“Investigate the Effect of Semantic Search on Search Engine Optimization”

A dissertation submitted in partial fulfillment of the requirements for the degree of Bachelor of Science (Honours) in {Software Engineering}

By Mahdi Mashrafi

Cardiff Metropolitan University April 2017

Cardiff School of Management

Department of Computing & Information Systems
Declaration

I hereby declare that this dissertation entitled ‘Investigate the effect of Semantic Search on Search Engine Optimization’ Is entirely my own work, and it has never been submitted nor is it currently being submitted for any other degree.

Supervisors Name: Imtiaz Khan

Candidates Signature: ........................................ Date: .................................
Abstract
This Bachelor’s thesis aims to provide a sense of understanding on the influences semantic search has on the modern day search engine optimization techniques for a website. SEO is a key component for marketing especially in this digital world therefore businesses must understand the implications of semantic search to make the most out of the internet.

A substantial part of this paper aims to discuss about the SEO strategies estimated to last a long time when attempting to gain a high ranking in search engines, in particular Google. Google currently has 77% share of the search engine market (Netmarketshare, 2017) so it was fair to justify the effects on SEO from the actions conducted by Google search engines.

By reviewing the findings, it gives a good overall view on the future of SEO, why search engines heading towards semantics and the connections to SEO. Furthermore, the importance of SEO on businesses is outlined.

Acknowledgement
This dissertation was the biggest challenge for me in my academic years as a Cardiff Metropolitan University student. I would like to express my special thanks to Dr Imtiaz Khan my dissertation supervisor who has assisted me throughout the course of this process by offering valuable help. Secondly I would like to thank my family and friends who have supported me during this year, without them this would not be achievable.
## Contents

1.1 | Introduction ........................................................................................................... 4
1.2 | Background Research ......................................................................................... 5
1.3 | Purpose of Study ..................................................................................................... 6
1.4 | Literature Review .................................................................................................. 7
1.5 | Search Engine Optimization (SEO) ........................................................................ 7
1.6 | Google Search Engine Algorithms ...................................................................... 10
1.7 | Semantic Search ..................................................................................................... 12
1.8 | Future of SEO ........................................................................................................ 14
1.9 | Relation Between Semantic Search and Content Creation .................................. 17
2.0 | Case Studies .......................................................................................................... 18
2.1 | Summary ............................................................................................................... 24
2.2 | Methodology ........................................................................................................... 24
2.3 | Introduction ............................................................................................................ 24
2.4 | Research Philosophy .............................................................................................. 25
2.5 | Methodology Summary .......................................................................................... 27
2.6 | Results .................................................................................................................... 27
2.7 | Introduction ............................................................................................................ 27
2.8 | Comparative analysis of Case Studies .................................................................. 27
2.9 | Discussion .............................................................................................................. 30
3.0 | Findings Analysis ................................................................................................... 32
3.1 | Findings Summary ................................................................................................ 33
3.2 | Conclusion .............................................................................................................. 34
3.3 | Review of Aims and Objectives .......................................................................... 34
3.4 | Reflection of Study ............................................................................................... 35
Reference Section ........................................................................................................... 36
Appendix ......................................................................................................................... 39
1.1 Introduction

Search Engine Optimization (SEO) is the process of increasing the number of users visiting a particular website by ensuring the website is optimized with various strategic methods in order to secure a high visibility in the list returned by a search engine however recently Semantic Web is becoming a big factor in the development of web, in this paper it aims to analyse Semantic Web, the effect it has on search engine optimization because a newer thus more technical approach may be on the rise due to the gradual progress of semantic search. The main principal of this research is to evaluate the possible changes semantic search brings to the search engine optimization strategies and whether businesses need to make significant changes to their online marketing tactics.

Information related to the study will be discussed in this paper, delivering a general grasp of the subject in question and to understand why it may be a concern for organisations executing SEO as a part of their internet marketing strategy. The aims and objectives of this study which hopes to be achieved and answered are also detailed in this section.

The next chapter will create a foundation for the study to work off. It will contain information about the past literature works associated with search engine optimization, the materials used mostly are journals, articles, and academic books. This section will aim to provide an insightful knowledge of SEO, how it began, the changes and updates made to it by search engine algorithms and its use in the world of business furthermore the elements surrounding SEO strategies will also be explained in the chapter.
The methodologies used to complete the study will be explained in the third chapter. Research philosophy and approaches will be written about as well as the data collection methods used by researchers to obtain their targets. Specifically, information about research types i.e. quantitative research and qualitative research will be elaborated on in that section. In addition to this, a case study outlining the effects of search engine optimization on existing businesses, this aims to give an understanding of the cruciality of SEO.

Findings and results gathered by secondary data research will be presented in the fourth section. Explanation of the findings will be outlined, the future forecast of semantics search will be looked at as the Google and many other search engines are aiming to investigate their users searching trends in order to provide the best possible experience online.

Finally, a conclusion of the study conducted will be provided in the final chapter. It will contain a reflection and evaluation of the research undergone. Furthermore, the aims and objectives will be reviewed to make sure they have been achieved, any omissions will also be detailed in the section.

1.2 | Background Research

The World Wide Web developed by computer scientist Tim Berners-Lee was formally recognizable as the internet in 1990. Due to its rapid growth, there are many definitions of the internet but in the simplest description, a “worldwide system of interconnected networks and computers” (Tim Berners-Lee, James Hendler, Ora Lassila, 2001). In 1991 the first web page was created bringing some major innovation to the world of the Internet. Its purpose was to explain what the World Wide Web was due to its unfamiliarity. In 1995 was when the Internet became commercialised with the first development of SSL (Secure Socket Layer) encryption creating it to be safer for online financial transactions, as a result two major online businesses started that year; Echo Bay now formally known as Ebay and Amazon (Jennifer Lawrence Browne, 2006).

A year later Larry Page and Sergey Brin started a research project called BackRub it aimed to create a search engine that ranked websites according to the number of backlinks directed to it, this ultimately became what we now know as Google. In the beginning search engines used to rank websites based on how many times the search word appeared on a web page. Sooner than later in the year 2000 google started selling keyword advertisements, it followed a system where you only pay for the advertisement when someone clicked on your website link in Google’s search result – thus Pay Per Click was born. In the early days of the internet (Jennifer Lawrence Browne, 2006).

Jeri L. Ledford (2009) stated, SEO was almost non-existent because having the ability to manipulate the search engine rankings wasn’t quite there yet as you either had to know the creators of the search engine or be able to manipulate the order of the results returned by the search engine, so in a way SEO was like politics; being in touch with the right people. The founders of Google quickly noticed this is an inefficient method to find an ideal website in their search list, especially with the rapid growth of the web and its future potentials, as a result they planned to come up with an algorithm that returned the most relevant website based on the searched keyword entered by the user. Shortly after Google developed an algorithm named PageRank to manage the search result returned. It analysed the number of backlinks previously known as ‘citations’ and the quality of these backlinks, the quality is
determined by the level of priority the website has. The better the number of quality links the higher the ranking i.e. the websites with the most quality backlinks was ranked first, the second most were ranked second and so on. The PageRank algorithm was becoming more and more popular therefore companies studied the functioning of the algorithm and managed to identify ways to manipulate the website rankings, that’s when the process was named Search Engine Optimization.

To this day, Google produced many additional search algorithms effecting their search results, such as the Penguin and Panda algorithms, one is used to monitor the backlinks and other is used to track the quality of the content on the webpage. Google’s aim is to give their users the best possible experience on the search engine, with the focus on enhancing user experience Google introduced much semantic technologies to its search engines procedures, in addition, many articles, researches and journals state that Google is shifting towards the world of semantics. Actually, understand the user’s intentions and be able to output quality result is what the tech giants are striving for.

1.3 | Purpose of Study

The primary purpose of this research project is to investigate the effect semantic search has on search engine optimization and to identify if companies should respond to this change by adapting and implementing new strategies to their SEO tactics. Being a Software Engineering student and interested in the field of marketing made this particular topic very interesting.

Objectives

- To investigate and assess the algorithms produced by Google to determine website ranking position and Google’s use of semantic technology.
- To investigate and assess the relationship between semantic search and content creation.
- To investigate the future of search engine optimization and if it will remain relevant in the world of internet marketing.
- To assess the benefits of utilising search engine optimization in a business’s marketing strategy.
1.4 | Literature Review

1.5 | Search Engine Optimization (SEO)

Tsvetan Vetskov (2012) stated in his paper that Search Engine Optimization can be defined as the processes used to increase the web visibility and brand recognition for a particular website. The process aims to drive as much natural traffic to a website as possible. The research went on further saying the biggest lump of the process is ranking the website in the search engines result for desired keywords.

According to Abrar Sohail (no date), SEO is the art of designing, developing, modifying and coding Web pages in order for them to receive a high ranking in search results and possessing the ability to convert high user traffic. He went on stating SEO can be performed by two practices which are White-hat SEO and Black-hat SEO. White-hat optimization is known as ethical SEO, meaning it follows guidelines and rules set out by search engines, it is generally how most SEO practitioners perform their SEO practices compared to Black-hat SEO which refers to illegal SEO practices against search engines rules so they can get the fastest possible result in the least amount of time.

1.6 | Search Engine Keywords

SEO keywords are the key phrases created and inserted in a website content for people to locate the site in search engines. The better the content relates to the user’s keywords entered the higher search engines will rank the websites. Keywords are one of the many main components of Search Engine Optimization.

To find the best keywords for content creation, you must undergo keyword research. In other words, you should know how people are searching for products, service or information that is in your field. The possibility of users landing on your web page is highly reliant on the keywords were chosen, which is why keyword research is one the first and most important steps to execute in order for the SEO campaign to be a success.

There are plenty of tools SEO specialists can use to find the right keywords for their niche, however they have to target keywords very cautiously, some keywords are very common and densely utilised, for example – aiming to rank a website high for a keyword such as “Nike shoes” will take a lot of time and effort, a more sensible and achievable keyword would be something like “Nike air maxes shoe men”. The main aim of determining the success of keyword research is by providing content that stands out and truly answers the questions prospective customers are asking with their keyword researches (Word Stream, 2017).

1.7 | Search Engine Marketing

SEM (Search Engine Marketing) is the process of gaining website traffic through purchasing ads on search engines (Boughton, 2005). Paid results of a keyword like “web design” will usually appear at the top part of search results. Compared to organic or natural search result, that will appear after the paid advertisement. The figure below shows paid and organic results of webpages in a search engine result.
1 - The first four search results returned by the search engine are paid advertising of web design agencies and web building platforms.

2 - The results displayed in the figure above are all organic results. The process of Search Engine Optimization has been highly utilised by these companies for their website to be in the first page of Google’s keyword – “Web Design Cardiff”.
1.7 | Onsite & Offsite SEO

Onsite and Offsite Search Engine Optimization are two main components of the SEO process. For a website to achieve the best possible ranking, it is crucial to understand how to operate the two elements.

Onsite SEO also is known as on-page SEO, it is the process of making a website search engine friendly, what this means is certain features of a website is altered in such a way making it easy for search engines to crawl your website and understand the content and structure. The title and description are two of the most crucial elements which need optimizing in a website because it is one of the first elements looked at by the search engine when crawling a website. If the optimization process is done correctly it will change the way that search engines, see a website. It can either hurt or help a search engine results page SERP’s (CARREL, 2012).

Offsite SEO should be considered after utilizing on page SEO. It promotes a website on the web. The most effective methods are links pointing (backlinking) to a website from high powered websites and social media marketing can bring traffic to a website through a regular call to action posts. Google uses many algorithms to rank a websites position on the search engine for a keyword, the algorithm is influenced positively or negatively by the links pointing to the website. The quality of the link is dependent on its ‘vote of trust’ and the higher the quality the better the ranking of the website, however, if the links are coming from a low-quality website it can downgrade the ranking of the website or even get it shut down. (Chris, Tippi, 2015).
1.8| Google Search Engine Algorithms

Google's algorithm has multiple segments each contributing to a site's search ranking. Google Panda has the job of ensuring the quality of a website's content, Penguin observes the quality of the links pointed back to the website, Google Hummingbird is responsible for conversational search queries (Slegg, 2016).

1.9| Google Panda Algorithm

In February 2011, a major update was implemented in Google's search ranking algorithm named Panda. The concept behind the algorithm was something completely new compared to the former algorithm; where SEO professionals used to perform basic operations resulting in them achieving satisfying outcomes. Google Panda takes the quality of the websites' content quality into consideration when ranking the websites in the Search Engine results. The Panda update made sure sites with lower quality content would be at a disadvantage when trying to gain a high search engine ranking, on the other hand, websites with higher quality content is to be prioritized higher in the search engine results.

Currently, the Panda Algorithm has been vastly enhanced as it is one of the core algorithm utilized for ranking websites. Previously it was a simple task for Google to distinguish websites with high-quality content from websites with low-quality contents but due to the constant evolution, the process is a part of a slow-moving update lasting a very long time, therefore, it is more difficult to identify low-quality website content.

The introduction of the Panda Algorithm rapidly changed the field of online marketing, no longer can SEO experts be dependent on gaining a positive Search Engine Ranking Position from poor quality content, the Panda algorithm simply encouraged them to produce better and more accurate content so Google can enhance their user's experience which is their primary goal. Google Panda is officially part of Google's core ranking system its last known update was Panda 4.2 which is still slowly progressing to its complete form over the next few months.

2.0| Google Penguin Algorithm

Google's Penguin Algorithm was launched in April 2012, its job was solely to deal with link quality. Google’s Matt Cutts said in the official Webmaster Central Webmaster Blog post Penguins mission is to reward sites with high quality backlinks(2012). Before this, many websites had purchased links of low quality, through low-quality directories, blog, spam or infographics, after the Penguin update, this resulted in their sites no longer rank for search terms.

Google announced this algorithm was aiming to decrease the ranking of websites which were violating Google's quality guidelines. Sites which have used sketchy or rudimentary tactics for link building. Regardless whether or not the site owner knows about these strategies, the consequences will still apply to them. Negative SEO is also a factor of linking, site owners that get in trouble with breaching Google's guidelines often blame their competitors for pointing the low-quality links to their website. However, Google has previously said they are relatively good at noticing this when it happens, therefore, it is not something website owners have to worry about from their competitors.

In September 2016 Google announced the Penguin 4.0 is officially part of its Core Algorithm. Penguin 4.0 is now real time; this implies that the algorithm is much more efficient at
identifying website with low-quality links and be able to take action on the websites search engine ranking. There will be no more updates to the Penguin Algorithm, version 4.0 is the last in its history (Cemper, 2016).

### 2.0 | Google Hummingbird Algorithm

Google Hummingbird is a part of the main Google search algorithm; it was fully released in September 2013. Even though Hummingbird algorithm was technically an update it was not considered to be one, as much as it seems to be an entirely “new engine”. Danny Sullivan, one of the first people to publish information about the algorithm in his article - “FAQ: All About The New Google ‘Hummingbird’ Algorithm” (2013) stated the name Hummingbird derived from being “precise and fast”, resembling the hummingbirds. The algorithm does not affect SEO; it only allows Google to process the signals in a new way and nor affect the search result like Panda and Penguin updates did (Lievonen 2013).

The Hummingbird update heavily relies on the concepts of semantics (meaning). Computers have still not reached a stage where they are capable of distinguishing difference between two different yet similar concepts unless they are instructed to. Due to this misconception, semantic search was introduced, it focused on improving the search result by understanding what the user really meant and how their search relates to other information on the web in a broader sense by looking at the contextual relevance, rather than taking the search input of the user as a string of keywords with no depth (Shewan, 2016).

Conversational search was implemented by the Hummingbird update. This enabled the user to search for information in a “conversational way” with the Search Engine. An example of this is to search for “The tallest man in the world”, the search engine will give the result in both written and voice format and if you’re interested in knowing more about that person you may go on asking “What is his age?” the conversational search will pick up from your previous search and continue from that without you having to define the name again.

Even though it has no significant impact on SEO, Hummingbird is said to be positively influencing websites with high-quality content that reads well to its users. Some of the features of Hummingbird such as the conversations with the search engine, a show of accurate content, all plays a part on enhancing the user's experience on the web. Updates and changes made to the algorithm by Google are not yet known.

### 2.1 | Google Rank Brain Algorithm

Rank Brain is a machine learning artificial intelligence program used to assist Google when processing search queries. The program sets extensive amounts of written languages into mathematical entities. These entities known as vectors are interpreted by computers. Rank Brain was launched in the early 2015 and it is very much used globally by Google.

Rank Brain is precise at determining the Search Engine Ranking of webpages, it was compared to Google search engine experts when looking at different webpages and had to guess the ranking position of each site. Google search engine experts were 70% correct and Rank Brain program was 80% correct. Furthermore, Rank Brain can learn and recognise new patterns and later re-examine the search engine result pages based on its new mastery (Ben, 2015).

Before the Rank Brain program, Google's software engineers would produce mathematical algorithms that would assess the ranking of a webpage. However, with Rank Brain, it is constantly learning and changing. Due to this frequent change SEO campaigners, must carefully choose their desired keywords (e.g. keywords for an Italian restaurant website.
would be something like Italian food Swansea) in order to have a successful SEO campaign. Ideally, the keywords must be more smart and adaptable to changes in the search engine ranking environment.

Rank Brains focus is on refining queries processed by Google, it is now also one of the many algorithms used to help Google rank web pages. In addition, Google company said it is their third most important ranking factor (Kim, 2016).

2.2 | SEO for Businesses

There is no doubt that the internet swept the entire world like a storm making it a crucial element for everyone’s day to day operations, thus it is a major opportunity for small and big companies to take advantage of this growing interest and pursue their business in the online world. At the early days of the internet companies were very reluctant on spending their budget on internet marketing. In 1995 the total amount of money spent on internet marketing for agencies was $0 and two years later-1997 the online industry was nearly worth $1billion (Tsvetan Vetskov, 2012)

Search engine optimization has now been a “must do” strategy for many online businesses and the ones that do not perform the techniques often find themselves behind companies that do perform Search engine optimization. The goal of any search engine is to provide fast quality content which is relevant to the user’s search, the more likely the user runs into reliable information the more likely they will use the search engine again. What makes a website well optimised is its ability to have great content relating to the keywords, user-friendly and well-structured use of elements also not to forget the site must be displayed on the first page of Google. Companies invest a lot to achieve those online characteristics because it increases traffic which ultimately is linked to an increase in Return on Investment (Sohail, no date).

2.3 | Businesses Investment In SEO (Slettengren, 2016)

Marketing budget is almost always the first one to receive a hit, but as customers spend a significant amount of time online, cutting cost on digital marketing especially SEO isn’t much of a wise idea anymore. SEO is worth the investment and here below is some reason why businesses put a lot of emphasis on Search engine optimization.

- **SEO will remain active for the most of the foreseeable future** – SEO will be around if Google is present because websites will still compete for attention on the search engines. In addition, considering how much people particularly in this generation are reliant on Google for seeking answers to their questions makes it even more likely for SEO to still be in action.

- **It cost-effective**- During the start of the SEO campaign businesses may not see positive ROI, this is usually the first few months, however over some time the positive results will outweigh the negative cost. Pay Per Click SEO is very popular too. A study reported by SEMPO identified the 11% of the marketing budget is invested in SEO and in that percentage 87% are spent on Pay Per Click SEO which is yet still useful but to make best of ROI organic SEO would be most ideal because even though it’s a slower process to index but once achieved there is fewer cost to
maintain whereas Pay Per Click SEO mostly has a fixed cost also just because people
click on the link doesn’t correlate directly with leads so cost can be inefficient.

- **Competitive** – Due to the increase of online users and online shopping conducted,
  companies are very quickly jumping on the SEO bandwagon to fully optimize their
  businesses services/products. The later companies act, the more left behind they will
  be and at the same time the number of online users will only increase.

## 2.3 Semantic Search

Semantic Web has been present for a long time. The name Semantic Web was given to a
long-term project carried out by W3C. It aimed to understand data on the web and how
they’re linked to one another therefore it is not only used for display purpose but for
automation, integration and the ability to reuse information across various applications. For
example, if you wanted to search up Martin Scorsese in HTML context it would only work if
there are relevant documents containing the same strings matches of the name but in
semantic Web technology, there would be semantic searches conducted on the web,
looking for various linked data related to the subject. Thus, information such as the previous
movie directed, working colleagues and spouse etc. of Martin Scorsese would be displayed,
doing this allows the computer to form data relationship from the data in the Web (Ross,
2005).

Semantic Web brought a revolutionary search engine technology known to be Semantic
Search. The way humans now input search queries into search engines has changed
dramatically, with the ability to convert searches into the actual meaning and then display
the most precise answers to the user. As mentioned by Clark Boyd in his Crowd article,
semantic search is a data searching technique which aims to understand the intent and
contextual meaning of the user’s search and not only the keywords so the most accurate
search result can be outputted(Boyd, 2016).

The rapid growth of technology was the main motive for the creation of the feature. People
now can make search queries from a wide range of devices – going from mobile phones to
TVs, this ease of searching influences the way we input or say our queries (with Cortana or
Google Now), from former and more common queries such as “barbers in Cardiff”
transitioned to more specific queries like “the best place to get a shape up in Cardiff” or
“what is the best barber place in Cardiff”.

As prior to semantic Web, search engines used to look for keyword matches in the search
query to display a reliable result. They soon realised keyword matches is not an effective
strategy to satisfy their users fully, therefore they had to look at the actual meaning and
context of the keywords in the website and grasp an understanding of it, and how they
related with one another through the web. This, as a result, was one of the most important
changes to search engine development. Sergio Redondo said in his journal about Semantic
Search “Words become concepts and search engines evolve into genuine learning
machines”, which is a perfect sentence to describe the functionality of Semantic Search.
Semantic Search Examples

Semantic search was discussed about as far back as 2003, a paper carried out by employee of IBM, students of Stanford and W3C. They gave predictions of how semantic search would work.

To execute the theory into reality took some time but as discussed in the previous sections, the Hummingbird update was introduced in 2013 and was the breakthrough in semantic search. Its aim was to be precise and fast (Patel, 2016).

Here is an example of a query being executed in semantic search.

Figure 3 SEMANTIC SEARCH EXAMPLE

Figure 4 ACTUAL VIEW OF SEMANTIC SEARCH
As you can see the actual result looks a lot like the prototype developed in 2003. With the search results being on the left part of the page and the knowledge graph is displayed on the right side of the page.

Googles Knowledge Graph is worth knowing about in this study. The Knowledge Graph is produced by gaining and connecting data about objects in the real world. This was done as an attempt to improve users experience and search performance. In addition to the improvements, Google added related information to the search result. What Google does is identify and combine what other people have found helpful for a particular search query with the information already found in the knowledge graph, as a result, Google delivers a more consequential result to its users. For example, a search for a university would return necessary information such as address, phone number etc. but also the added benefit which maybe something like the notable alumni who also attended that university, will be displayed (Elbedweihiy, 2014).

2.4| Future of SEO

Barry Adams, SEO consultant gave his thoughts on what he thinks will be the future of SEO in a Search Engine Journal article. He stated Googles AMP (Accelerated Mobile Pages) will be a thing to look out for and believes Google will transition a lot of their efforts into AMP, ultimately determining whether the project has a successful future (Goodwin, 2016).

Google, to this day indexed 150 Million AMP documents on its index page. However, the average Google user does not know the benefits of AMP results yet.

A survey conducted by Glenn Gabe, shows that only three out of 44 candidates can correctly identify what the AMP symbol in the result pages means. Mobile friendly websites were favoured over AMP.
This shows Google's aim is to bring mobile web usage level equal with native app all in hopes to increasing Google's relevance in the mobile-centric world.

As we should know, Google’s Knowledge graph is a knowledge base used to improve user’s experience on the search engine by collecting and displaying semantic search information from a wide variety of sources (including Wikidata) throughout the web.

Mostly, the Knowledge graph elements outputted in forms of boxes with the source link in the bottom of the box. The most common forms are the knowledge panel displayed on the right side of the result page and an answer box shown at the top of the results page.
Here is an example of each:

**Knowledge Panel**

![Figure 6 EXAMPLE OF KNOWLEDGE PANEL](image)

**Answer box**

![Figure 7 EXAMPLE OF ANSWER BOX](image)
The number of queries that display rich answer boxes is only increasing. In September 2016, an ongoing study from Stone Temple Consulting showed 40 percent of queries in Google display answer boxes including featured snippets but not knowledge panels. Therefore, many companies are constantly looking to manage the impression, conversation and queries customers and other people have about them.

One of the main focuses on the future of SEO is semantic search, focussing on the semantics of the words in the search query and understanding the relationship between them. Search Engines primarily do this because they can interpret the user's search needs in a more contextual level rather than solely rely on keyword matches (Giarratana, 2017). With these semantic advances, search engines can position the content to a much greater content (Lyngby, 2009).

To conclude, it is fair to say Google will focus on improving machine learning for their RankBrain algorithm, understand semantics, connection and user experience in the future. Currently, SEO has a strong relationship with content marketing, a major reason why Google is obsessed in improving the timing, contextual and helpfulness of contents delivered to their searchers.

2.4 | Relation Between Semantic Search and Content Creation

In the book “Googles’ Semantic Search” written by David Amarland (2013), stated that the meaning of the word Search can be defined as; the way we navigate the web. A business that are not listed for search will make it difficult for their customers to find them. Search is one of the main components of marketing and the way users are searching is rapidly changing.

Semantic search is an intelligent search that delivers answers which exactly solves our questions on the web page. Tim Bern Lee the man who is said to be the father of the Internet, mentioned about semantic search explaining that semantic search is the usage of carefully calculated mathematics to remove the occurrence of guess work and gain a clear understanding of what words mean and to gain a clear conceptual knowing of how it connects with other elements on the web so the search engine can know exactly what their users are looking for (David Amarland, 2013).

After the launch of Hummingbird, searchers may have noticed that Google search results were presenting a more precise answer to their user’s search questions. This is when Googles developed its semantic mastery.

With the Panda algorithm, Google’s focus is to drop the ranking of websites that possess lower quality content in their search results thus promoting websites with higher quality content up in the rankings. As mentioned before it is done by Google to provide the best possible content to answer their user’s search query. Semantic search doesn’t just rely on exact keyword matches instead it possesses the involvement of quality resources to perform a search and deliver the most suitable results (Julia McCoy, 2016).

Because of this semantic transition, content and SEO rankings are strongly linked. Writing keyword stuffed contents and poor keyword usage will quickly be noticed by Google Semantics and lead to consequences for that particular website.
The relevance of keywords does still matter but as long as the content produced is focused on a specific set of keywords then good ranking is achievable, that being said every piece of content created should have a clear focus on a single topic this will make it easier for search engines to identify the semantics of the content. Long tail keywords for example; “best responsive WordPress themes” is more achievable to gain a high ranking in than a short focused keyword such as “best WordPress themes”. Neil Patel an SEO expert & content creator witnessed a 91% traffic increase through focusing his content on long tail keywords (Niel Patel, 2015). Understanding users intents are the era of semantic search, the content created must be relevant, hence be able to satisfy the users intent and not just match the exact keywords entered in the search engine box, after all, “semantic search is about identifying users intent.” (Niel Patel. 2016).

2.5| Case Studies

Key Strategy used to Increase Website Traffic (2017) (Neil Patel, 2016)

In this study Neil Patel, a SEO expert detailed a case study he uses to gain high traffic to his website. The SEO strategy he works with is mainly long tail keywords combined with quality content creation. Some of the in-depth articles written by Neil Patel managed to gain high rankings due to the implementation of long tail keywords, appropriate headline selection and of course high standard content.

Googles top results gets on average 36.4% click through rate (number of people clicking on the link), that gives a lot of other websites a chance to also gain attraction. However ranking first on page two gave a slight more advantage in getting clicked on than ranking last on first page did, first links on page two had a 0.4% more chance on getting clicked on.
At the end of February 2014 Neil Patel's blog had attracted 238,195 visitors where 100% of the visitors arrived from long tail keywords.
Google puts more emphasis on SEO specialists to understand their user’s intent rather than just select keywords which were popular. By understanding user intent and fulfilling their searching needs will result in search volumes to the site to be increased, Google praises websites containing helpful content.

As well as long tail keywords, headlines are another crucial factor effecting a user’s judgment. Headlines which began with numbers or “How to” tends to entice users into clicking them. Headers starting with numbers has a click-through rate of 36% (Bill Flitter, 2016) (assuming the link is on the first page).

Websites with uninspiring headlines usually equals to low click-through rates or even if a web user did happen to click on the website it can usually end up with a likely scenario of them leaving and clicking on the more appealing header, for the website they left this will increase its bounce rate which can ultimately result in Google lowering the website’s rankings because it indicates the website’s content is of low quality or maybe irrelevant to the search keywords.

When searching, people tend to look for sentence cases, research shows 64% of users will respond to relevant headlines that relate to their search query, 21% click on all capital headlines, 7% respond to lower case and the remaining 8% have no preference.

Despite SEO’s claims of increasing traffic with other unconventional tactics to improving search ranking and traffic volume. The methods discussed have been targeted and used densely by Neil Patel and almost always works. Conducting keyword research to directly manipulate search engine ranking isn’t as beneficial as looking for what phrases are ideal target audiences are looking for. By understanding users queries and creating useful content which satisfies the users enough to share it with others resulting in an increase search volume through the usage of long tail keywords and sentenced headlines.

**Effect of SEO on Businesses**

In this section, two case studies will be analysed to identify businesses adapting search engine optimization and compare it with another business that focusses more on semantic search marketing. This comparison will be studied to identify the difference of both strategies and which approach contributes the most to a business’s success, thus ultimately determining which SEO method contributes the most to a company’s success.

As summed up in the previous pages SEO (Search Engine Optimization) is the process of getting traffic to a website from the result returned by a search engine. Search engines such as Google, Bing, and Yahoo ranks websites and other contents like videos according to their relevance to the search keywords.

The first case study written by Phil Frost in early 2017, the case study spoke of the SEO tactics used to boost a client’s digital presence. The client was an asphalt paving company. The client’s aim was to outrank their competitors on Google search engine.
This meant the client realised that their business was losing out on a chance to gain customers mainly because their competitors ranked on the first page of Google for keywords such as “asphalt paving” and “paving contractor”.

The SEO agency Main Street ROI ran an audit on the web page and the companies market. It consisted of deep keyword research and competitor research this was to identify best keywords for increase traffic. Edits to the main parts of the website. Creation of fresh content which targeted the additional “buying-intent” keywords e.g. “asphalt paving company + location”, also content creation for new informational pages to target “research-intent” keywords e.g. “top 5 best paving techniques”

These procedures were on page SEO, this was everything on the businesses website which effected their rankings. On-page SEO is often the most controllable SEO feature as the website is in their full control.

Main Street ROI’s next stage was to focus on the off page SEO, these were factors outside of the websites control. A lot of effort went into mentioning clients name and contact details in relevant industries and geographic business directories this would point the page back to the businesses website increasing the website's domain authority, all in hope to boost the website's rankings.

In addition to this, the SEO agency launched two content marketing strategies. The first one was to create content on the client's website that targeted research intent keywords, this was done to getting ranked on Google. The second strategy was to post content as a guest on websites with high domain authority with the goal to getting ranked on Google and receiving a point back to the client's website. The result is displayed in Google Analytics showing website traffic with the leads generated from the SEO campaign.

From the graph above you can see the traffic has increased from 90-100 visitors in 2014 to 279 in May 2016 (179% increase). But most significantly, the user to customer conversion rate increased from 6 customers in October to a new high of 20 in April 2016 (233% increase).

The use of SEO increased the number of yearly customers; from 30 leads in 2014 to 122 leads in 2015, therefore, a 307% increase. The average fee for paving a driveway is estimated about $5000, SEO lead to sale conversion is difficult to track but if we assume a 5% conversion rate, thus 92 additional leads would generate 5 more customers so $25000. Comparing the sales to the investment of SEO, $500/ monthly was the cost of the SEO
service for 12 months would be $6000 so the ROI calculation would be as follows; \((25000-6000)/6000 = 317\%\) ROI.

2015 was a successful year for the business but if you look at the graph you can see 2016 outperformed 2015 meaning SEO is a growing benefit. When done correctly SEO is an increasing asset which can ultimately generate a better ROI each year.

Semantic search engine optimization has recently been more favorable by search engines. It’s a way of making the search result to accurately and honestly relate to a user’s search query enabling it to become more personal and convenient. For example, a query like “where does Homer Simpson work” has a humanistic vibe to it and queries like these are only increasing as time goes on, that’s why it would need to be executed accordingly by Google. It gives each user a specific search list that is tailored to their searching needs. One of the reasons why Google is leaning over to semantic web is to reduce the number of spam users encounter on their search engine, in addition, it is more humanistic and user-friendly.

In 2015 Jarno Van Driel carried out a case study on the importance of semantic search marketing, it focused on the structured data on a content and how it can significantly impact inbound traffic. The study focused on a Cosmetic Surgery Website - cosmeticsurg.net. Before the study began, the website had been witnessing two years of declining traffic despite hiring many SEO specialists to boost their websites ranking in Google search engines.

Jarno used three steps to increase the websites traffic. The first step began by building structured data foundation, figuring out how they can more clearly breakdown the parts of the business. The way they did this was by building a knowledge graph – a knowledge base used by google to enhance its search engine’s semantic result by gathering information from many sources. The graph detailed information related to the surgery like the surgeon, their practice, their surgery centre etc. In addition, they included links to the website on many related websites and also placed the link in workers social media accounts in addition to this they created links to DBpedia, society of plastic surgery, Google+ etc. Thus, adding these triples, Google managed to identify a relation between the data and then later connected them.

The result was measured by testing the outputs of different google searches in order to analyse how Google would connect and display the information. They found out no matter how the user searched, the surgeon was displayed to be related to the practice, thanks to Google linking the information through the knowledge graph panel in the search results.
The second step was building a foundation through Social Media Markup. They added mark-ups for Twitter’s Summary Card, Open Graph article mark-up was added for Facebook and Google+. They did this so they could see if the social sharing helps them increase traffic, it did but it was not conclusive change or a significant increase in Google Analytics.

The final step was clarifying the content for Google with Schema.org which is a code that you insert in your website to help search engines return more insightful results about the website to the users. It was easy to identify that Google was confused. The system showed that there were overlapping queries and pages as there were many websites competing for the same keywords. Initially, they added clarification on two topics which the article spoke of that resulted in no significant change. Moving on, they added more details about the two topics and linked the data on the web in Wikipedia, Wiktionary, Wikidata etc. This resulted with increased traffic due to the additional details about the topics, using Google’s Tag Manager’s Tags and other tools in Google Analytics this allowed them to see traffic for each page with structured data.

Executing these semantic approaches, their site traffic grew substantially - Site-wide: 75% growth; Blog articles: 200% growth; Medical procedure pages: 300% growth.

Search Engine Optimization is a highly beneficial tool for a business, when carried out precisely it can contribute significantly to a business’s overall growth. The asphalt paving company was struggling to find leads with their existing website, but when approaching a suitable SEO agency their online presence grew substantially all because of the strategies developed by the company. Simply stating that before beginning optimization, it is important to consider many things which influence the business i.e. keyword research that understand user intent. Each website may require different processes to achieve a good SEO result. Jarno’s study of Semantic Marketing proved businesses can benefit from Semantic SEO significantly. CosmeticSurg a company who was also seeing a steady decline in their website traffic over the recent years, however when introducing semantic marketing to their online business there was a rapid growth of traffic to their website. Both methods are relatively similar, the boost of traffic occurred after the content was or more optimised, however, CosmeticSurg seemed to put more concentration on off-page SEO with social and link building strategies thus positive results to be displayed took more time compared to Mainstreet ROI SEO strategies; focusing on both on-page SEO and off-page SEO.
Nevertheless, Semantic Search Marketing and Search Engine Optimization are both equally treated by Google, therefore both very identical strategically.
2.6|Summary

Search Engine Optimization can be said to be an ever-evolving industry, it has many processes from onsite SEO being things like optimised keyword creation, page speed etc. and offsite optimization (outside of the website) such as link building and social media. Google being the king of all search engines are creating new and updating existing algorithms, firmly promoting rich content, quality links and now in 2017 mobile-friendly experience with of course other factors e.g. load up time and positioning of header tags. Utilising all these factors will certainly result in positive outcomes.

The use of SEO plays a vital part in business marketing, millions of brands are using it worldwide. Equal to a billion searches are done daily, and with the correct keyword optimization businesses can see a steady flow of traffic to their websites by their ideal customers. The good news for many SEO experts and agencies the volume of searches conducted is only growing. Seth Godin said “Marketing is a contest for people’s attention” and digital marketing opens a huge field to gain attraction, not only that but it is also a very cost effective method of marketing compared to the more high-cost approaches like radio/television advertising also it is easier to track and analyse traffic with SEO. Regardless of business size, they know to compete in today’s digital market, SEO is a must.

The future of search engine looks to be aiming in delivering the best possible experience to their users, to achieve this, search engines must gain a grasp understanding of their user’s intents. Features like the knowledge panel and answer box all enhance users experience on the web. Therefore, SEO experts must prepare to meet the needs of these semantics searches for the website to have a successful SEO campaign.

The second case study compared the use of both SEO and semantic search marketing for existing organisations digital marketing strategies. Furthermore, it outlined the benefits an optimized website can bring to a company’s success. Jarno said organisations can benefit substantially with the correct use of SEO, simply stating effective SEO isn’t all a publicity hype and has the possibility to produce real world results.

2.7| Methodology
2.8|Introduction

Chapter 1 explains the motive of this study is to understand the influence semantic web in specific semantic search has on search engine optimization and to observe the use of SEO in terms of marketing for businesses plus its technical algorithms used by search engines like Google. It outlined the aims and objectives of this study and how it would go about being executed.

The main purpose of this study is to grasp a knowledge of how semantic search effect SEO and how this affects a companies approaches to internet marketing. Search engine engineers pay very close attention to what can make human interaction with search engines more “pleasing”. By gathering adequate relevant information from existing journals, research papers and articles allowed a critical evaluation and judgment of viewpoints to be outlined explaining the current state of search engine functions used to rank websites and the future of SEO. Furthermore, the sources assess the effect of semantic search on Search engine optimization.
Data collection is mostly undertaken after the research answers have been clearly illustrated. For trying to obtain relevant information on the appropriate approaches to collecting the data must be outlined in the paper. Undergoing extensive research into many types of methods and the explanation on the origin of the components linked to the research question. This approach was to gather valuable information about semantic search and SEO such as the history of it, technicality aspects like the search engine algorithms, the use and the future of Search Engine Optimization, furthermore, SEO is a major tool for marketing, the reasons and ways business operate with SEO is also outlined in the research section.

This chapter will express and justify the research philosophy selected, the style of approach to design and the methods suitable for collection of data and the analysis.

2.9 Research Philosophy
Ontology research uses the fundamental nature of existence. There is no right or wrong answer as the views on the topic is different for different people based on their role and values (Vanson, 2014). Ontology is, for example, a transport for a shared understanding of concepts and relationships, integration systems and intelligent systems such as information retrieval and knowledge-based machine learning (Raj Sharman, Rajiv Kishore, R. Ramesh, 2004).

Epistemology is the thesis of knowledge, it reflects the “view of what we can know about the world and how we can know about it.”, there are two main types to be mentioned in this paper. It is possible to acquire knowledge about the world without facing any obstructions. Secondly, the observation is never influenced objectively but always affected by the social perception of ‘reality’ (Dr. David Richards, 2003).

To choose which data collection method is most appropriate, you must observe the methods influenced by the data collection strategy, factors like the type of variables, the accuracy required and the skill of the enumerator all should be considered when choosing an approach. (Burke Johnson, Lisa A. Turner, 2003). There are two categories of data collection falls into; one is primary data collection and the second would be secondary data collection. In primary data collection, the information is analysed and gathered from first person experience, examples would be; questionnaire, interviews focus group interviews etc. Secondary data collection is data which already exists and published, an example would be book or research paper. Both methods possess their own benefits, primary data method such as an interview can give a more quality aroma because it offers a more precise and in-depth result which secondary data lacks to offer this type of realistic vibe however secondary research is far less time consuming making it more economical also because it saves efforts and expenses. Secondary data is mainly used to expand or gain knowledge about an existing problem through obtaining long texts of information or mathematical equations that can be used for analytical reasonings.

This study will solely be conducted by researching secondary data. The data will be acquired from articles mainly in forms of case studies. The sources have been referenced according to the Harvard referencing format. This research will examine and assess the effect of semantic search has on Search Engine Optimization and whether businesses should adopt a different strategy when operating SEO.
3.0| Research Approach

In the journal written by (R. Murray Thomas, 2003) it states that Qualitative research is multimethod in focus, meaning multiple types of qualitative or quantitative data are collected (Creswell & Plano Clark, 2007). It involves a humanistic approach to its subject matter. Thus, it enables qualitative researchers to study in their preferred settings, with a goal to create a sense of or to understand existing situations according to the meanings people bring to them. This particular type of research relies on a variety of first person materials, so things like interviews observations, case study and visual texts that outlines procedures and difficult situations that needs solving. Qualitative researchers aim to make a sense of personal and figure out the ways the story interacts.

In Quantitative research, accurate sampling strategies and experimental designs are parts of its methods, its aim is to produce generalized results. The researchers conducting quantitative research must analyse, measure and should not “contaminate” the information through personal involvement with the research topic (Glesne & Peshkin, 1992).

The aim of a case study is to capture the meaning of a single case (Zaidah Zainal, 2007). It allows the investigation of complex issues. Recognised as an effective tool in many social sciences, with issues regarding education, case studies are known to be an important element (Gulsecen & Kubat, 2006). The case study was becoming a more prominent research method when researchers were becoming concerned with the limitation of quantitative methods when using it to present in-depth explanations of a research question. With case study, the researcher’s able to go beyond the statistical result and can better grasp occurring trends.

Including both quantitative and qualitative data in a case study helps to describe both methods and result of an occurrence through a complete analysis of the cases being examined (Tellis, 1997). The debates around quantitative and qualitative methodologies usually lead to a contest between the so-called innovative, socially responsible methods against narrow-minded methods [said by a person who supports qualitative research] (Stewart & Shields, 2001). Nevertheless, most authors in today’s world see the both approaches to be complementary. Both quantitative and qualitative methods can be utilised effectively within the same research paper. However, most research projects or researchers tends to put more emphasis on one type of approach over the other.

As mentioned before, case studies will be conducted in this research, therefore, this investigation does not require any contribution from the general public because only previous studies and articles will be observed. Cross-case analysis will be used to analyse and evaluate the case studies. The results are summarized and discussed in the following chapter with the aim to gain a better understanding of the effect of semantic search on SEO and whether businesses should implement changes to their SEO marketing strategy.
3.1 Data Collection Methods

To achieve the aims and objectives in chapter one a vast amount of research must be performed. Quantitative data collection in specific case studies will be the only style of data collection methods used because it is believed to be adequate for this research.

The data collection method will be gathered using the case study conducted by (Neil Patel, 2011), the article presents a case study on increasing website traffic through the usage of long tail keywords and quality content. The study reviews the characteristics of semantic technologies using first person research, it is a good source because the elements surrounding semantic technology is concluded to ensuring websites high ranking.

The study was conducted by performing actual experimentation with long tail keywords and content creation, this allowed the SEO expert to reasonably justify the effects of semantic search technologies has in the modern world of SEO. Once assessed and identified by the expert he concluded with valuable information surrounding the transition semantic technology.

A further case study was conducted containing two case studies that compared the benefits SEO and semantic search marketing had on organisations, it compared the both and outlined which tactic was the most beneficial for websites to gain high ranking. This related to the research question because it demonstrates a sound understanding of the benefit of SEO’s has on a company’s growth when used correctly.
3.2 | Methodology Summary

By operating with past work for investigation and justification in order to gain sufficient amount of information for the study conducted. The studies chosen will have relevant findings and discussions these finding will contribute to this study as it outlines information on the impact semantic SEO has on businesses and also the impact semantic search has on SEO.

The first study is a case study which determines the most accurate findings and results, most of the findings will be represented in diagrams so it can be interpreted easily. The second study looks at another case study where businesses implement SEO related strategies to their online marketing and describes how this correlated with the overall growth of the company.

The purpose of looking through these case studies is to gain an understanding of common grounds and analyse existing benefits towards the research problem. The field of SEO and digital marketing is a new era of advertising so appropriate literature were not accessible as they were either irrelevant or outdated therefore articles were operated with. The case studies gave a clear analysis on the present and future state of search engine optimization. The following chapter will analyse the case studies conducted by the SEO experts.

3.3 | Results

3.4 | Introduction

The information collected through secondary data for this research has been justified and observed to answer the research question since it does outline the traffic increase a website experiences from the influences of semantic search on the SEO’s plans. Case studies were the only method/approach used to collect the necessary information, answering the research question. A comparative case study analysis will be done in the discussion section, the aim is to present a clear description of the discoveries identified through observing and synthesising the similarities, differences, and trends occurring in the selected case studies and how these relate to answering the research questions. There are two case studies; two within a singular case study and another separate case study, they both focus on contributing to the answer of the overall research question.

One of the case studies vastly describes the most effective techniques used to increase traffic to a website where the other case study splits into a further two sections; both sections are case studies, it describes the results a business witnessed from using search engine marketing and regular SEO methods, both internet marketing techniques are compared to determine which one is the most effective for determining a business’s success.

3.5 | Comparative analysis of Case Studies

Neil Patel 2016 – Increase Website Traffic

Neil Patel an online marketer, founder and a digital consultant for companies like Amazon and NBC, launched an article in late 2016 “How to generate more online visitors”, in this article he wrote a cases study displaying the strategies used by him to almost always gain a positive success rate in terms of SEO. Many people visited and shared his articles, this, as a result, lead Google to rank him very high in their search result.
The strategies used was mainly identifying long tail keywords. Key word research is undoubtedly the most influential part of an SEO campaign. Keyword research is the process of browsing for phrases users may search for. Without conducting a keyword research, it will be inefficient to optimize the pages on a website or draw up a content strategy qualified enough to drive visitors or potential traffic to a website (Jay Rieckmann, 2013). However, when selecting a keyword, it is important to choose a phrase that isn’t so competitive like “mobile phone” instead focusing on long-tail keywords such as “One Plus X”. (Statista, 2015) identified to have a successful on-page optimization would require 50% focus on long tail keywords. When coming up with a long tail keyword, a factor that determines its success would be to understand the audiences intentions, Tom Fanelli said when focusing on intent, good keywords will follow, the standard of the content will improve as a result.

Users who use long tail keywords tend be more qualified than users who type in head terms, due to this the conversion rates are higher for long tail keywords.
The use of appropriate headers is another strategy used by Neil Patel to achieve high traffic for his website. Headers beginning with numbers have the highest click thorough rate (36%). In a survey conducted by Nathan Safran identified 64% of users prefers sentence case headlines, second was capital headlines.

**The Result**

The article linked to many other successful case studies explaining the use of long tail keywords and appropriate header format contributed to a websites success. By targeting long tail keyword, with attention grabbing headers and creating quality content positively correlates with obtaining high search engine rankings. It demonstrated techniques used to target the right keywords by searching for phrases with high monthly search volumes, this is ideally done to know what the audience is searching for. One of the articles produced by the author using these long tail headers, good titles and helpful content had attracted 238,195 search visitors, where 100% of the visitors found the article through long tail keywords.

**Phil Frost 2017 SEO ROI Case Study**

Phil Frost wrote a case study based on a client SEO campaign. The company using the SEO strategy was Asphalt paving company. The SEO agency implemented many tools to boost the clients ranking for the selected keywords. Before the SEO process can begin the agency had to run an inspection on the paving company’s website.

After finding the suitable keywords they worked with the on-page optimization strategies. This was everything within the websites control, they researched and implemented two types of keywords in the company’s website contents; one was the buying intent keywords and the other one was the research-intent keywords, many other edits on the websites pages were done along with this.

After they began operating with off-page optimization techniques, this involved link building in relevant geographically located websites and related business platforms. The aim of this was to get links pointing back to their website increasing domain authority meaning the website is more likely to be found by intended searchers.

One of the final steps taken by the agency was launching a content strategy plan. The agency crafted a highly useful content and inserted it in the companies website, this was to target research intent users meaning it was content which prove beneficial for searchers and the part of the strategy was to guest post on a similar niche website, this was to establish content partnership with influencers who deliver useful content to the similar target audience. The guest post contained a link back to the website, boosting its domain authority thus Google ranking.
The Result

The implementation of SEO to the paving company’s website boosted its traffic and the leads generated significantly. The return on investment was an impressive 317%. However that was not the most impressive part, the campaign began on 2014 and ended in 2015 giving the company a positive return on investment for the first year, but the ROI increased in 2016 meaning SEO is an ongoing asset if executed effectively.

Jarno Van Driel 2015 Semantic Search Marketing ROI Case Study

This case study discusses semantic search marketing being orchestrated on a Cosmetic Surgery Website. The site already had some SEO implemented to it but this was ineffective as the site owners were seeing two years of declining traffic despite the attempts to complement the Google Panda algorithm.

Jarno Van Driel had enforced three plans to improving the SEO rankings of CosmeticSurg website. He started off by building structured data foundation which connected segments of the business together, this was done through the usage of knowledge graphs which in detail specified their surgeon and surgery centres. This information was also linked across all social media platforms. By doing this Google connected all the information they have on the surgery and displayed it when a user entered a search query regarding that surgery.

Step 2 gave them a desirable outcome through social sharing, they achieved this by adding markups for Twitter’s summary card, a summary card with large images, open graph article markup was inserted in Facebook and four a carefully planned blog was inserted in Google +. However, this only increased traffic temporarily. There data structure looked like the following:

![Figure 16 COSMETICSURG KNOWLEDGE GRAPH](image)

The final steps used was simplifying the websites content through Schema.org, to fix Googles confusion they clarified the content to target specific keywords this resulted in a drastic change, they later created more fresh content and linked it with relevant websites in the similar field like the American Society of Plastic Surgeon.
The Result

After conducting a methodical approach of constructing a strong data structure foundation followed by creating fresh meaningful content is what crucially played a part in determining CosmeticSurg’s success in the online world, because of the strategies implemented, the business seen a significant growth in traffic; blog articles: 200% growth and medical procedures pages: 300% growth.

3.6|Discussion

The aim of search engine optimization is to direct as much traffic to a website as it possibly can, this traffic isn’t just any random visitors it has to be targeted visitors this means to present the website to people who are in search of what you’re are offering.

To increase the likeliness of a website being found by a prospective reader/customer, a keyword research must be undergone, the website’s focus and content must be around the keyword’s chosen. Some of these keywords might be immensely targeted. That’s when the market research is conducted, the website owner must know and understand what keywords and phrases their target audience is typing in when searching for their niche. Considering the target audiences intent when choosing the most suitable keywords is a valuable effect on determining the success of the web-sites search engine visibility.

One of the reasons to why Niel Patel, Asphalt Paving company, and CosmeticSurg experienced a lot of traffic was because of understanding and basing their targeted keywords around their user’s intent. Neil Patel’s article focused on users who were keen on improving their knowledge, this is known as ‘research intent’, it would not have attracted 238,195 search visitors if the keyword was inaccurate and just targeted anyone, long tail keywords in specific is what is used to target research intent users.

By choosing long tail keywords the competition level for the keyword has automatically decreased compared to choosing a short head keyword, therefore there is more of a possibility for the web-site to be positioned higher in the search result rankings.

The case study based on the implementation of SEO on Asphalt Paving Company and Semantic Search Marketing on CosmeticSurg.com were both very alike strategically. Jarno’s focus on building a solid structured data foundation for CosmeticSurg.com through social media and links to DBpedia was carried out to assist Google in understanding the content of the website. It was similar to Mainstreet ROI’s off-page optimization on Asphalt Paving company’s website, they concentrated on mentioning their clients company name, address and phone number on all relevant industry and geographic business directories found, this made Google identified the relationships and improved the companies visibility on the search result i.e. a knowledge graph was made containing all the relevant information of Asphalt Paving Company.

However, Jarno’s second approach in creating social markups did create a slight rise in traffic but this was temporary so it was moderately an ineffective method. Mainstreet ROI didn’t implement such philosophy in their SEO process.
After identifying keywords and phrases that were high in search volume, all three case studies included this crucial element that spiked their websites traffic thus ranking, it was assembling a content strategy.

This element is what spiked consistent traffic flow for all three-case study. (Neil Patel, 2017) stated in his article “How to generate 20,000 visitors per month” that a significant amount of traffic is generated from producing useful content that answers many of the target audience’s questions and end of all the content should leave them satisfied. Mainstreet ROI launched two content marketing strategies; one was for research intent user’s and the following was for a guest post. The guest post was to gain a recognition from the people of paving and create relationship with influential content writers who specify in that sector and not to mention the do-follow backlink pointed back to the website increasing its domain authority, this ultimately lead to them to have a ROI of 317% increase. The same strategy was used for Cosmeticserch.net, the production of insightful research intent keyword content along with the backlinks from big brands like America Society of Plastic Surgeon lead them their website to obtain high rate of traffic.

![Figure 17 COSMETICSURG RESULT](image)

### 2.6 Findings Analysis

The overall research question is to investigate the effect of semantic search on SEO and establish whether or not businesses must make any drastic changes to their SEO strategies. After doing an extensive amount of research, looking through past thesis, journals, books and articles, the effect of semantic search on SEO and the measures businesses should take to please search engines is fairly comprehensible.

The world of semantic search is gradually becoming a breakthrough for search engines especially Google. This mean’s old traditional SEO methods are not good enough to gain or maintain a successful flow of traffic to a website anymore.

As mentioned multiple times before, semantics search is the process of understanding the users intent and respond by delivering relevant information. Search engines particularly
Google is leaning more towards this because prioritising semantic search means less irrelevant content, a better understanding of users intentions and more use of natural languages i.e. conversational searches.

After all, from a business sense, you can interpret why Google is doing this, better user experience increases the probability of them using the search engine again, therefore higher volume of Google searchers means more businesses will utilise Google as a main source of advertisement for their business.

As search engines algorithms have become more focused on delivering content that matters it does show an effect on SEO. SEO experts must carry out a vast amount of research to understand what the users want therefore SEO is gradually becoming a psychological approach.

Most experienced SEO experts acknowledged that the psychology behind why people search the way they do impacts significantly on establishing a successful SEO strategy. Experts must know people who will benefit from the product or service their website is aiming to present. Developing and detailing personas of people who will most likely interact with the website should be done, with this understanding the user intent will be much simpler, as a result, you can then provide the targeted personas with engaging informative content that is tailored to attract their attention.

SEO is no longer just competitively inserting keywords in a content. To be useful you have to give customers the information they need, this will, as a result, increase the businesses conversion. It is important to understand the problems target audiences are facing, or want to learn more about. Producing useful content that truly answers users question is what truly makes a successful SEO campaign.

Neil Patel, Mainstreet ROI and Jarno realised knowing their audience is a contributing factor for good SEO result, this enabled them to launch a content strategy aimed at their user’s intent which leads there online presence to significantly improve.

As well as producing meaningful content, semantic search is increasing the conversational searches conducted. Users are becoming more personal with their queries e.g. instead of typing “laptop sale Cardiff” the user is likely to ask a more conversational question such as “where can I find a cheap laptop in Cardiff”, therefore when developing an SEO strategy, it is relevant to consider how people will ask Google to find the products or service. Using long tail keywords in a search strategy is one of the only ways to obtain high organic traffic (Dan Shewan, 2016).

3.7|Approach
The case studies were selected with careful consideration, the number of case studies available online on SEO is relatively low, this can be because most SEO providers prefer not to reveal their tactics or they do not find sufficient amount of time to put together a detailed case study. However, the ones chosen were written in fine detail, they precisely demonstrated the steps taken to attain positive results. The studies conducted were fairly new therefore having a clear understanding of the effect semantic search has on SEO and the measurements taken by business was equitable justifiable.
3.8 Findings Summary

The results obtained from the case studies were well descriptive and sufficient for analysis. All three case studies had similar approaches being implemented in their SEO process. From the studies, it seems that semantic search is only becoming a more desirable feature for search engines and SEO providers must modify their strategies in order to maximize their marketing experience in the online world.

With the constant release of algorithms, the SEO world moves in a fast pace, what worked a few years ago may be useless to operate with now. On the other hand, there are some aspects of SEO which stay more or less the same.

However, with the evolvement of semantic search, SEO provider must focus on producing and publishing user orientated content. Content marketing is highly linked with search engine optimization, without content SEO is impractical. Articles, keywords substances are required. By reading through the findings it is noticeable the first and most crucial parts of SEO is keyword research and the only way to utilise the keywords is being able to strategically use them throughout the websites content. With content marketing, highly optimised substances containing the targeted keywords can be produced.

The Panda algorithm mentioned in section 1.9, will identify content that over spams and over optimizes keywords, but if SEO and content marketing is done appropriately, great results can be achieved.

Semantic search is basically understating the user’s intent, therefore keywords that will be used by audiences must be identified, if inaccurate keywords are chosen and implemented the content will have little to no use, which is why selection of keyword is the most important part of the SEO process.

To understand user intent, fair amount of psychology and market research is involved the SEO providers must know what influences their audiences to search and how their user searches. Various personas should be discovered and developed based on their intent, i.e. research intent, buying intent etc. when this is finished, content should be posted and shared accordingly. Long tail keywords have seen to gain the most traffic over the recent years therefore the companies in the case study; Asphalt Paving and Cosmeticsurg.net have witnessed high traffic due to delivering content which were aimed for research intent users.

Offsite SEO still play a role in SEO, inbound links to a website are still important. Especially from high authority websites. Not only does it notify the search engine to crawl a website but backlinks pointing back from high authority websites shows the search engine that the website with link pointed to it has valuable content worth ranking and promoting, otherwise the high authority website would not have placed the link in their website. Mainstreet ROI’s second content marketing strategy was to guest blog in a website relevant to their niche, exactly with Cosmeticsurg when linking back to their websites from similar niches such American Society of Plastic Surgeons.
3.9|Conclusion

4.0|Review of Aims and Objectives
The main purpose of this study was to analyse and evaluate the effect of semantic search on SEO and what measures business should take to either move up or maintain their websites visibility in the search engines. The goal was achieved by accomplishing all the four objectives listed in section 1.3. Each objective will be listed below and explained if they have been met in the section above.

To investigate and assess the algorithms produced by Google to determine website ranking position and Google’s use of semantic technology.
- The result of this was obtained through the usage of secondary research, reviewing sources such as journals, existing thesis and articles helped gain a clear sense of the algorithms affecting websites ranking and Google’s use of semantic technology in today’s world.

To investigate and assess the relationship between semantic search and content creation.
- The outcome of this objective was achieved and understood from observing existing articles published by qualified SEO and content creation providers.

To investigate the future of search engine optimization and if it will remain relevant in the world of internet marketing.
- This was accomplished through, by looking through recent articles related to this topic and observing a few existing thesis.

To assess the benefits of utilising search engine optimization in a business’s marketing strategy.
- This objective was met and explained in section 1.3, by looking through journal articles on the benefits of utilising SEO for a business and why it is a key marketing tool.
4.1 | Reflection of Study

A broad reflection of this study established to be a worthy research, it showcased that search engines are an ever evolving field and with this SEO techniques are always changing and developing. The increase in usage of search engines does make a company like Google to enhance its program to sustain the number of users, they do this by strengthening the functions of the semantic features. The data collected and obtained through secondary research revealed that semantic search has an impact on SEO. However, to gain actual academic books and journals on the effect of semantic search on search engines was difficult at this time because the topic is fairly new, even though the sources used did adequately answer the objectives. Although constant algorithms are being produced by search engines, it seems like user intent will always be the big focus SEO providers must take into consideration when architecting their SEO tactics. To understand user intent, thorough market research and psychological actions must be undergone. Once identifying user intent, developing content that is truly useful for their audience’s intents will undoubtedly create positive SEO outcomes. Thus, a significant aspect of SEO is dependent on content marketing.
Reference Section


Appendix

When undertaking a research or enterprise project, Cardiff Met staff and students are obliged to complete this form in order that the ethics implications of that project may be considered.

If the project requires ethics approval from an external agency (e.g., NHS), you will not need to seek additional ethics approval from Cardiff Met. You should however complete Part One of this form and attach a copy of your ethics letter(s) of approval in order that your School has a record of the project.

The document *Ethics application guidance notes* will help you complete this form. It is available from the [Cardiff Met website](#). The School or Unit in which you are based may also have produced some guidance documents, please consult your supervisor or School Ethics Coordinator.

Once you have completed the form, sign the declaration and forward to the appropriate person(s) in your School or Unit.

**PLEASE NOTE:**

*Participant recruitment or data collection MUST NOT commence until ethics approval has been obtained.*

**PART ONE**

<table>
<thead>
<tr>
<th>Name of applicant:</th>
<th>Mahdi Mashrafi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supervisor (if student project):</td>
<td>Imtiaz Khan</td>
</tr>
<tr>
<td>School / Unit:</td>
<td>Cardiff School of Management</td>
</tr>
<tr>
<td>Student number (if applicable):</td>
<td>ST20063959</td>
</tr>
<tr>
<td>Programme enrolled on (if applicable):</td>
<td>BSc (Hons) Software Engineering</td>
</tr>
<tr>
<td>Project Title:</td>
<td>Investigate the influence of semantic search on SEO.</td>
</tr>
<tr>
<td>Expected start date of data collection:</td>
<td>25/01/2017</td>
</tr>
<tr>
<td>Approximate duration of data collection:</td>
<td>No Data Collection</td>
</tr>
<tr>
<td>Funding Body (if applicable):</td>
<td>N/A</td>
</tr>
<tr>
<td>Other researcher(s) working on the project:</td>
<td>No other researchers</td>
</tr>
<tr>
<td>Will the study involve NHS patients or staff?</td>
<td>No</td>
</tr>
<tr>
<td>Will the study involve human samples and/or human cell lines?</td>
<td>No</td>
</tr>
</tbody>
</table>

**Does your project fall entirely within one of the following categories:**

---

44
<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper based, involving only documents in the public domain</td>
<td>Yes</td>
</tr>
<tr>
<td>Laboratory based, not involving human participants or human samples</td>
<td>No</td>
</tr>
<tr>
<td>Practice based not involving human participants (e.g. curatorial, practice audit)</td>
<td>No</td>
</tr>
<tr>
<td>Compulsory projects in professional practice (e.g. Initial Teacher Education)</td>
<td>No</td>
</tr>
<tr>
<td>A project for which external approval has been obtained (e.g., NHS)</td>
<td>No</td>
</tr>
</tbody>
</table>

If you have answered YES to any of these questions, expand on your answer in the non-technical summary. No further information regarding your project is required. If you have answered NO to all of these questions, you must complete Part 2 of this form.

In no more than 150 words, give a non-technical summary of the project:

The way internet users and webmasters are using search engines are changing, this means search engines providers i.e. Google, must perform action to keep up with these demands. They are more concerned with the semantic part (meaning) of the searches than the actual keyword matches typed in the search box. This is used to improve search accuracy by trying to understand the contextual meaning of what the user types in.

Through this research I will investigate search engine optimisation (SEO) techniques and trends. I will outline algorithms used by dominant search engines like Google. This research will investigate how semantic search will impact SEO. Furthermore, I will look at commonly used searching methodologies.

**DECLARATION:**

I confirm that this project conforms with the Cardiff Met Research Governance Framework

I confirm that I will abide by the Cardiff Met requirements regarding confidentiality and anonymity when conducting this project.

STUDENTS: I confirm that I will not disclose any information about this project without the prior approval of my supervisor.

Signature of the applicant: Mahdi Mashrafi  
Date: 18/01/2017

**FOR STUDENT PROJECTS ONLY**

Name of supervisor:  
Date:  
Signature of supervisor:
### Research Ethics Committee use only

**Decision reached:**
- Project approved
- Project approved in principle
- Decision deferred
- Project not approved
- Project rejected

**Project reference number:** Click here to enter text.

**Name:** Click here to enter text.  
**Date:** Click here to enter a date.

**Signature:**

**Details of any conditions upon which approval is dependant:**  
Click here to enter text.

### PART TWO

#### A RESEARCH DESIGN

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1 Will you be using an approved protocol in your project?</td>
<td>No</td>
</tr>
<tr>
<td>A2 If yes, please state the name and code of the approved protocol to be used</td>
<td>N/A</td>
</tr>
<tr>
<td>A3 Describe the research design to be used in your project</td>
<td>N/A</td>
</tr>
<tr>
<td>A4 Will the project involve deceptive or covert research?</td>
<td>No</td>
</tr>
<tr>
<td>A5 If yes, give a rationale for the use of deceptive or covert research</td>
<td>N/A</td>
</tr>
<tr>
<td>A6 Will the project have security sensitive implications?</td>
<td>No</td>
</tr>
<tr>
<td>A7 If yes, please explain what they are and the measures that are proposed to address them</td>
<td>N/A</td>
</tr>
</tbody>
</table>

#### B PREVIOUS EXPERIENCE

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1 What previous experience of research involving human participants relevant to this project do you have?</td>
<td>Click here to enter text.</td>
</tr>
</tbody>
</table>
| B2 Student project only  
  What previous experience of research involving human participants relevant to this project does your supervisor have? | |

---

1 An Approved Protocol is one which has been approved by Cardiff Met to be used under supervision of designated members of staff; a list of approved protocols can be found on the Cardiff Met website here.
### C POTENTIAL RISKS

<table>
<thead>
<tr>
<th>C1</th>
<th>What potential risks do you foresee?</th>
</tr>
</thead>
<tbody>
<tr>
<td>C2</td>
<td>How will you deal with the potential risks?</td>
</tr>
</tbody>
</table>