers if the information delivered by the service provider is perceived to be of inferior quality.

Buyer power: moderate to strong.

3.2.2.3.2. Suppliers

- Most location-based information companies studied used services provided by Google (such as Google Maps and Google Analytics). However, these services can be substituted for similar services if the supplier's terms become unreasonable.
- Other map services, such as services provided by Microsoft, Apple, and Amazon should help to decrease the amount of power that Google has to influence the users of its map services.

Summary: the services consumed by the location-based service companies are available from various vendors and can easily be substituted.

Supplier power: weak.

3.2.2.3.3. New Entrants

- Relatively easy for a new competitor to start a location-based information service company.
- Various patents already exist and some of these patents are already being enforced by their owners, which may help to create an entry barrier for new players. Fortunately these patents are not applicable to companies that only serve the South-African market.
- Most of the popular location-based information service companies are well funded which will make it harder for new entrants to compete with them.
- Few South-African location-based information companies in existence. Opportunity therefore exists for new entrants to enter the local market.

Summary: relatively easy for newcomers to enter the market. This is especially true for companies focusing on South-Africa.

Threat of entry: strong.

3.2.2.3.4. Substitute products

- Information supplied by location-based sites can easily be found anywhere on the internet, in books or maps. Substitutes are therefore readily available.
- The end user could potentially switch to non-location-based information alternatives at no cost, assuming that a person's time is of no value to him/her. However, in most situations this assumption will not be valid. Location-based information services will make it easier to locate information about places which in theory should save the end-user time. An end-user that chooses not to make use of such services anymore would therefore incur the cost of investing additional time in finding location-based information, which means that he or she would incur a switching cost.

Summary: substitute products are available, but there may be switching costs involved if the substitutes should be utilised.

Threat of substitute products: moderate.

3.2.2.3.5. Rivalry among competing sellers

- Some sellers have extremely innovative ideas (such as Screenscape) while others still make use of outdated software business models.
- It can be argued that the demand for location-based information services is likely to grow as more users switch to smartphones.
- Industry players will have relatively high fixed costs to keep their information systems up and running.
- A large number of industry players are located in the USA.
- Few South-African location-based information services currently available.

Summary: the demand for location-based services is likely to increase as more users start using smartphones.

Rivalry strength: moderate.

3.2.2.3.6. Summary

The location-based information industry seems rather attractive from a South-African perspective, as intellectual property barriers to entry for new players are not applicable to South-African companies that focuses on the local market. In addition, it can be argued that the power of the suppliers and buyers is relatively low, and that the rivalry between location-based information companies can be described as moderate.

It is interesting to note that a lot of the location-based information companies manage to generate revenue through the provision of white-label software. These companies typically offer mobile content management systems that can easily be customised for customer companies. Such a model may be more workable in a South-African context as opposed to advertising. Generating revenue from advertising in South-Africa does not seem feasible as there are simply not enough internet users in South-Africa to make serving advertisements a lucrative investment. The provision of location-based information systems using the white-label software approach could be one way to enter the location-based services market.

3.2.2.4. Location-based gaming

Location-based gaming services provide games and gaming services that are linked to geographical areas in some way or another. Please refer to Appendix F for more information on the identified gaming companies. The rest of this section will discuss the location-based gaming

environment. A five forces analysis will now be conducted using the company information found in the appendix and using the data collected as part of the study.

3.2.2.4.1. Buyers

- It is difficult to determine the cost of switching to competing products, as gaming services may not always be available for a user's country of residence. In such situations there are no alternative location-based games to switch to, which means that the end-user will still use the service (if available), even if they dislike some parts of it.
- An involved gamer is unlikely to switch to a different game, as the types of games provided are unlikely to be the same.
- Location-based games are not standardised and have various unique aspects to them.

Summary: location-based gamers can potentially switch from one game to the other but are unlikely to do so if a game offers a certain feature or characteristic that is valued by the user.

Buyer power: weak to moderate.

3.2.2.4.2. Suppliers

- Most location-based information companies studied used services provided by Google (such as Google Maps and Google Analytics). However, these services can be substituted for similar services if the supplier's terms become unreasonable.
- Other map services, such as services provided by Microsoft, Apple, and Amazon, should help to decrease the amount of power that Google has to influence the users of its map services.
- Providers of other technologies, such as audio compression or 3D rendering technologies would have a limited amount of power as it would be possible to replace the technologies used with a relative amount of ease in a well-designed system.

Summary: the services consumed by the location-based service companies are available from various vendors and can easily be substituted.

Supplier power: weak.

3.2.2.4.3. New Entrants

- Barriers to entry are rather low for new entrants.

- Industry members will generally focus on their region of operations, which means that those not covered by the industry members are still available for new entrants.
- Skilled employees are required to develop location-based games, which mean that new entrants will also have to acquire people with the right skills (which may be costly).

Summary: a company can easily enter the location-based gaming industry if the company has the right human capital.

Threat of entry: moderate to strong.

3.2.2.4.4. Substitute products

- Substitute products, such as real-world scavenger hunts and geocaching, are available and likely to be free of charge.
- Low physical cost of switching between substitutes.

Summary: relatively easy to switch to substitute products and low switching costs are involved.

Threat of substitute products: strong.

3.2.2.4.5. Rivalry among competing sellers

- Location-based gaming is fixed to physical locations due to the fact that the games revolve around GPS coordinates.
- Location-based games are focussed on physical locations. It can be argued that location-based gaming companies are only competing if two companies provide location-based games that incorporate the same geographical area in their game play.
- There are not a lot of location-based gaming companies, and none of them are focussing on South-Africa, which means that an opportunity exists to provide location-based gaming services in this country.
- It can be argued that the size of the market for location-based gaming is likely to grow as more users switch to smartphones.

Summary: location-based games are fixed to physical locations. It can therefore be argued that companies are only competing if they provide location-based games for the same geographical locations.

Rivalry among competing sellers: weak.

3.2.2.4.6. Summary

Location-based gaming seems relatively attractive, due to the fact that only a few competitors exist and none of them are actively targeting South-Africa. This means that opportunities exist to implement similar offerings for various South-African cities.

3.2.2.5. Message sharing

Location-based message sharing can be described as services that allow users to share messages that are relevant to specific locations. An example of such a service includes information about special offers that are sent to a user's smartphone when he/she enter a store's parking lot.

Please refer to Appendix G for more information on location-based message sharing companies. This section will discuss the environment for location-based message sharing in more detail. A five forces analysis will now be conducted using the company information found in the appendix and using the data collected as part of this study.

3.2.2.5.1. Buyers

- The buyers in this example can be divided into two groups – business buyers and personal users.
- The business buyers that consume location-based messaging services as part of their offerings should be able to switch between suppliers with moderate ease, as their offering will have to be changed to accommodate the switch.
- Business buyers can easily create their own message push services and stop using the services provided by the SaaS companies.
- Personal users can switch between offerings, but other offerings may not necessarily have all the user's acquaintances registered to use the service, which may also make switching more difficult.
- Personal users can access the service to inform others of notable or interesting occurrences. Relatively easy to switch between services, as these services tend to be free.

Summary: business users and personal users can easily switch between services, but the services may not necessarily offer the same advantages or level of expose supplied by more popular services.

Buyer power: moderate.

3.2.2.5.2. Suppliers

- Suppliers in the location-based message industry can be seen as infrastructure providers and map providers.
- Infrastructure and map providers can easily be replaced by other services providers.
- Supplier components are critical, but can be replaced by similar components from other suppliers if needed.

Summary: the services consumed by the location-based service companies are available from various vendors and can easily be substituted.

Supplier power: weak.

3.2.2.5.3. New Entrants

- Few barriers to entry exists which means that new entrants could easily come into the market.
- Companies making use of the current services can easily create their own versions of the service and compete against already-established companies.

Summary: few barriers to entry exist and it would be relatively easy to create competing products.

Threat of new entrants: high.

3.2.2.5.4. Substitute products

- Substitute products such as text messaging, billboards and fliers are available. Switching costs may be a deterrent as these options could possibly be more expensive.

Summary: substitutes are available, but may be more costly to use.

Threat of substitute products: moderate.

3.2.2.5.5. Rivalry among competing sellers

- A few service companies that supply location-based messaging services.

- The products of the competitors are not directly linked to physical location which means that it can generally be used anywhere in the world.
- White label software and transaction-based pricing seem to be popular due to the fact that a lot of the location-based services are provided by upstream suppliers.
- It can be argued that demand for location-based messaging services will grow as more end-users switch to smartphones.

Summary: the market for location-based messaging services is expected to grow in the future and companies could take advantage of this opportunity by supplying white-label solutions to corporate customers.

Rivalry power: weak.

3.2.2.5.6. Summary

The location-based messaging market could be profitable to enter for a while, but profits can easily start to deteriorate as more competition starts to enter the market. Starting a location-based messaging service in South-Africa does not offer any considerable advantage globally. It should also be mentioned that the location-based messaging services can easily be copied and replaced by companies currently making use of those services. Location-based messaging (targeting end-users and business customers) can therefore serve as a good secondary product idea, but unlikely to be sustainable in the long run as a primary product.

3.2.2.6. Location-based photo sharing

Location-based photo sharing services provide ways for users to share photos linked to geographical locations. Please refer to Appendix H for more information on location-based photo sharing companies.

The rest of this section will describe the environment for location-based photo services in more detail. A five-forces analysis will now be conducted using the company information found in the appendix, and using the collected as part of the study.

3.2.2.6.1. Buyers

- Buyers are likely to be price sensitive as they are unlikely to pay for a service that is provided free of charge by another provider, unless the service provides substantial benefits. It is rather unlikely that location-based photo sharing would be able to produce such benefits which the users value enough to pay a premium for. However, buyers may be willing to pay for additional photo storage which means that a freemium strategy could possibly be implemented.
- Little room for differentiation as location-based photo sharing is a relatively fixed concept.
- The buyer's cost of switching to competing services are low in terms of monetary value but higher when taking into account that photos may not be available to friends on different location-based networks once a user switched.

Summary: buyers could easily switch to other photo sharing services, but other services may not necessarily provide the exposure that some of the more popular services provide.

Buyer power: moderate.

3.2.2.6.2. Suppliers

- Google is one of the dominant suppliers with regard to online services. Google Maps and Google Analytics are in high demand among online service consumers.
- Suppliers of map services provide services that are conceptually the same. However, there are some switching costs involved as the ways in which the services are accessed are different between suppliers.
- Suppliers of infrastructure services hold relatively little power, as it is not extremely difficult to switch between infrastructure providers.

Summary: the services consumed by the location-based service companies are available from various vendors and can easily be substituted.

Supplier power: low.

3.2.2.6.3. New Entrants

- Relatively high barriers to entry as established players are already providing photo sharing services.
- Cost of bandwidth and storage can be expected to be high due the nature of multimedia products.
- Relatively simple to create photo sharing services and therefore enter the market.
- Most of the services provided are ad-supported or generate revenue through listings or product placements. A purely South-African service provider will not be able to generate a substantial revenue stream in that way as the potential South-African user base is relatively small.
- No advantage to being a South-African service provider, apart from the fact that a South-African service provider may be able to sidestep patent-related battles. Bandwidth and storage will be considerably more expensive, which means that a South-African photo service provider will gain little benefit by being located in South-Africa.

Summary: established players already exist in the market and relatively high operating costs linked to photo sharing services.

Threat of entry: low.

3.2.2.6.4. Substitute products

- Substitute products, such as photos with hand-written descriptions and other methods to convey location-based information, are readily available. The uniqueness of location-based photo sharing is therefore relatively low.
- Location-based photo services will have a performance advantage in a sense that the services can approximate (or in some instances detect) the area in which a photo was taken. Substitute products are unlikely to have this capability, which means that there is a slight advantage to using location-based photo services.

- Digital substitute services are likely to be free, while physical substitutes (such as printed photos) are likely to have costs associated with them.

Summary: substitute products are available, but may not have some of the performance or cost advantages associated with location-based photo sharing products.

Threat of substitute products: moderate.

3.2.2.6.5. Rivalry among competing sellers

- Larger players are more likely to capture the location-based photo market share.
- Photo sharing services are offered by many competitors as a complementary service to an already-existing service.
- Competitors that offer stand-alone photo sharing services should therefore offer it in a way that is clearly unique or superior to the complementary offerings of other providers.
- Although the photo sharing services are usually free, there tends to be costs involved in switching (such as photos that are not available to friends not using the service).
- Photos and multimedia consumes more space (compared to text messages), which means that more storage space will be required, which would in turn increase fixed costs for the provider.

Summary: A lot of established industry players already exist and high operating costs. Little opportunity for differentiation exists in the location-based photo sharing market.

Rivalry between competitors: strong.

3.2.2.6.6. Summary

The location-based photo sharing industry seems relatively unattractive due to the fact that location-based photo sharing seems to be offered as a complementary service to already-existing offerings. Competition among players is already strong and it would be rather difficult to differentiate a seemingly standard service to attract users.

It would also be of little advantage to host such a service in South-Africa, or target South-African users as it is of little advantage, when compared to other services, to be located in South-Africa.

3.2.2.7. Niche location services

Niche location services focuses on small niches that currently exist in the location-based service industry. Please refer to Appendix I for more information on companies that focus on niche location-based opportunities in the market.

This section will only focus on the location-based family monitoring niche that currently exists for the purpose of the discussion. A five forces analysis will now be conducted using the company information found in the appendix and using the data collected as part of the study.

3.2.2.7.1. Buyers

- Buyers are likely to be price sensitive.
- Switching costs between suppliers would be relatively low.
- Buyer demand is expected to grow as more families upgrade to smartphones.
- Products can be differentiated substantially depending on the niche.

Summary: buyers are likely to be price sensitive and the market is expected to grow as more families start to use smartphones.

Buyer power: moderate.

3.2.2.7.2. Suppliers

- Google is one of the dominant suppliers with regards to online services.
- Suppliers of map services provide a service that is conceptually the same. However, there are some switching costs involved as the way in which the services are accessed is different between suppliers.
- Suppliers of infrastructure services hold relatively little power as it is not extremely difficult to switch between infrastructure providers.
- Cellular networks may also be seen as suppliers, as the networks could potentially provide enhanced tracking and location services to the companies. Such services could be offered as part of premium packages, which means that the cellular networks may have little power in this example.

Summary: the services consumed by the location-based service companies are available from various vendors and can easily be substituted.

Supplier power: weak.

3.2.2.7.3. New Entrants

- Relatively low barriers to entry.
- US patents already exist, which makes it harder for new companies to enter the market. The patents would fortunately not be valid for players focusing only on the South-African market.
- New players can easily enter the market, which means that the market may become crowded in the future.
- Relatively high economies of scale at work, as tracking services are relatively cheap to supply to thousands or millions of users.

Summary: low barriers of entry and high economies of scale could attract a lot of competition in the near future.

Threat of new entrants: high.

3.2.2.7.4. Substitute products

- Various alternative solutions already provided by firms in other industries.
- SMS, telephone calls and messages are among the substitutes available for location-based family tracking.
- Substitute products are not as convenient as location-based family tracking services.

Summary: a lot of substitute products exist, but the substitutes may not be as convenient (and possibly more expensive) than the services provided by the location-based service companies.

Threat of substitute products: moderate to low.

3.2.2.7.5. Rivalry among competing sellers

- Relatively few service providers that are providing family tracking solutions.
- Size of market may increase as more family members are upgrading to smartphones.
- Industry players from various locations, but none of them are focussing on the needs of South-African users.

- Fixed costs for running a family tracking service would be moderate in terms of hardware and software requirements.
- It seems that industry players providing family tracking services generally provide freemium services which make the market rather attractive to competition.

Summary: relatively few service providers in the market. These providers are not focusing on South-African needs.

Rivalry among sellers: weak.

3.2.2.7.6. Summary

The location-based family tracking niche seems quite attractive, as there are relatively few players active in the market and demand for such services is likely to increase in the future. An opportunity for diversification into other forms of tracking also exists, once a family tracking business has been established.

A family tracking service that is adapted to the needs of the South-African market could be extremely beneficial to end-users, and make sense from a business perspective. Location-based family tracking services should be relatively easy to market, due to the perceived high rate of crime in South-Africa. Competition in the market would also pose little threat, as external competitors are not yet focussing on the South-African market.

3.3. Criticisms

One of the first aspects surrounding the study that may draw the attention of critics is the fact that mostly international location-based services companies were studied. It is true that some location-based companies are already active in South-Africa. However, the purpose of the study is not to identify and study already-existing location-based service companies in South-Africa, but to identify possible ideas that were already implemented elsewhere, that could be provided for the South-African market. A study on the South-African location-based software industry can possibly be undertaken in the future.

It can also be argued that using one source to determine web rankings would not be the optimal way to determine the popularity of location-based services, due to the fact that some location-based companies provide only smartphone applications that do not necessarily have to be downloaded from the service website (as the application can also be downloaded from application stores). This is a valid argument, but it can also be contended that users may do research about a location-based service before installing and using the service. Website owners

would also link to the websites of services that they value, which in turn would increase traffic to the location-based service provider's website. This means that popular services will still receive web traffic, while less popular services may receive very little web traffic. The web statistics can therefore be used as a rough guideline of the popularity of a service.

Various web ranking services exist, but it was decided to use Alexa.com for this study. The reason for this decision was that various web ranking companies use various techniques to determine the global ranking of websites, and therefore comparing the results produced by different companies would be like comparing apples to oranges. The relative position of one location-based website to another, as computed by one source, should be good enough to give a rough estimate of the popularity of online services.

Some critics may also argue that more location-based companies should have been studied. Table 5 shows a list of all location-based companies that qualified for this study. Each one of the websites of the respective companies was visited to evaluate those companies. Companies specialising in different location-based service niches were selected to ensure a variety of services. The reasoning behind this is that it would be better, for the purposes of the study, to identify and examine various niches than to study all the competitors in one niche (e.g. check-in service competitors). Such a study could be conducted in the future should the need arise for such information.

Another criticism may be that the primary source of information for this study was the internet. Some may argue that the internet changes frequently and that the information gathered by the study will not be valid in the near future. This may be true – the internet does change, but along with that there will be changes in the location-based software industry. Opportunities that exist at this moment in time may not be viable in a year from now, due to new players entering the market or changing marketing conditions. In addition, it can also be argued that although some of the data collected would be different if the study was to be repeated, it would in fact deliver comparative results to what a questionnaire would have delivered in a year from now if the exact same persons were to fill in the questionnaires again. There would obviously be some form of deviation, as a lot would have happened in a year's time. People's opinions change, and so will the results of a questionnaire. By taking the information directly from the internet, the study reflects the current state of services provided by location-based service industries and not the opinions of some people about the industry. It would therefore be of more value to people that need an actual reflection of the state of the location-based software industry.

3.4. Conclusion

This chapter has shown that various niche location-based service opportunities may exist within South-Africa. The niche opportunities are largely linked to opportunities that exist for the provision of services that are tightly coupled to physical locations. Identified service niche opportunities include the provision of location-based deal services, location-based information services, location-based gaming and location-based family tracking.

It would be advisable not to follow an advertising-only approach within the South-African market as the target market may not be big enough to make such an approach profitable. A freemium or white-label approach could potentially generate more revenue and therefore be more profitable to South-African location-based service companies.

3.5. Chapter summary

This section will contain a summary of the information in this chapter. The purpose of this section is to concatenate the knowledge gained from the study of the competitors and highlight some of the more interesting examples.

The first company up for discussion is Foursquare. Foursquare is perhaps the most widely recognised check-in service at the time of writing. Foursquare is available on most popular smartphones, ranging from the iPhone, Blackberry, Android, WebOS, Symbian and Windows Mobile. Various other check-in services also exist, and very little can be done to differentiate check-in services due to the sheer simplicity of the services. To create a stand-alone South-African check-in service to compete with Foursquare seems senseless, as not much can be changed (apart from sponsors perhaps). It may however be useful to consider check-in services as a complementary service to other location-based offerings.

Various location-based service companies manage to produce revenue by delivering white-label location-based software to paying corporate customers. The development of white-label software is done by various location-based service companies, notably Mobnotes, FootFeed and Locai. The beauty behind white-label software is that a company can create one customizable product and make it available to various customers as a service. The white-label software company only needs to take care of the development of the software, and it is up to the client company to create content and attract users. It will also be rather challenging to migrate from one white-label software package to another, which means that once a customer starts using the service it is likely to do so for an extended period of time. A white-label strategy may also make sense from a South-African business perspective, as there are a lot of skilled

software developers in South-Africa which are generally cheaper to hire compared with skilled developers in first-world countries.

One interesting service provided by Friendsticker and SCVNGR is location-based scavenger hunts. What makes the idea rather appealing is the inherent capability of the service provider to drive traffic to pre-determined locations, such as shops, gas stations and other points of interest. Scavenger hunt services could also be applied to create various self-guided tours (as in the case with SCVNGR). Value-added services can even be provided in which virtual tours are created for paying customers.

Location-based gaming also seems to be an option that could be implementable in the South-African context, due to the fact that location-based games are tightly coupled to actual locations (such as streets, shops etc.). The concept is implemented by various companies, notably Millform AG and Grey Area.

A simple advertising revenue generation model may not provide enough income to cover the costs of running location-based games in South-Africa, due to the fact that the location-based gaming niche may not be large enough to generate revenue in such a manner. Revenue should therefore be generated more creatively. One way to do this would be to offer referral services to store owners in which store owners pay for the amount of people sent to their stores as part of the scavenger hunt.

Another way to generate revenue could be to provide the entire service for free. However, players are allowed to purchase special items that do not impact the game in any way (such as clothing) or even better still – save some time by skipping mundane tasks that would normally have to be performed. Users with limited time that truly enjoy location-based games could for example pay a fee to speed up the game, or reduce some kind of waiting time that non-paying players will have to go through to complete missions. The end result would be the same for paying and non-paying players, but the paying players would be able to complete their missions in shorter amounts of time.

Another location-based service type that may have a lot of potential within a South-African context is location-based family tracking. International players like LocationLabs, Zoemob and Life360 already provide such services, but none of them currently focusses on the unique needs of the South-African market. Location-based family tracking services can be designed to make use of the freemium model in a sense that a set of core features are provided free of charge. This will be done to attract users. Anything else will have to be paid for by the user as part of a monthly subscription.

4. Study summary

4.1. Introduction

This chapter will provide the reader with a systematic summary of the work discussed in this dissertation. Chapter-by-chapter discussions are provided in the following subsections, followed by a list of final recommendations based on the knowledge gained through the execution of this study.

4.2. Chapter 1

The first chapter of the study supplied the reader with background information on concepts linked to online service delivery. The cloud service model, consisting of IaaS, PaaS, and SaaS, was briefly discussed to supply the reader with enough information to understand the basic concept of online service delivery. Other general concepts surrounding cloud computing, such as security, legal issues and marketing, were also discussed briefly.

The first chapter also discussed the purpose and the scope of the study. The purpose of the research is to study already-existing global location-based service delivery companies to identify the location-based services that have the potential to generate sustainable revenue streams and could be adapted to serve the South-African market.

4.3. Chapter 2

Chapter 2 expanded on the concept of cloud computing and online service delivery in great detail. The benefits associated with the use of the cloud service model were highlighted to help the user gain a better understanding of its strengths. Some of the key benefits included scalability, hardware and resource benefits, decreased software distribution costs, better economies of scale and the composition of services by combining already-existing services from other providers. The list of benefits clearly shows that the use of cloud computing can be extremely beneficial to the software providers as it manages to address various problems plaguing traditional software distribution methods.

The challenges linked to cloud computing were also discussed to allow the reader to gain a better understanding of the strengths and weaknesses of online service provision. The challenges identified include convincing users to switch to cloud services from traditional desktop software, the difficulty of managing the online value chain, reduced product turnover, issues with scalability and high levels of initial investment required to get these services off the ground.

A study of online business models was also conducted to determine how companies manage to generate revenue through the provision of online services. Various well-known online businesses were also discussed to help the reader understand some of the complexities involved with the generation of revenue from online service delivery.

A short discussion on strategy, online marketing, security, community building and intellectual property was also presented to allow the reader to grasp other, less direct, aspects of online service delivery that would have an impact on the success of an online business.

The chapter also described location-based services in more detail, and offered explanations as to why people use them. Surveys were conducted by researchers to determine why people use location-based services and the types of these services they generally use. The survey results were studied and discussed in an attempt to better understand user characteristics of the location-based service industry.

The concept of location-based marketing and its advantages were also discussed in great detail. From the discussion it became evident that location-based marketing is likely to grow considerably in the future as smartphones become more prevalent. The perceived problems of location-based service delivery are closely linked privacy and security issues. Some recommendations on how to create mechanisms to safeguard user privacy have also been discussed to help the reader understand how the problems can be addressed.

4.4. Chapter 3

Chapter 3 contains a study of existing location-based services in an attempt to determine which services could be reproduced in South-Africa. The study was conducted by firstly identifying the major players in the location-based services industry. This was done through literature studies, internet searches and internet company database searches. A total of 195 location-based service companies were identified. Each one of the company websites was visited and evaluated in an attempt to identify companies that met the study criteria. A total of 123 companies qualified for the study.

It was calculated that a total of sixty location-based companies had to be studied to provide reasonable results. Sixty prominent location-based service companies were selected from the qualified company list. Information about these companies was collected from various sources and compiled into one document containing the research data. The data was analysed and the findings were discussed.

4.5. Recommendations

It is interesting to note that a study of the location-based service usage patterns revealed that most location-based services will not attract a lot of users, with the exception of a few services that would basically attract the majority of users. It is therefore advisable for start-ups not to enter a niche location-based service segment in which a dominant player is already present. This is especially true for check-in services and photo sharing services, due to the fact that powerful competitors already managed to attract the majority of users existing in those niche areas.

It was also interesting to note that most location-based service companies target the entire world (and not just a country or continent). Services that are geographically bound to certain locations (such as location-based games that depend on the layout of specific cities and are designed accordingly) would be able to by-pass international competition (assuming that the international competition is not targeting South-Africa), due to the fact that the service cannot easily be reproduced at other geographical areas. It would therefore be advisable to provide services locally that would require a considerable amount of investment for international players to provide in South-Africa. Examples include location-based gaming and possibly location-based deals (although location-based deal market already has a few competitors in South-Africa and is therefore not extremely attractive).

It seems like a large amount of location-based service companies are generating revenue through advertisements, premium services and the creation of white-label software. Generating revenue through advertisements would make sense when a service can draw a relatively large amount of users. However, this strategy may not make sense when a product is focussed on a specific niche, due to the fact that the size of the potential user base decreases the more specialised a niche becomes. Advertising-based revenue generation therefore is not recommended as a primary source of revenue generation for a South-African location-based service company, due to the fact that the niche would in all likelihood be relatively small. The provision of premium services and the creation of white-label software may be more feasible, and therefore recommended above stand-alone advertising-based strategies. Advertising can however be applied to generate additional revenue.

The analysis of numeric data also revealed that a statistically-significant relationship exists between the amount of links to a webpage (originating from other sites), and its global ranking. It is therefore advisable that online services make it as easy as possible for third-party websites to link to them. A recommendation on how this can be achieved is to add easy accessible buttons on webpages, or application user-interfaces, to share content on Facebook, Google+

and other services. This simple action could help to generate more exposure for content provided by online services.

The study also revealed that more popular websites generally experience less single-click visits (bounces) than less popular sites. It can therefore be argued that more popular sites are likely to have content that is of greater interest to users. It would therefore be advisable that companies generate content that is of value to the end-user, to keep them interested in the service. If the content is user-generated then it is advisable that some form of mechanism is implemented to separate higher quality content from lower quality content through the implementation of some kind of ranking mechanism in an attempt to provide higher quality content first to users (to keep end-users interested).

It is also interesting to note that a relationship exists between the amount of single-click visits and the amount of traffic generated through search engine referrals. It would therefore be advisable not to rely on search engines as the primary vehicle to bring users to a service website, but rather as one of the many tools to drive traffic to a site.

The study revealed that a lot of check-in services already exist, and that it would be senseless to create yet another check-in service, as the niche provides little room for differentiation. It would also be of little advantage for a South-African location-based service company to provide only check-in services (apart from cheaper skilled labour compared to developed countries). It would therefore be advisable not to provide check-in services as a primary service, but rather as a complement to another location-based service.

It can be said that the provision of white-label location-based software can make sense in South-Africa for various reasons, which include access to relatively inexpensive skilled labour (compared to first-world countries). White-label software also has the advantage that one service can be customized and supplied to hundreds or thousands of paying corporate customers, at a fraction of the cost for any of the corporations to develop such services for their own consumption.

It was also mentioned in the dissertation that the location-based service market in South-Africa can be seen as a niche market, which means that the amount of users that would use the service would generally be low. It would therefore not be recommended that South-African location-based services implement an advertising-only revenue generation model, due to the fact that it may not be sustainable. A freemium revenue generation model (in which the free version is ad-supported) would be more viable and would therefore be recommended above an advertisement-only revenue generation model.

It has been argued throughout this dissertation that specific location-based niche services will have to be connected to a country or characteristics of a country for the service to be successfully reproduced in South-Africa, without having to be threatened by international competition. Three types of location-based services are recommended. Each of the recommendations will now be discussed.

4.5.1. Location-based family tracking

The Location-based family tracking concept has the capability to address a huge problem in South-Africa: crime. It can be argued that most parents would feel slightly concerned about their children when their children leave the house to visit friends or to attend sporting events. Location-based family tracking software could help to supply concerned parents with the tools that they need to ensure that their children are safe.

The service can follow possibly a subscription or freemium model to generate revenue. Pricing could possibly be done on a handset or family basis. It can be argued that most families would gladly pay a reasonable amount to have the peace of mind of knowing where their family members are, which means that it would not be too difficult to convince caring parents to subscribe their families to the service.

The service can also be customised for South-African users by supplying multilingual smartphone applications (supporting various African languages) and by incorporating South-African safety points of interest (such as hospitals, doctors and police stations), along with South-African emergency numbers.

The following features are recommended for such a service:

- Support for multiple languages.
- Database of South-African points of interests.
- Database of South-African emergency numbers.
- Geo-fencing to alert parents if their children are going to undesirable places.
- Speeding vehicle alerts that can be configured to take South-African speed limits into account.
- Current location requests in which one person can send a request to another family member for his/her location.
- Stolen smartphone lockdown feature.
- Emergency button to immediately inform family members of a problem. This feature should be able to work over the internet, SMS or voice to allow the emergency

message to get through, regardless of the type of network services available at the place where the family member is located.

4.5.2. Location-based scavenger hunts

Location-based scavenger hunts/virtual tours can also be implemented successfully in South-Africa largely due to the fact that scavenger hunts are also directly linked to physical locations. Scavenger hunt software could be provided free of charge to the end-users. Revenue can be generated in various ways, namely:

- Through the provision of scavenger hunt creation services in which tours are created for large institutions for a pre-determined fee.
- Corporate customers can also be charged for the amount of scavenger hunts that were served or simply a monthly hosting fee to keep the corporate tours online.
- Revenue can also be generated for non-corporate scavenger hunts by partnering with local shop owners. Shop owners can pay for the additional traffic brought to their stores, which can be monitored by allowing the shop owners to read an identification code from each of the scavenger hunt users. The users would in turn receive some form of points or tokens that would allow them to continue with the hunt.
- The end-user could also be allowed to create scavenger hunts. The creator of a scavenger hunt could be allowed to share a part of the revenue generated by the company as a result of scavenger hunts performed. This would serve as an incentive to end-users to create their own content and to inform other users about the service.

4.5.3. Location-based gaming

Yet another service that can be implemented successfully in South-Africa is location-based gaming due to the fact that location-based games are tightly coupled to operational environments. Location-based game services could potentially create game maps by creating games for the streets of large cities, like Johannesburg, Durban, Pretoria and Cape Town. The location-based games could possibly generate revenue in various ways, namely the displaying of in-game advertisements, along with the sale of virtual items or even the sale of a premium version of the game with more features.

A location-based gaming company can easily be taken from a South-African context to the entire world by making use of the service's user base. This can be done by paying users to create location-based game maps all around the world. The way in which this could work is simple: the location-based service company can supply a map creator application to interested

individuals. These individuals can use the application to create playable maps for other users living in the same area. Each map creator will receive a part of the revenue generated as a result of other players playing the game using maps that they have created. This would inspire more users to create maps around the world and also motivate them to tell their friends about the service.

4.6. Conclusion

This dissertation discussed various aspects surrounding cloud computing and online service delivery. An in-depth study was performed to identify services that could be implemented successfully within a South-African context. Location-based family tracking, location-based scavenger hunts and location-based gaming seem like good candidates for implementation within South-Africa due to the fact that these services can be linked directly to physical geographical areas.

Various opportunities therefore exist in the location-based service market within South-Africa that can be addressed by location-based service companies to generate sustainable revenue streams.

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6. Abbreviations

This section contains the abbreviations used in this document.

Table 4: Abbreviations used in this document.

Abbreviation	Meaning
ASP	Application Service Provider
CRM	Customer Relationship Management
DNS	Domain Name System
DVD	Digital Video Disc
FTC	Federal Trade Commission
GPS	Global Positioning System
IaaS	Infrastructure as a Service
IDC	International Data Corporation
ISACA	Information Security and Control Association
IT	Information Technology
PaaS	Platform as a Service
SaaS	Software as a Service
SaaS	Software as a Service
SSL	Secure Socket Layer
US	United States
USA	United States of America
VAT	Value-Added Tax

Appendix A

The following table presents a summary of the evaluation of each of the identified location-based service websites.

Table 5: Location-based service company evaluation sheet.

Website	Finding
http://beta.amgonna.com/login	Acceptable
http://blockboard.org	Acceptable
http://br.kekanto.com/sp/sao-paulo	Not relevant
http://brechoh.com.br/	Not relevant
http://btree.co.il/projects/chatsquare/	Not active
http://carlsays.com/	Not active
http://cartomapic.com/	Acceptable
http://cityrend.com/	Not working
http://citysquares.com	Acceptable
http://dailyplaces.com	Acceptable
http://eatdrink.it/	Not relevant
http://echoer.com/	Acceptable
http://en.friendticker.com	Acceptable
http://faces.in/	Not active

http://fongdu.com/	Acceptable
http://footfeed.com/	Acceptable
http://frestyl.com/	Not active
http://gbanga.com/	Acceptable
http://geomium.com/	Not relevant
http://grublits.com/	Acceptable
http://impulcity.com/	Acceptable
http://irlconnect.com/	Acceptable
http://jiepang.com/	Acceptable
http://loku.com	Acceptable
http://lukkin.com/	Acceptable
http://mnvr.me/	Not active
http://mobile.webtrends.com	Acceptable
http://monadik.com/	Not relevant
http://mycityway.com/	Acceptable
http://mygpsid.com/	Not active
http://playd.it/	Not working
http://primospot.com/	Acceptable
http://screenscape.net	Acceptable
http://shownearby.com/	Acceptable

http://slmtechnology.com/	Acceptable
http://socialight.com	Acceptable
http://spotpulse.com/	Not working
http://spotscore.com/	Not working
http://streetmavens.com/	Not working
http://sweepio.com/	Acceptable
http://teemew.com/	Not working
http://tellmewhere.com	Acceptable
http://tupalo.com/	Acceptable
http://tymr.com	Acceptable
http://urbanairship.com/	Acceptable
http://walkbase.com/	Acceptable
http://waysgo.com/everything	Acceptable
http://where.com/	Acceptable
http://whonear.me/	Acceptable
http://wifislam.com/	Acceptable
http://www.armadealo.com	Acceptable
http://www.barspace.tv/	Not active

http://www.beatthetraffic.com/	Acceptable
http://www.bigredzebra.de	Acceptable
http://www.bluelightapp.com/	Not relevant
http://www.bodsix.com/	Acceptable
http://www.booyah.com/	Acceptable
http://www.brian-industries.com/	Acceptable
http://www.buddhatheapp.com/	Not active
http://www.checkineasy.com/	Acceptable
http://www.checkpoints.com/	Acceptable
http://www.citysearch.com/	Acceptable
http://www.citysourced.com/	Acceptable
http://www.crowdzone.com/	Acceptable
http://www.crunchbase.com/company/apploors	Not active
http://www.crunchbase.com/company/a-r-o	Not relevant
http://www.crunchbase.com/company/cnectd	Not relevant
http://www.crunchbase.com/company/crowdhopp	Not relevant

http://www.crunchbase.com/company/firefly-4	Not working
http://www.crunchbase.com/company/h-ourspot	Not active
http://www.crunchbase.com/company/i-tv	Not relevant
http://www.crunchbase.com/company/milna-studios	Not relevant
http://www.crunchbase.com/company/oobook	Not relevant
http://www.crunchbase.com/company/olivia-greets	Not relevant
http://www.crunchbase.com/company/ozmota	Not relevant
http://www.crunchbase.com/company/pocketweb-ltd	Not relevant
http://www.crunchbase.com/company/spirent	Not relevant
http://www.crunchbase.com/company/telcobridges	Not relevant
http://www.dinamundo.com/	Acceptable
http://www.ditto.me/	Acceptable
http://www.drinkpass.me/	Not active
http://www.drumo.com/index.htm	Acceptable
http://www.everywaretechnologies.com/apps/pcube	Acceptable
http://www.evotz.com/	Not relevant

http://www.explorencence.com/	Acceptable
http://www.facebook.com	Acceptable
http://www.fiddme.com/	Acceptable
http://www.fullcircle.net/	Acceptable
http://www.fyesta.com/	Acceptable
http://www.gameup.tv/	Not relevant
http://www.geocade.com/	Acceptable
http://www.geodealio.com/	Not relevant
http://www.geodruid.com/	Acceptable
http://www.georeachnetwork.com/index.html	Acceptable
http://www.getbeezy.com/	Acceptable
http://www.getnearme.com/	Acceptable
http://www.glympse.com	Acceptable
http://www.gowalla.com	Acceptable
http://www.happyshop.com/	Not relevant
http://www.heycosmo.com/	Not active
http://www.hotlist.com	Acceptable

http://www.hummba.com/	Acceptable
http://www.insiteo.com/	Acceptable
http://www.intelify.net/	Acceptable
http://www.introbridge.com/	Not working
http://www.iphso.com/	Not relevant
http://www.irlgaming.com/	Not relevant
http://www.kngroo.com/	Not relevant
http://www.latitude-sedona.com/	Not relevant
http://www.leanin.com/	Not relevant
http://www.life360.com/	Acceptable
http://www.livebuzz.com/	Not active
http://www.locai.com/	Acceptable
http://www.loc-aid.com/	Not relevant
http://www.localmind.com/	Acceptable
http://www.locationlabs.com	Acceptable
http://www.locify.com/	Acceptable
http://www.looppt.com	Acceptable

http://www.loqate.com/	Acceptable
http://www.loxi.biz/	Not relevant
http://www.mapicurious.com/	Acceptable
http://www.matchpin.com/	Acceptable
http://www.memap.com/	Acceptable
http://www.meporter.com/	Acceptable
http://www.mergelocal.com	Acceptable
http://www.meridianapps.com/	Acceptable
http://www.mob.ly/	Not active
http://www.mobile-flow.com/	Acceptable
http://www.mobileresearchlabs.com/	Acceptable
http://www.mobnotes.com/	Acceptable
http://www.mowingo.com/	Acceptable
http://www.navmii.com/?country=GB	Acceptable
http://www.navx.com/en/gps/speedcams/	Acceptable
http://www.near2there.com/index.aspx	Acceptable
http://www.nearbyfeed.com	Acceptable

http://www.nutiteq.com	Acceptable
http://www.orbster.com/	Acceptable
http://www.photoenforced.com/	Acceptable
http://www.pickntell.com/	Acceptable
http://www.playbaaju.com/	Not working
http://www.plyce.fr/	Acceptable
http://www.pointinside.com/	Acceptable
http://www.qrumb.com/	Not relevant
http://www.queraltinc.com/	Not relevant
http://www.quipster.co/	Not working
http://www.qwiqq.me/	Not working
http://www.qype.co.uk	Acceptable
http://www.radcarpet.com/	Not active
http://www.reallymet.com/	Acceptable
http://www.recursionsw.com/	Not relevant
http://www.repudo.com/	Acceptable

http://www.rummbble.com/	Acceptable
http://www.safecllc.com/	Acceptable
http://www.safely.com/	Acceptable
http://www.scvngr.com/	Acceptable
http://www.senionlab.com/	Acceptable
http://www.shadowcities.com	Acceptable
http://www.shopkick.com	Acceptable
http://www.shortgps.com/	Not working
http://www.sleeq.com/en/intro/	Acceptable
http://www.slingr.net/	Acceptable
http://www.smarp.com/	Acceptable
http://www.spotzot.com/	Acceptable
http://www.statusscout.com/info.html	Acceptable
http://www.streetlife.com	Acceptable
http://www.tagcrumbs.com/	Not working
http://www.taggstr.com/	Not working

http://www.tangotab.com/jsp/	Acceptable
http://www.teamtrackr.co.uk/	Not active
http://www.telenav.com/	Acceptable
http://www.thirstyvip.com/	Acceptable
http://www.touchwebag.com/	Not relevant
http://www.traqr.com/	Not relevant
http://www.tripadvisor.com/	Acceptable
http://www.trolion.com/	Not relevant
http://www.trover.com/	Acceptable
http://www.truthkit.com/	Not relevant
http://www.urbantag.com/	Acceptable
http://www.widgetrevolt.com/	Not relevant
http://www.wimbim.com/	Acceptable
http://www.xtify.com/	Acceptable
http://www.yellowbot.com	Acceptable
http://www.yelp.com	Acceptable

http://www.youscoopit.com/	Not active
http://www.zagat.com/	Acceptable
http://www.ziemo.de/	Not working
http://www.zipano.com/	Not relevant
http://www.zoscomm.com/	Not relevant
http://wyst.it/	Acceptable
http://yeplike.com/	Not relevant
https://foursquare.com	Acceptable
https://www.loyakk.com/	Acceptable
https://www.zamp.co/	Acceptable
https://www.zoemob.com/en/	Acceptable
playbadger.com	Not relevant

Appendix B

This section contains the statistical analysis performed on the numeric data contained in the quantitative study. The data was analysed using the PHStat software distributed with Statistics for Managers (Levine *et al.*, 2008) in addition to a SaaS offering called StatWing (Statwing, 2012). The statistical analysis of the more interesting items is discussed in the following subsections.

Global website ranking

There were some companies that performed exceptionally well in terms of global website ranking. The website with the best ranking was Facebook.com (ranked second in the world). The mean ranking for all the studies companies was 1,521,520 (with a standard deviation of 2,847,841). The information is illustrated in Table 6.

Table 6: Global website ranking analysis.

Variable	Value
Mean	1521520.91
Standard Deviation	2847841.17
Minimum	2
Maximum	14805243
Largest(1)	14805243
Smallest(1)	2

It can therefore be said that there are a few exceptional performers in the location-based service industry, but most companies will have rather poor global web rankings.

Backlinks

Backlinks can be used as a way to measure the amount of confidence that other web users have in the content displayed on a website. The gathered data once again shows that a few websites are extremely popular while the others are rather average. The minimum amount of backlinks detected in the study was 5 and the maximum 7,704,433. The mean amount of backlinks was 134,463 with a standard deviation of 993,944.

Table 7: Backlink analysis.

Variable	Value
Mean	134464.65
Standard Deviation	993944.60
Minimum	5
Maximum	7703433
Sum	8067879
Largest(1)	7703433
Smallest(1)	5

Page view per user

The mean amount of page views for the location-based company's studies is 3.47 with a standard deviation of 3.01. The information is supplied in the following table.

Table 8: Analysis of page views per user.

Variable	Value
Mean	3.47
Standard Error	0.40
Standard Deviation	3.01
Sample Variance	9.07
Range	17
Minimum	1
Maximum	18

The page views per user are rather interesting as it indicates an expected user access patterns. The 3.47 page views per user indicate that people do generally not care much for the information stored on the location-based service provider company's website. Most of the location-based service providers supply users of their services with mobile applications that can

be used to access the services. This could indicate that the typical user can go to the site of the service company, search for the application download page and download it. The rest of the service access could happen from the mobile application. The higher page views per user websites would typically have content on their sites that users would find worthwhile to view.

Bounces

The amount of website bounces indicates how many people only viewed one page on the site. This would typically indicate that people found the site in some way or another, evaluated the content and found out that this was not what they were looking for. The mean for the amount of bounces in the sample was 48% (in other words 48% of page views were bounces) with a standard deviation of 15%. The following table illustrates this information:

Table 9: The analysis of website bounces.

Variable	Value
Mean	48.37
Median	48.2
Mode	42.9
Standard Deviation	15.39
Minimum	22
Maximum	81.8

It can therefore be said that a high number of visits were due to the fact that people accidentally stumbled upon the website and did not find what they were looking for.

Search engine traffic

A mean of 15% of internet traffic was generated by search engines (with a standard deviation of 10.68%) for the sample. The following table presents the search engine information:

Table 10: The analysis of traffic received from search engines.

Variable	Value
Mean	15.50
Standard Error	1.57
Standard Deviation	10.68
Minimum	2
Maximum	42

It can therefore be said that search engines account for relatively little website traffic to location-based services companies. This can also be expected as location-based services tend to be accessible from location-based service applications and not always from websites.

Supplied cloud services

It is also interesting to note that sampled location-based service companies that do indeed expose their services to downstream vendors are more likely to supply SaaS services. The following table presents the cloud service types provided by the location-based services companies:

Table 11: Cloud service types offered by location-based companies.

Cloud service type	Percentage
IaaS	8.51
PaaS	10.64
SaaS	76.6

Developer resources

The service providers that made their services also available to downstream vendors also need a way to get downstream vendors to easily learn and use their services. The following table reveals more information about facilities created to help downstream vendors:

Table 12: Third-party developer resources.

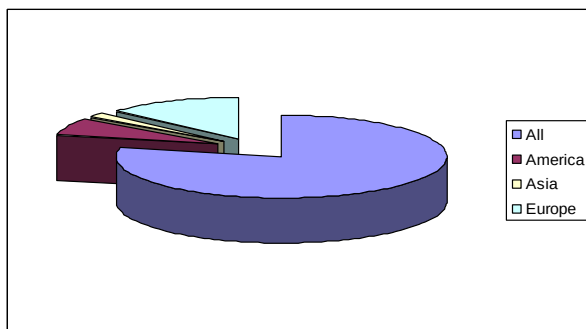
Developer facilities	Total
Examples	17
Has 3rd party developer community	18
Success stories	6

Most sampled service providers that make services available to downstream vendors have examples and a 3rd party developer community. Only a few actually publish success stories of their customers.

Geographical coverage

Most sampled location-based service provided services to the entire world. Only a few provided services to specific geographical locations. The following graph depicts the regions covered by the sampled companies:

Figure 2: Geographical targeting of location-based service companies.



Privacy

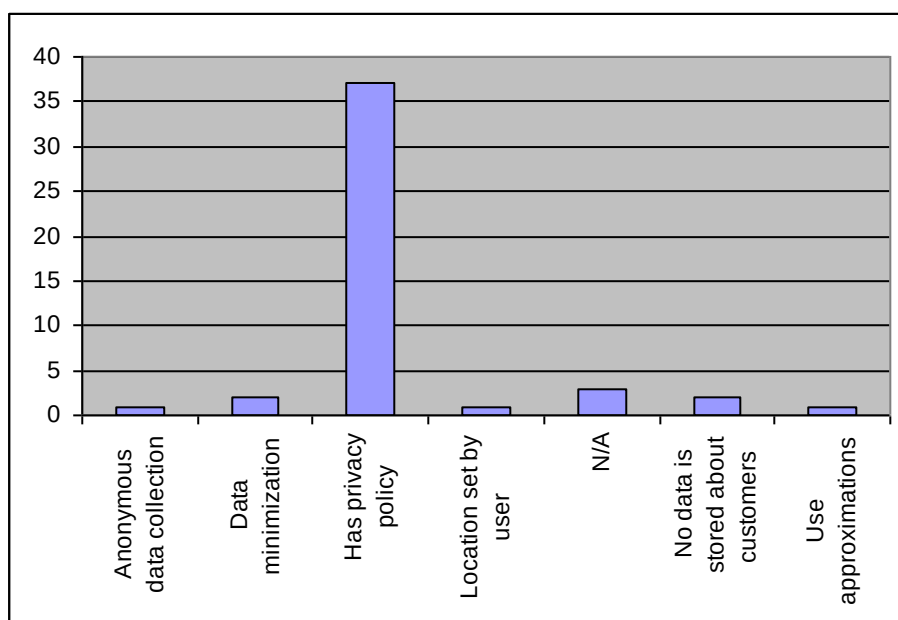
Not all companies were extremely concerned with the privacy of their users. A total of 37 companies had a privacy policy in place. Some companies applied data minimization and did not store any information about its users. The following table contains more information about the privacy-related data:

Table 13: Location-based privacy features.

Privacy and features	Total
Anonymous data collection	1
Data minimization	2
Has privacy policy	37
Location set by user	1
N/A	3
No data is stored about customers	2
Use approximations	1

The following graph clearly indicates that most sites had a privacy policy in place, but not many techniques were applied to decrease privacy issues:

Figure 3: Illustration of collected location-based privacy features data.



Revenue generation

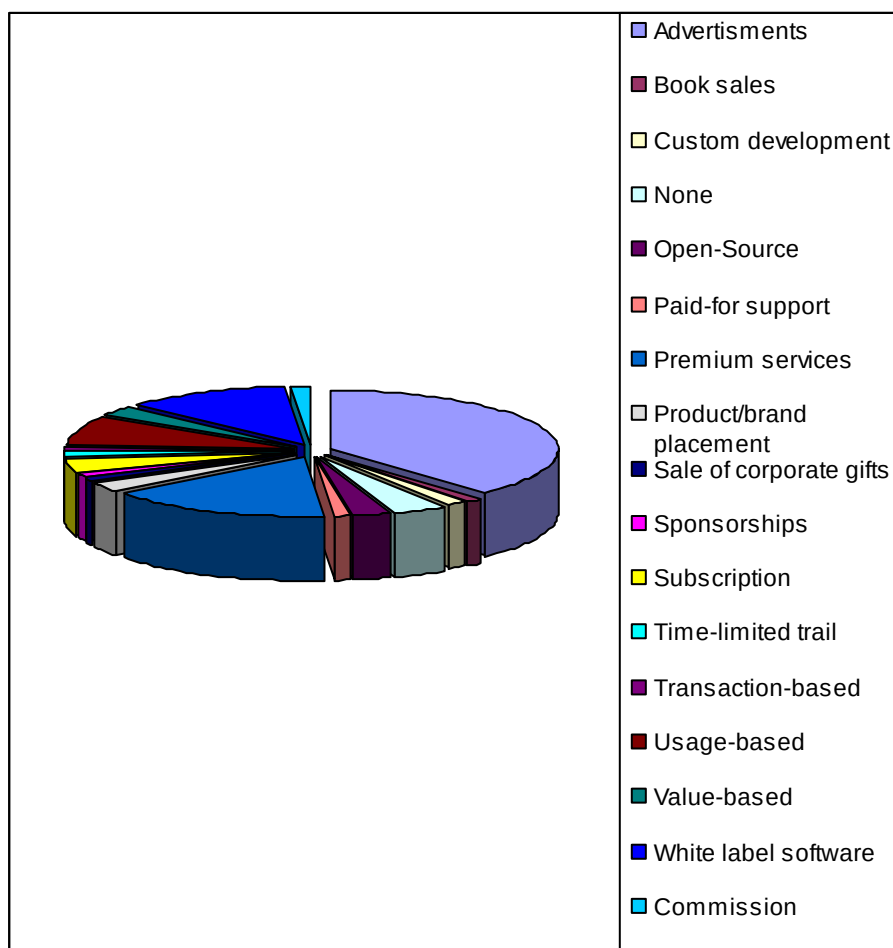
A total of 29 service companies studied generated an income from advertisements and a total of 12 generated an income through the delivery of premium services. The following table supplies a summary of revenue generation tactics employed by the sampled companies:

Table 14: Revenue generation strategies.

Revenue generation strategy	Total
Advertisements	29
Book sales	1
Custom development	1
None	3
Open-Source	2
Paid-for support	1
Premium services	12
Product/brand placement	2
Sale of corporate gifts	1
Sponsorships	1
Subscription	3
Time-limited trail	1
Transaction-based	1
Usage-based	6
Value-based	2
White label software	9
Commission	1

The following graph clearly illustrates that advertising is by far the most popular way for service delivery companies to generate revenue:

Figure 4: Visual representation of ways to generate revenue.



Security

Most websites use one or more techniques to provide some form of security to their users. Passwords are very popular and some websites also supply security (through SSL) to ensure that the information sent between the service companies and their users are secure. The following table contains the security-related findings:

Table 15: Security features.

Identified security feature	Total
No data is sent to server	1
No email validation	6
Not required to register	2
Passwords	44

SSL	17
Auto shut off	1

Popular location-based services

Location-based service companies supply one or more location-based services. The sample of location-based companies revealed that location-based information was the most commonly provided service (at 46.67%). Check-in services (36.67%), photo sharing (28.33%) and map services (23.33%) were also extremely popular. The following table contains various online service types and their occurrences:

Table 16: Popularity of various location-based service types.

Service type	Occurrence	Occurrence %
Audio guides	1	1.67
Check-ins	22	36.67
Coupons	10	16.67
Discounts	11	18.33
Drink ordering	1	1.67
Event information	1	1.67
Family safety and tracking	1	1.67
Fault reporting	1	1.67
Geo-fencing	3	5
Geo-location planning	1	1.67
Guides	1	1.67
Indoor location-based services	1	1.67
Information	28	46.67
Location tracking service	1	1.67
Location-based gaming	3	5

Location-service limiting	1	1.67
Maps	14	23.33
Message sharing	15	25
Mobile Analytics	1	1.67
Photo sharing	17	28.33
Reviews	1	1.67
Rewards	1	1.67
Rewards for visiting business	1	1.67
Social services	15	25
Speeding vehicle alert	1	1.67
Analytics	1	1.67
Data mining	1	1.67
Path finding	1	1.67
Remote alarm	1	1.67
Remote wipe	1	1.67

Relationship between backlinks and website ranking

A strong relationship exists between the amount of backlinks reported by Alexa and a website's global rankings. An analysis of the relationship between the two variables revealed the following results:

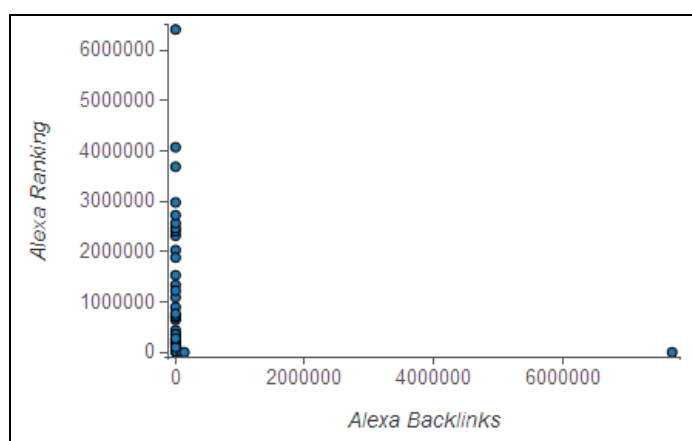
Table 17: Relationship between global ranking and backlinks.

Variable	Value
P-Value	< 0.00001
Effect Size (Spearman's rho)	-0.871
Confidence Interval of Effect Size	-0.926

to -0.780	
Sample Size	48

The P-value of 0.000001 indicates that the relationship between the two variables is statistically significant ($P < 0.05$). The negative effect size indicates that higher values for one variable are linked to lower values of other variables. This can be expected as a site with more backlinks is bound to have a better (and therefore a lower) numeric score. The following diagram represents a scatter plot of the backlinks vs. ranking data:

Figure 5: Scatter plot representing ranking vs. backlinks.



Relationship between page rank and employees

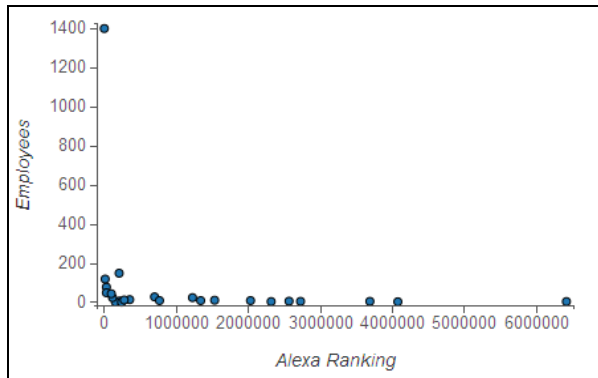
A relationship also exists between a website's global page ranking and the amount of employees a company has. An analysis of the two variables revealed the following results:

Table 18: Relationship between page rank and employees.

Variable	Value
P-Value	0.000205
Effect Size (Spearman's rho)	-0.688
Confidence Interval of Effect Size	-0.854
Sample Size	24

The P-value indicates statistical significance ($P < 0.05$). The effect size indicates that large values of one variable correspond to small values of the other variable. This can be expected as more employees would be needed to create and maintain services with better (lower) rankings. The following scatter plot shows the employee vs. rankings data:

Figure 6: Scatter plot representing employees vs. global ranking.



Relationship between page views and bounces

A statistically-significant relationship also exists between the amount of page views and the amount of single views per user (bounce). An analysis of the two variables yielded the following results:

Table 19: Relationship between page views and bounces.

Variable	Value
P-Value	< 0.00001
Effect Size (Spearman's rho)	-0.653
Confidence Interval of Effect Size	-0.803
Sample Size	39

The P-value indicates that a statistically significant relationship exists ($P < 0.05$) between the two variables. The effect size indicates that larger values of one variable can be linked to lower values of another variable. This indicates that the more popular a site or service is, the less likely it would be for a user to simply visit the site and leave without interacting with the site. More popular sites may therefore have content that may be of more interest to the user as opposed to content found on less popular sites. The following diagram illustrates the relationship between page views per user and single user clicks:

Figure 7: Scatter plot representing bounces vs. page views.



The following equation was calculated for the percentage of web bounces:

Table 20: Equation for page views/bounces relationship.

Variable	Value
R-Squared	0.324
Line of Best Fit	$\text{Bounce\%} = (-4.35 \times \text{Page view/user over 3 months}) + 63.2$

Relationship between search engine traffic and bounces

A relationship also exists between the percentage of traffic brought by search engines and single page clicks (bounces).

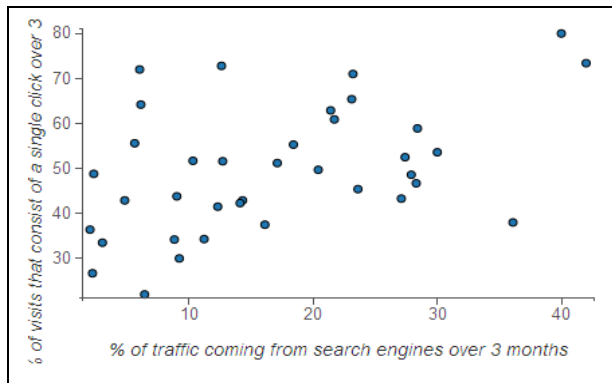
Table 21: Relationship between search engine generated traffic and bounces.

Variable	Value
P-Value	0.00436
Effect Size (Pearson's r)	0.458
Confidence Interval of Effect Size	0.157
Sample Size	37

The P-value indicates that the relationship is statistically significant ($P < 0.05$). The effect size indicates that one variable increases as the other variable increases. This makes sense due to the fact that search engine results are not always extremely accurate. The amount of traffic

coming from people that were actually looking for something else would therefore increase as traffic originating from search engines increases. The following scatter plot illustrates the two variables in action:

Figure 8: Visual representation of bounces vs. search engine traffic.



The following equation shows the amount of expected percentage of bounces that will originate from search engine referrals:

Table 22: Calculated equation for bounces using search engine traffic as input.

Variable	Value
R-Squared	0.21
Line of Best Fit	Bounce% = (0.590 × % of traffic coming from search engines over 3 months) + 39.8

Validity

The validity of the measuring instrument used to capture categorical data was tested using the Cronbach Alpha coefficient (Cronbach, 1951), defined as:

$$\alpha = \frac{K}{K-1} \left(1 - \frac{\sum_{i=1}^K \sigma^2 Y_i}{\sigma^2 X} \right)$$

The following table offers an explanation of the variables used in the equation:

Table 23: Cronbach Alpha variables.

K	The number of components (K-Items)
$\sigma^2 Y_i$	The sample variance
$\sigma^2 X$	The total variance.

Table 24 shows the values used in the Chronbach Alpha calculation. A Cronbach Alpha value of 78.83% was calculated for the measuring instrument. This indicates that the results that were obtained by using the measuring instrument are in fact valid.

Table 24: Cronbach Alpha calculation

$\sigma^2 X$	36.06
$\sigma^2 Y_i$	11.18
K	8
Cronbach Alph	0.788339

Appendix C

The following section on check-in service companies was compiled by studying the data collected from the location-based service companies. The name of each of the companies, a short description of each of the companies and various interesting characteristics of each of the services will now be discussed.

Table 25: Check-in service companies.

Company	Description
Foursquare	Foursquare is arguably the most popular location-based check-in network in the world. Foursquare manages to generate revenue with paid-for brand placement. Foursquare also has a relatively strong developer community which uses and integrates Foursquare's services into their offerings. Foursquare supports the iPhone, Blackberry, Android, WebOS, Symbian and Windows Mobile smartphones. Foursquare's global internet ranking is 822 at the time of writing, indicating that the service is extremely popular. The typical Foursquare users are females between the ages of 25-43 with graduate school degrees. Foursquare has recently been involved in a patent battle over the alleged use of unlicensed location-based patents (US Patent No. 7,693,752) (Wauters, 2011).
Gowalla	Gowalla was one of the earlier check-in services. It generated revenue by offering premium customised listings. Gowalla has been sold to Facebook and is not operating as a stand-alone service anymore. Gowalla's website is currently ranked 64,312 but the ranking is irrelevant as the service is not in use anymore.
Jiebang	Jiebang can be described as a Chinese clone of Foursquare. Jiebang is extremely popular in China, but not really used elsewhere. Jiebang generates revenue through the delivery of premium services and advertisements and supports the iPhone, Blackberry, Symbian and Android.

	Jiebang has a global website ranking of 15,166 which indicates that the website is a relatively strong contender but not a mainstream player.
Loopt	Loopt was a location-based service delivery company that was started in the early days of location-based service delivery. Loopt generated revenue through location-based advertising. Loopt managed to achieve widespread adoption by leveraging its extensive sets of lucrative deals with carrier networks. Loopt has been sold recently to Green Dot Corporation and is not operating as a stand-alone service anymore. The website ranking and typical users will also not be discussed as it would be of little value due to the fact that the service is not running anymore.
Wushibu LLC	Wushibu LLC developed a product called NearbyFeed that allows its users to find out what is happening around them through the provision of social networking and micro blogging functionality. Wushibu LLC doesn't seem to have any form of revenue generation for NearbyFeed. NearbyFeeds supports iPhone and Android smartphones. The website has a global ranking of 2,404,529 and its average users are males between the ages of 25-34 with graduate school degrees.
Rummbles Labs	Rummbles labs offers check-in services and location-based recommendation services with support for iPhone, Windows Phone and Android. The Rummbles labs website states that their service and APIs are free to use, so it's difficult to determine how the company generates revenue (although it may be possible that the company provides white-label software). The company has a third party developer community and it managed to raise \$800,000 in venture capital from m8 capital (O'Hear, 2010). The timestamps on a few of its company webpages also indicate that it has been some time since the pages were updated. It is

	therefore unclear if the service is still actively being developed. The Rummble labs website has a global ranking of 1,092,030 and its average users are males between the ages of 25-34 with graduate school degrees.
BaDTech SAS	BadTech SAS developed a service called TellMeWhere. TellMeWhere offers various location-based services and a personalised search engine. Tellmewhere supports the iPhone, Android and Bada smartphones and offers premium services to paying customers. TellMeWhere has a global web ranking of 644,514 indicating that the service is used, but not as frequently as other services. The typical user of TellMeWhere would be a male between the ages of 33-44 with a graduate school degree and who does not have any children.
Mobnotes	Mobnotes allows its users to share mobile notes, photos and videos about places with others. Mobnotes offers white-label software to paying corporate customers. Mobnotes works on the iPhone, Nokia, Android and Vodafone 360. A mobile web page is also available for other devices. Mobnotes has a global web ranking of 1,882,174 which indicates that the service is not too popular, but it is used. The average user would be a childless female with a graduate school degree between the ages of 25-34 who browses from work. Mobnotes received funding from Brainspark worth EUR 600,000 (Bloomberg, 2011).
FriendsTicker	Friendsticker is a location-based scavenger hunt that offers its users rewards for visiting places. The service has the capability to drive people to stores that they would not normally visit. The service is available on the iPhone and Android and only works in Germany. The Friendsticker site has a rating of 1,224,420 which means that is not extremely popular on a global scale, but this can be

	expected as the service only focuses on Germany. The general site user would be a male with a graduate school degree between the ages of 25-34.
Dailyplaces GmbH	Dailyplaces GmbH created a service called Dailyplaces. The Dailyplaces service allows users to stay in touch through the provision of location-based services. Dailyplaces is interesting in the sense that it shares its advertising revenue with its users. In addition users also get credits for making use of the services provided, such as check-ins. (Pohl, 2012). The Dailyplaces service is available for the iPhone and Android and it has a strategic partnership setup with TrifelsVerlag GmbH. The typical DailyPlaces user would be a male between the age of 35-44 that attended college and has children.
EasyCity	EasyCity created a service called GeoDruid. GeoDruid supplies information about places that would help travellers and people seeking places to visit. GeoDruid provides services to its users through its web and mobile sites and it manages to generate revenue from advertisements. GeoDruid generally attracts females with postgraduate degrees living in France. GeoDruid has a global web ranking of 154,451 which indicates that the service is relatively popular.
Qype	Qype allows users to review places and events. A version of Qype is available for most mobile devices, including iPhone, Blackberry, Android, Symbian and Windows Mobile. Qype generates revenue through advertisements. Qype secured venture capital from Wellington Partners, Advent Venture Partners, Partech International, Vodafone Ventures (Bonney-Doyle, 2012). Qype's global ranking is currently at 7047 which means that the service is very popular. The typical Qype users would be females with graduate degrees aged 25-34, browsing from work.

Tupalo.com	Tupalo provides a web service that allows its users to find and review shopping and entertainment locations around the world. Tupalo supports the iPhone and Android smartphones and its website has a global website ranking of 14,463 which indicate that it is rather popular. The typical Tapalo user would be a woman between the ages of 45-54 with a graduate school degree that is visiting the site from work. The service is extremely popular in Austria and has nearly 2 million users (Borras, 2010).
Yelp	Yelp is a service that helps its users to find great local businesses. Business owners can set up free accounts and Yelp makes money by selling local ads. Yelp is available for various locations, but not South-Africa. Yelp supports the iPhone, Blackberry and Android smartphones and its website has a global ranking of 210, making it an extremely popular online destination. Yelp's typical users would be females between the ages of 25-34 browsing from work. Yelp recently managed to sign a deal with Elevation Partners in which Elevation will invest up to \$100 million in the start-up (RAO, 2011). Yelp was recently involved in a patent infringement battle involving US Patent 5,828,837 (PatentSmart, 2010). This patent may also be used as ammunition against other service delivery companies in the near future.
Facebook	Facebook is an extremely popular social networking site that offers various location-based services. Facebook has native applications available for the iPhone, Blackberry, and Android. It also supports many more smartphones through its website. Facebook has become the second most popular website site in the world. Facebook's typical users would be females between the ages of 25-34 with graduate school degrees. Facebook own a vast amount of patents, but it seems that though these patents have only been used defensively. Facebook's

	patents are therefore of little threat currently to start-ups.
FootFeed	FootFeed offers white-label software to allow companies to offer their users multiple check-ins to various location-based services to drive traffic to their sites. Footfeed supports the iPhone, Android and Symbian smartphones and its website global ranking is 1,622,022. A typical user would be a male between the age of 25-34 with a graduate school degree and without any children.
DrinkPass	DrinkPass is an application that allows its users to check-in and order drinks from bars while staying connected to their friends. DrinkPass supports the iPhone and Android devices and its website global ranking is 9,765,833. The typical user of the service would be between the ages of 18-24 and have attended college.
MergeLocal	MergeLocal allows users to earn points for writing reviews of their favourite businesses. MergeLocal seems to have gone offline in September 2012. MergeLocal supported the iPhone and Android smartphones and its average user would be between the ages of 25-34 with a college degree browsing from work.

Appendix D

The following information on discounts and coupons was compiled by reviewing the data collected from the study on location-based service companies. The name of each of the players, a short description and various interesting characteristics of each of the services will now be discussed.

Table 26: Discount and coupon service companies.

Company	Description
Foursquare	Please refer to Table 25.
Loopt	Please refer to Table 25.
Plyce	Plyce is a location-based deals service that allows its users to locate tips, deals and discounts in their area. Plyce has more than 30,000 tips and 300 retail partners (Vouillon, 2011). Plyce focuses on France and supports the iPhone and Android. Plyce managed to raise EUR 600,000 from Jainan among others (Vouillon, 2011). Plyce has a global ranking of 212,298 and its typical users would be males between the ages of 25-34 with graduate school degrees browsing from work.
BaDTech SAS	Please refer to Table 25.
Mobnotes	Please refer to Table 25.
FriendsTicker	Please refer to Table 25.
Where	Where.com is a mobile advertising provider and location-based deals provider. Where has recently been acquired by PayPal media. Where's global traffic rank is 206,098 and its typical user would be a childless female between the ages of 25-34 that uses the service from work.

InMarket	InMarket developed a service called CheckPoints.com. Checkpoints allow its partners to communicate directly with potential customers when they enter shopping centres by offering interactive content, messages and coupons to users. Checkpoints has a global traffic ranking of 276,190 and is visited the most by females with no formal qualifications between the ages of 25-35.
Armadealo	Armadealo developed a smartphone application for the iPhone to push a list of discounts and offers to users when they are in shopping centres. The website statistics are not available as the website does not attract a lot of visitors.
Insiteo	Insiteo is a company specialising in indoor location-based tracking. Insiteo's offices are located in Europe. The company owns at least two international location-based patents, namely PCT/FR2010/052265 and PCT/FR2010/052266. Insiteo supports the iPhone, Android, Windows Mobile, Linux and the web. Its website has a ranking of 1545150.
Loopt	Please refer to Table 25.
Qype	Please refer to Table 25.
CitySearch	CitySearch reviews certain cities in America. Scouts are sent to popular locations in those cities, and those locations then receive ratings. CitySearch works on the iPhone and Android smartphones and it is generally used by females between the ages of 55-64 that are browsing from work.
ShopKick	ShopKick created a service that drives traffic to various stores in America. This is done by giving points to users of the service for visiting stores of its customers. ShopKick has a trademark on the word "KICKS" and possess patent-pending technology called ShopKick Signal (although it was

	not possible to determine at the time what the ShopKick Signal technology actually does). ShopKick has various partnerships in place with retail stores, such as Target, Macy's and Best Buy. The average ShopKick users are females between the ages of 25-34 with a college degrees.
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Appendix E

The following information on location-based information services companies was compiled by studying the data collected on location-based service companies. The name of each of the companies, a short description of each of the companies and various interesting characteristics of each of the services will now be discussed.

Table 27: Location-based information service companies.

Company	Description
Jiebang	Please refer to Table 25.
Foursquare	Please refer to Table 25.
Wushibu LLC	Please refer to Table 25.
Screenscape	Screenscape specialised in location-based direct in-store marketing. Screenscape has various screens mounted in popular stores on which it displays targeted marketing material. Screenscape uses Foursquare to determine which users are in the store and then display content that would be to their liking. Screenscape currently only operates in the USA and Canada. Screenscape has a global ranking of 697,543 and the typical visitors of the Screenscape site are males between the ages of 45-54 with college degrees. Screenscape applied for two US patents relating to location-based advertisements. The application numbers are 2009/0248,491 and 2009/0240,583. Screenscape managed to raise \$6 million in funding from HartCo Inc. (Gauvreau, 2011).
Rumble Labs	Please refer to Table 25.
EasyCity	Please refer to Table 25.
tymr	Tymr offers a geo-location-aware social event scheduling system. Tymr is extremely popular in Portugal and has a global ranking of 895,317.

	The average tymr visitor is a male between the ages of 25-34 with a graduate school degree.
SharpMind	SharpMind developed a tool called BigRedZebra. BigRedZebra is a J2ME application that uses triangulation to determine its current position. It is therefore appropriate to use with older cellular phones. The application uses a point of interest database to inform the users of places that are close by. A free version is available but users can pay \$30 for the full version. BigRedZebra only supports a few cities in Germany.
Sosialight	Sosialight allows users to create local content through its community management system that is supplied as part of a white-label offering to companies. The offering would therefore make it much easier for companies to have their own location-based content by simply making use of Sosialight's white-label offering. The Sosialight site has a global ranking of 436,816 and is generally visited from work by males between the ages of 18-24 with college degrees.
Locify	Locify is a J2ME application dual-licensed under an open-source and commercial license. Locify supplies various location-oriented features, such as maps, navigation and route recording features that are generally not present on older cellular phones. This makes Locify very attractive for users with older phones. Locify has a global ranking of 2,977,354 and is generally visited from work by males between the ages of 25-34 with college degrees.
Streetlife	Streetlife supplies a service that makes it possible for people in the UK to share local opinions and information. It is especially useful to share information about crimes, public services, recommendations and various other local topics and it uses local ads to generate revenue. Streetlife has a global ranking of 264,290 and is generally visited by females over the age of 65 living in the UK.

Qype	Please refer to Table 25.
CitySourced	CitySourced can be described as a civic engagement platform that allows its users to provide ways to report civic issues to participating city halls. CitySourced also integrates into major CRM, AMS and GIS systems to make it easier for local municipalities to use CitySourced with already-existing information systems. CitySourced supports the iPhone, Blackberry, Android and Windows Mobile smartphones. CitySourced's global website ranking is 2,724,776 and its average users are males aged 18 to 24 with a graduate school degrees. CitySourced has a few high-profile partners, namely Microsoft, ESRI, CrimeMapping, WebQA and Eskel Porter Consulting (CitySourced, 2012).
Tupalo.com	Please refer to Table 25.
CitySearch	Please refer to Table 26.
Solfo	Solfo created a service called YellowBot. YellowBot can be described as a search site for local content. YellowBot supports the iPhone and Android smartphones and its website has a global ranking of 15,707. Its average user is a female between the ages of 55-65 with a college degree. YellowBot was recently involved in a patent infringement case in which Geotag Inc. claimed that Solfo violated its United States Patent No. 5,930,474 (Justia, 2011).
PixelFish Inc.	PixelFlash introduced a service called CitySquares. CitySquares provide ways for businesses to advertise using video marketing. CitySquares created a video directory for local businesses that the company claims is becoming the largest video business directory. CitySquares only operates in America which means that the idea could potentially be implemented elsewhere. CitySquares has a global ranking of 29,314 and its average users are

	males from India between the ages of 45-54. PixelFlash recently acquired a trademark for the word SLIGHTLY (trademark serial number 85695195). PixelFlash managed to raise about \$4 million in Venture capital from investors such as FLOODGATE, Tomorrow Ventures, Mack Capital, Western Technology and 500 Start-ups (Emson, 2011).
Zagat	Zagat provides survey-based information for restaurants and other venues. Zagat has a team of surveyors in more than 100 countries that rate the destinations based on a 30-point scale. The ratings are added to various lists to help individuals choose great places to visit. Zagat generates revenue through advertising, book sales, sale of corporate gifts and survey services. Zagat was acquired by Google in September 2011. Zagat patented its 30-point rating process to stop others from using it (although it could not be determined what the relevant patent number is). Zagat supports the iPhone, Blackberry, Android and Windows Mobile smartphones. The Zagat website has a global rating of 11,810 and its average user would be a female between the ages of 25-34 living in America with a college degree.
TripAdvisor	TripAdvisor has all the information needed to plan trips ranging from hotel reviews to flights and packages. The TripAdvisor website is translated into various languages and even operates in China. TripAdvisor claims on its website to have 56 million monthly unique visitors and more than 75 million reviews and opinions. TripAdvisor also hosts an affiliate program in which its affiliates are given commission on sales. TripAdvisor's global ranking is 240 and its typical user would be a female aged between 55 and 65 with a college degree browsing from work. TripAdvisor owns the TripAdvisor trademark and at least two US patents, US Patent Application No: 2004/0158,617 and US Patent Application No: 2011/0231,745.

Yelp	Please refer to Table 25.
Facebook	Please refer to Table 25.
Meridian Inc.	Meridian offers a white-label content management system that can be used by companies that want their own location-based smartphone applications. It supports the iPhone, Blackberry, Android, Symbian and Windows Mobile smartphones and has a global ranking of 1,129,432. The website's average user is a male between the ages of 18-24 living in the USA. Meridian managed to obtain funding from Oregon Angel Fund and Bellingham Angels Group. Notable customers include Boston Children's hospital, Portland international airport, Powell's Books, AMNH, Jeld-Wen Field.
Echo Labs	Echo Labs created a service called Echoer that allows its users to create location-based messages called Echoes. Echoer is available for the iPhone, iPad, iPod touch and Android. It seems that Echoer generates revenue through advertisements. Echoer's global ranking is 244,936 and its typical users are females between the ages of 25-34 with graduate school degrees.
Locai	Locai allows companies to quickly build mobile location-based applications using their application builder tool. The real value in such an offering is that no external developers are required and the development of such an application only takes a short while as the application is assembled from already-existing pieces. Locai supports the iPhone and Android smartphones. The Locai website has a global rating of 12,429,723 and its average users are males between the ages of 25-34 browsing from work.
UrbanTag	UrbanTag allows its users to share and recommend places with people that they trust. UrbanTab currently supports the iPhone. The UrbanTag website currently has a global ranking of 1,120,817. Its average users are females between the ages of 35-44 browsing from

	work.
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Appendix F

The following information on location-based gaming services was compiled by studying the data collected on location-based service companies. The name of each of the companies, a short description and various interesting characteristics of each of the services will now be discussed.

Table 28: Location-based gaming service companies.

Company	Description
Millform AG	Millform AG created a service called Gbanga. Gbanga can be described as a location-based mafia game in which the players battle it out to become the supreme Mafioso. Gbanga has the ability to drive its players to various pre-determined locations such as stores and restaurants as part of their quests. This concept obviously has the ability to drive traffic to stores, which in turn could be rather profitable for the company if managed correctly. Millform AG offers custom map building services and in-game advertising (although in-game advertising is limited) Gbanga supports the iPhone, Blackberry, Android, Symbian, Windows Mobile and Java Mobile smartphones. The company's website has a global ranking of 2,029,448 and its average users are males between the ages of 33-44.
Grey Area	Grey Area created a location-based game called ShadowCities. The game was originally tested in Finland but was later launched in other parts of the world as well. Grey Area currently supports iPhones and its website's global ranking is 1,337,782. Its average users are males between the ages of 25-34 with graduate school degrees. Grey Area managed to secure funding from Index Ventures, London Venture Partners and Initial Capital.

Appendix G

The following information on location-based messaging services was compiled by studying the data collected on location-based service companies. The name of each of the companies, a short description of the companies and various interesting characteristics of each of the services will now be discussed.

Table 29: Location-based messaging service companies.

Company	Description
Urban Airship	Urban Airship supplies services that can be consumed by application developers to supply location-based push messaging and analytics to mobile applications. Urban Airship supports the iPhone, Blackberry and Android smartphones. Urban Airship generates revenue through transaction-based billing which means that its customers are charged for the amount of transactions that they use. Urban Airship's global ranking is 29,195 and its average users are males between the ages of 25-34 with graduate school degrees.
Loyakk	Loyakk offers a service that allows users to autonomously post messages to various location-based channels. Loyakk supports the iPhone, Android and the web. The Loyakk website has a global ranking of 6,414,151 and its average users are males browsing from work.
Wushibu LLC	Please refer to Table 25.
Blockboard.org	Blockboard is a location-based service that allows users to report problems in their neighbourhoods, such as crime, accidents and problems. Blockboard currently supports the iPhone smartphone and its global website ranking is 2,463,784. Blockboard's typical users are males between the ages of 25-34.

	Blockboard has a unique approach to privacy in a sense that it will not give away the location of reporters, but will only make approximations available to protect the privacy of its users.
Dailyplaces GmbH	Please refer to Table 25.
IRL Connect	IRL Connect allows social network users to specify their locations on a map so that other friends using the service would be able to find them. The geo-location can be done manually or approximated through IP address and Wi-Fi geo-location. The service does not have any native smartphone applications and only works through its website. IRL Connect generates revenue through the provision of white-label software. The IRL Connect website has a global ranking of 4,074,114 and its average users are males between the ages of 25-34.
Streetlife	Please refer to Table 27.
Xtify	Xtify allows marketers to push location-based marketing messages to the users of their applications. The push notification service is accompanied by an analytics dashboard to help marketers determine how successful their campaigns are. Xtify provided a SaaS package to its customers and would therefore bill according to usage patterns. Xtify supports the iPhone, Blackberry and Android smartphones and its current global website ranking is 352,145. The typical users of the Xtify site are males between the ages of 25-34 with graduate school degrees.
Yelp	Please refer to Table 25.
Insiteo	Please refer to Table 26.
Meridian Inc.	Please refer to Table 27.

Echo Labs	Please refer to Table 27.
Locify	Please refer to Table 27.

Appendix H

The following information on location-based photo sharing services was compiled by studying the data collected on location-based service companies. The name of each of the companies, a short description as well as various interesting characteristics of each of the services will now be discussed.

Table 30: Location-based photo sharing companies.

Company	Description
Gowalla	Please refer to Table 25.
Wushibu LLC	Please refer to Table 25.
Dailyplaces GmbH	Please refer to Table 25.
EasyCity	Please refer to Table 25.
IRL Connect	Please refer to Table 29.
Socialight	Please refer to Table 27.
Locify	Please refer to Table 27.
Qype	Please refer to Table 25.
Tupalo.com	Please refer to Table 25.
CitySearch	Please refer to Table 26.
TripAdvisor	Please refer to Table 27.
Hummba	Hummba is a South-African company that sells audio guides for various tourist attractions around the world. Hummba also offers a social sharing platform on which users can share photos and other digital information collected as part of their travels. Hummba is available on the iPhone and Android smartphones. Its website currently has a global ranking of 1,531,419 and its average users are males between the ages of 25-34.

Trover	Trover is a social sharing platform on which users can share photos of interesting places. Trover is available on the iPhone and Android smartphones and a web-based version of the service also exists. Trover has a global ranking of 358,141 and its average users are males between the ages of 35-44. Trover is funded by TravelPost which managed to raise \$9.8 million from General Catalyst Partners, Ignition Partners and Benchmark Capital (Rao, 2011).
Yelp	Please refer to Table 25.
Facebook	Please refer to Table 25.
UrbanTag	Please refer to Table 27.
Locai	Please refer to Table 27.

Appendix I

The following information on location-based niche services was compiled by studying the data collected on location-based service companies. The name of each of the companies and short description as well as various interesting characteristics of each of the services will now be discussed.

Table 31: Niche location service companies.

Company	Description
Walkbase	Walkbase is an indoor location-based services company that provides ways for downstream service providers to track their users indoors. Walkbase makes use of its Wi-Fi access point database to determine the current location of users. Walkbase also applied for two different location-based service patents to protect its intellectual property, but the patent numbers could not be determined. Walkbase supports Android smartphones and its website currently is ranked 2,315,854. The average Walkbase users are females between the ages of 18-24. Walkbase managed to secure \$500,000 in seed funding (Anderson, 2011).
Glympse Inc.	Glympse provides a service that allows its users to share their location with other users. Glympse is very useful for meetings and travel in a sense that it can automatically inform people at the destination location if it detects that the user is stuck in traffic or if the user is running late. No account is needed to use Glympse and location information may be shared with anyone the user chooses. Glympse also has an auto-cut off feature that allows its users to specify when to stop sharing location-information with other users based on certain conditions. Glympse Inc. managed to raise \$7.5 million in venture capital (Kincaid, 2011). Glympse patented and trademarked a technology that it calls GlympseWatch. Very little information could be located

	about this patent. The Glympse website has a global ranking of 239,440 and its average users are males between the ages of 33-40. Glympse is available on the iPhone, Blackberry, Android and Windows Mobile.
SCVNGR	SCVNGR provides a virtual scavenger hunt service with the aim to allow its users to discover new places. SCVNGR can be used by universities to guide their students on tours of their campuses. Likewise the service can also be used by zoos, airports and other large places to supply virtual tours to their users. SCVNGR generates revenue by allowing business owners to create virtual tours for their users. Creating virtual tours are free, but hosting virtual tours are not. Business owners therefore pay for the provision of virtual tour services. SCVNGR is available for the iPhone and Android and the SCVNGR website has a global ranking of 168,110. The SCVNGR website's average users are males between the ages of 25-34. SCVNGR applied for two location-based US patents: patent 20110010245 and patent 20100331089.
Localmind	Localmind is a location-based question platform that allows its users to ask questions about any place to other people that are near the places that their questions are about. The service therefore helps curious users to get answers from people that may know certain physical locations of interest, such as soccer stadiums or universities. Localmind is available on the iPhone and Android and the Localmind website has a global ranking of 464,176. The average users of the Localmind website are males between the ages of 25-44.
Zamp	Zamp created a service that automatically detects the airports that its users are at and automatically detects the gate information and other flight-related information for the flight at the airport. Zamp

	can also calculate the total amount of miles travelled by its users. Zamp's website has a global ranking of 14,805,243 and is available on the iPhone as a native application.
Hotlist	Hotlist is a location-based planning tool that allows its users to plan which location-based events to attend. Hotlist has a deep social network foundation to allow its users to get recommendations and notifications about what is happening and things that are popular nearby. Hotlist is available as a native application on the iPhone. The Hotlist website has a global ranking of 169,381 and its general users are females between the ages of 18-24. Hotlist received \$800,000 in funding from Centurion Holdings and \$25,000 in the NYU Stern Business Plan Competition (Wauters, 2010).
Webtrends	Webtrends offers mobile marketing and analytics software and paid-for services. Webtrends supports the iPhone, Blackberry, Android and Windows Mobile. The Webtrends website has a ranking of 15,856 and its average users are males between the ages of 25-34.
LocationLabs	LocationLabs created a service called Safely which was designed to protect the safety of families. Parents can keep track of their children's activities and current locations through various online reports. LocationLabs generate revenue through subscriptions. Safely supports the iPhone, Blackberry, Android, Java Mobile and BREW. Its global website ranking is 715,582 and its average users are males between the ages of 33-44. LocationLabs states in its website that it managed to secure partnerships with AT&T, Sprint and T-Mobile and managed to raise more than \$26 million from Draper Fisher Juvertson, BlueRun Ventures, QUALCOMM Ventures, Intel Capital and Mitsui Ventures.

Zoemob	Zoemob is designed to help parents to ensure that their families are safe from threats. Zoemob allows parents to track their children and also offers speed alerts to alert parents when their children are travelling in speeding vehicles. Cellphone calls can also be blocked in risky situations (such as driving) and various conditional alerts can be configured. Zoemob is available on the Android and Symbian smartphones. The Zoemob website currently has a global ranking of 766,086 and the average users are males between the ages of 25-34.
Life360	Life360 is a service that was designed to keep families in sync and safe. Parents can easily locate their children or notify their families of their arrival at certain destinations. Life360 offers a free service and a paid-for premium service with additional features (therefore a freemium service). The service supports the iPhone, Blackberry and Android smartphones. The Life360 website has a PageRank of 114,680 and its average users are females between the ages of 35-44. Life360 managed to raise about \$5 million in venture capital from various investors, notably Seraph Group, Bessemer Venture Partners, Fontinalis Partners, Bullpen Capital, 500 Start-ups, Kapor Capital, Venture51, Bessemer Venture Partners, Echo VC Partners, Social Leverage and Eghosa Omoigui's, Launch Capital and Mark Goines (Perez, 2011).
Nutiteq	Nutiteq is a developer of location-based software libraries to increase the ease of location-based software development. Nutiteq publishes its libraries under the dual licensing model using the GPL and a commercial licence. The libraries are free to use in open-source projects but licences will have to be purchased for closed-source projects. Nutiteq also offers white-label location-based software development for companies that require location-enabled software. Nutiteq's libraries support the iPhone, Blackberry, Android,

	Symbian and Windows Mobile. Its global website ranking is 700,752 and its average users are males between the ages of 25-34.
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