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Master thesis

Reetta Pellikka

UTILIZATION OF SEARCH ENGINE MARKETING IN INTERNATIONAL CONTENT MARKETING OF HIGHER EDUCATION INSTITUTION

Supervisor: Professor Sanna-Katriina Asikainen

ABSTRACT

Author:	Reetta Pellikka
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This thesis examines the effect of search engine optimisation and search engine advertising techniques in connection with content marketing on search engine visibility, awareness and engagement of the website traffic. The thesis aims to find guidelines for search engine optimisation and advertising tactics to be implemented to gain better ranking in search engines as well as increase the traffic and the traffic quality to the website from search engines. The theory focuses on search engines, academic literature of search engine optimisation and advertising and online behaviours which influence the online users' engagement as well as click-through patterns to the websites. Search engine optimisation and advertising was performed based on suggestions in theoretical literature and their effect on visibility, awareness and engagement was measured. The results suggest that keyword implementation is an effective tactic to increase ranking, whereas search engine advertising works well in gaining traffic to the website. Based on the results, visitors through search engine optimisation are more engaged to the website and content.

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Tämä Pro gradu-tutkielma keskittyy mittaamaan hakukoneoptimoinnin ja -markkinoinnin yhteisvaikutusta sisältömarkkinoinnin kanssa, verkkosivuston näkyvyyteen ja sen tietoisuuden lisääntymiseen kohderyhmässä ja kohderyhmän sitoutuneisuuden kasvattamista. Tutkimuksen tavoitteena on löytää ohjeistusta, miten hakukoneoptimointia ja -markkinointia voidaan toteuttaa siten, että saavutetaan parempi sijoitus hakukonetuloksissa, lisätään verkkovierailuja ja verkkovierailijoiden laatua. Teoreettinen osa tästä tutkimuksesta keskittyy sen määrittelemiseen, miten hakukoneoptimointi ja -markkinointi vaikuttaa näkyvyyteen hakukonetuloksissa ja mikä on hakukoneiden rooli nykypäivän verkkomarkkinoinnissa. Teoria keskittyy hakukoneisiin, aiempaan akateemiseen kirjallisuuteen hakukoneoptimoinnista ja -markkinoinnista kuin myös verkkokäyttäytymiseen, mikä vaikuttaa verkkovierailijan sitoutumiseen. Tutkimuksen tulokset osoittavat, että avainsana implementointi on tehokas tapa parantaa sijaintia hakutuloksissa, kun taas hakukonemarkkinointi toimii hyvin liikenteen kasvattajana. Vierailijat jotka saapuivat verkkosivuille orgaanisien hakutuloksien kautta, olivat sitoutuneempia sisältöön ja verkkosivuun kuin maksetuista hakutuloksista saapuvat.

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*The secret of getting ahead is getting started. — **Sally Berger***

This thesis has been long time coming. Thinking process for the topic started almost one and a half year before writing this sentence and during that time, there has been couple of surprising turns, which have eventually led me to this point. There were moments when I doubted if I had taken on a topic which was way over my head and moments when I have been sure that this is just what I need to be doing. I can't say that I have loved every moment of it, but what I can assure is that I have learnt from every mistake made and come to the other side with confidence that I can tackle every obstacle that comes my way. Even though it took longer than expected to complete my thesis, this moment is exactly right, and I am ready to start a new chapter in my life.

Although I stand here alone, this could not have been finished without the help I got. Firstly, I need to thank University of Helsinki for believing in me and giving me this opportunity to study their website as a part of my thesis. It gave me inspiration and motivation to give it my all. Also, I need to specially thank my dad who introduced me to the right persons and pushed me forward when I was lost. Secondly, Sanna-Katriina has been the mentor I needed, by giving me the chance to stand on my own feet but pointing my thought process to the right direction with constructive and encouraging feedback. Thank you for the guidance and support, which is the reason I can be proud of my own work.

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Oslo, 18.4.2018
Reetta Pellikka

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1 INTRODUCTION

Online marketing has been the new rising marketing technique in the 21st century (Opreana & Vinerean 2015) and online presence has become one of the most important marketing channels (Kennedy & Kennedy 2008), due to its relation to all areas of marketing activities (Schibrowsky, Peltier & Nill 2007). The userbase of internet is still growing (Lukito, Lukito & Arifin 2015) and along the userbase, grows the information online and the task of identifying which information is valid gets increasingly difficult (Kritzinger & Weideman 2013; Egri & Bayrak 2014), highlighting the role of search engines in finding information (Luh, Yang & Huang 2015; Baye, De Los Santos & Wildenbeest 2016). The traditional marketing tactics have lost their effectiveness because consumers want to choose when and how they face marketing, marketing is viewed disruptive and the amount of these interruptions is enormous (Opreana & Vinerean 2015). Online marketing differs in many aspects from traditional marketing (Huang 2012) offering a unique way to find, reach and connect your correct audience (Popa 2015), faster (Mirzaei et al. 2012) and cheaper than traditional marketing (Mirzaei et al. 2012; Salehi et al. 2012; Ghose & Yang 2009). Online is a novel marketing arena (Opreana & Vinerean 2015) enabling targeting of either mass or specific market segments (Huang 2012; Mirzaei et al. 2012) without being limited by time or space (Huang 2012).

One of the biggest characteristic differences between traditional and online marketing is consumer involvement (Huang 2012), interactivity and engagement (Opreana & Vinerean 2015). Online marketing focuses on engaging the consumer throughout the marketing process (Opreana & Vinerean 2015), whereas in traditional marketing the consumer is more a target than an engaging customer (Huang 2012; Chiu et al. 2014). Online marketing also gives the possibility to be interactive, share experiences, opinions and knowledge online (Huang 2012; Chiu et al. 2014). Due to tracking possibilities, online marketing has become very personalized and pervasive (Parra-Arnau 2017). Online advertisements can be targeted specifically depending on user's location and page contact and therefore, advertising that relies on user’s browsing habits and information, is the most effective form of advertising (Beales 2010).

Search engine marketing (SEM) is number one channel for consumer acquisition online (Rutz & Trusov 2011) focusing on reaching potential customers with the marketing material when the consumer is looking for information, certain product or service aka being at the right place at the right time (Kritzinger & Weideman 2013). SEM assumes that while consumer is searching for information, they are more willing to receive marketed content, making the biggest impact (Yang & Ghose 2010; Zenetti et al. 2014). SEM is described by Clarke and Clarke (2014, 25) as "an aspect of online marketing strategy that involves increasing and maintaining Web site's rank on search engine results pages (SERPs) to be easily found by searchers". Search engine marketing is divided into two separate concepts, search engine optimisation (SEO) (Xing & Lin 2006; Kritzinger & Weideman 2013; Zhang & Cabage 2017) and search engine advertising (SEA) (Buckli et al. 2008; Rangaswamy, Giles & Seres 2009; Jansen, Sobel & Zhang 2011).

This thesis focuses on the University of Helsinki (HY) and their online marketing. University of Helsinki is the oldest and biggest higher education institution in Finland founded already in 1640. University of Helsinki is an international scientific community of 40 000 members and a well-established institution in Finland and abroad, ranking in the top 100 in international university rankings. (University of Helsinki 2018) Although the University of Helsinki has a successful history in attracting new researchers, students and investors, they need to keep their position as a forerunner and therefore implementation of search engine marketing is in place. At the present HY is doing the right things in the scene of online marketing, but they are lacking the efficiency and usability of search engine marketing techniques. Currently the information about how to perform search engine marketing on their webpage is present, but they lack in taking the steps to action. It has been identified that search engine marketing is a promising channel to reach the university's multiple different target audiences. The goal with search engine marketing is to gain awareness among chosen content topics bringing research global and knowledge as a common capital. Therefore, the motivation behind this study is to identify effective search engine optimisation (SEO) and search engine advertising (SEA) actions to be used alongside content marketing to reach the goals of University of Helsinki.

This research hopes to pinpoint which SEO and SEA actions work effectively in increasing awareness and visibility of HY's content topics in the search engine results and how this

gained visibility will affect the organisation's goal of attracting their international target audience through content marketing and in increasing their engagement. This research will look at the importance of high SERP from online user and organisational point of view aiming to build a theoretical framework which supports the importance of successful search engine marketing.

1.1 Background of the study

According to Parra-Arnau (2017, 96) "With a revenue of $27.5 billion in the first half of 2015, the online advertising industry is one of the most competitive industries in the world today" and in addition Gardner and Lehnert (2016, 293) state: "Internet-based advertising is the single fastest-growing ad expenditure category ". Online marketing has various definitions in the literature (Popa 2015), being a popular area of academic research (Xing & Lin 2006) and almost 70% of the studies made about online marketing have been made during the last 8 years (Pomirleanu et al. 2013). Definitions of online marketing tools and their effectiveness are discussed in the academic literature (Teo 2005) and according to Popa (2015, 1269) "the relatively similar concepts on the field are not yet clearly defined and delimited".

Utilizing the full potential of search engines is essential, since 93% of the internet traffic is managed by them (Egri & Bayrak 2014) and the goal of organisations SEM should be that when relevant keywords are searched for, their web page should appear at least within the first page of search results (Lukito et al. 2015). Based on the current literature the higher your webpage appears on the SERP, the more clicks your webpage will get (Clarke & Clarke 2014). Search engine marketing is a relatively new area of theoretical research and literature (Clarke & Clarke 2014) and SEM was first introduced in 2001 as an umbrella term for both search engine optimisation and search engine advertising (Kritzinger & Weideman 2013). Additionally, there is a lot of empirical and commercial information provided for example by Google (Google 2017). The potential with search engine optimisation and advertising is almost endless and it can be utilized in multiple scenarios by increasing the traffic to your website (Killoran 2013), such as creating an online presence, attracting new customers (Opreana & Vinerean 2015) and creating brand awareness (Zenetti et al. 2014). Due to the newness of the term in marketing vocabulary for the academia, there is a research gap in this

topic in the current literature. World wide web is full of practitioner's guidelines on how to perform search engine marketing (Killoran 2013), but the gap between theory and action among organisations is gaping and therefore, research is needed to pinpoint which actions give value to the organisations and how should they be implemented in to the daily actions.

Currently scientific content apart from scientific research is not owned by anyone, neither in Finland or abroad, which HY has recognised as an opportunity to take the role of scientific content media producer. HY has been planning to implement a new set of media concepts and goals, which will be supported by search engine and content marketing, which is where this research takes role. To take the position as a content creator and reach the international target audience in the content topics chosen, they need to be visible in search engines when the target groups are looking for information. Currently HY offers enormous amount of useful content which needs to be highlighted and made visible in the search engine results. Providing content topics which can be used to influence the audience, offers a big opportunity to renew the role as the oldest university in Finland and it will show the road for other actors.

1.2 Research objectives and research questions

The main goal of this study is to determine how search engine marketing can be utilized to increase visibility and awareness of the website in search engines as well as how search engine marketing can be used to engage target audience. The study is performed through search engine optimisation and advertising activities and the effectiveness of them is measured through Google Analytics. The goal after this study is completed, is that the case organisation will have tools and knowledge how to utilize search engine marketing in their day-to-day actions. The connection to content marketing and specific use of keywords to reach targeted audiences should be visible for everyone and in line with the future content creation to the website. The case organisation brought to attention two different problems they want to target with search engine marketing, which are how can search engine marketing be used to reach the target audience and to gain clicks on specific topics resulting in increase of visitors to the website and how can the engagement of the visitors be increased with connected search engine and content marketing.

From this research problem has the research question been built with a connection to appropriate literature and it aims to look at the problem from all angles and cover all the goals which the case organisation has for the research. The research question combines search engine marketing and content marketing as a marketing tool performed simultaneously and with support to each other. Search engine marketing contains two different practises: Search Engine Optimisation (SEO) and Search Engine Advertising (SEA) also known as paid placement (Xing & Lin 2006). Search engine marketing was first defined in 2001 according to Kritzinger and Weideman (2013, 276) by Danny Sullivan as "a variety of activities involved in performing SEO, managing PPC listings, submitting websites to directories, and developing online marketing strategies for businesses, organisations, and individuals". Search engine marketing (SEM) was created as an umbrella term including both paid and organic search results, but currently it has become more and more associated with only paid search excluding search engine optimisation (SEO) (Sullivan 2010). In this paper search engine marketing is being used as the umbrella term containing both search engine optimisation and search engine advertising as Sullivan (2010) suggested, which is why the concepts have been separated into two sub-questions. The sub-questions have been designed to identify the best tactics to use to reach the goals of increased ranking and clicks of the organisation and chosen topics on search engines and engaging the users to the website. Based on these concepts and research problem the research questions are following:

Main research question:

How can search engine marketing connected to content marketing be utilized to increase the awareness and engagement of international target group of a higher education institution?

Sub-research questions:

R1: How can search engine optimisation techniques be used to increase visibility in search engines?

R2: How can search engine advertising be used to gain awareness on specific topics among target group?

R3: How can search engine marketing alongside content marketing be used to increase engagement?

1.3 Literature review

This literature review aims to frame the theories and build the base for the theoretical framework. The goal of this literature review is to identify the main theoretical concepts and their relationships. Online marketing has been the focus of academic research for some time now and it is unlikely that the popularity of this concept will decline soon (Xing & Lin 2006; Pomirleanu et al. 2013). Simultaneously the userbase and information online are increasing rapidly (Kritzinger & Weideman 2013; Egri & Bayrak 2014; Lukito et al. 2015) and traditional marketing is decreasing in effectivity (Opreana & Vinerean 2015), making search engines the main channel for locating information (Egri & Bayrak 2014; Luh et al. 2015; Baye et al. 2016) and search engine marketing the key channel for online marketing to reach target audiences (Skiera, Eckert & Hinz 2010; Yang & Ghose 2010; Rutz & Trusov 2011; Kritzinger & Weideman 2013). Search engine marketing was introduced as a theoretical concept in academia by Danny Sullivan in 2001 (Kritzinger & Weideman 2013) as an umbrella term, covering both search engine optimizing and advertising (Sullivan 2010).

Search engine marketing has therefore developed into two main streams of research, focusing on search engine optimisation (Xing & Lin 2006; Xiang & Pan 2011; Kritzinger & Weideman 2013; Zhang & Cabage 2017) and search engine advertising (Buckli et al. 2008; Ghose & Yang 2009; Rangaswamy et al. 2009; Yang & Ghose 2010; Jansen et al. 2011; Haans, Raassens & van Hout 2013), also known as pay-per-click (PPC) advertising or paid placement (Xing & Lin 2006; Kritzinger & Weideman 2013; Abou Nabout et al. 2014). Search engine optimisation literature has been focusing on which elements can be implemented to increase search engine ranking (Luh et al. 2015; Zilincan 2015; Zhang & Cabage 2017), identifying bad practises (Malaga 2008; Berman & Katona 2011; Gandour & Regolini 2011; Enge et al. 2015; Shenoy & Prabhu 2016) alongside best practises and their effect on the ranking (Luh et al. 2015; Scott 2015; Shenoy & Prabhu 2016; Zhang & Cabage 2017), and how higher ranking influences the traffic to the websites (Lorigo et al. 2006; Kritzinger & Weideman 2013; Lukito et al. 2015).

Search engine advertising stream on the other hand has been focusing on the details of keyword auctions (Yoon 2010; Kritzinger & Weideman 2013; Zhang et al. 2014; Baye et al. 2016), keyword selection process (Li, Pan & Wang 2010; Skiera et al. 2010; Yang & Ghose 2010; Jansen & Schuster 2011; Lu & Zhao 2014; Zhang et al. 2014) and how to target

specific audiences in different phases of purchase with keyword selection (Moe 2003; Jansen & Schuster 2011; Jerath, Ma & Park 2014).

Third steam of literature in connection to search engine marketing has been focusing on the behavioural side of online users, including content marketing (Holliman & Rowley 2014; Feng & Ots 2015; Opreana & Vinerean 2015), online marketing avoidance (Edwards, Li & Lee 2002; Baek & Morimoto 2012; Lo, Hsieh & Chiu 2014), click tendencies of search engine users (Hoffman & Novak 1996; Moe 2003; Jerath et al. 2014; Joo, Wilbur & Zhuc 2016) and website engagement (Mollen & Wilson 2010; Vivek, Beatty & Morgan 2012; Demangeot & Broderick 2016). Content marketing has been identified to go hand in hand with search engine marketing due to its form of inbound marketing (Lieb 2011, 1; O'Neill & Curran 2011; Holliman & Rowley 2014; Opreana & Vinerean 2015) and because it is an answer for online advertising avoidance (Johnson 2013; Del Rowe 2016; Parra-Arnau 2017). Connection can also be made between content marketing and search engine visibility (O'Neill & Curran 2011; Agarwal & Verma 2016) and online engagement (Demangeot & Broderick 2016).

1.4 Theoretical framework

Figure 1. represents the theoretical framework of this research. It aims to draw out the process where search engine marketing and content marketing implemented simultaneously increase the ranking for desired keywords, which results to better visibility to the target audience, leading to increase in website visits and engagement. The theoretical framework illustrates the main research question but also highlights the connection between the sub research questions and to the main research question. It also shows how the united efforts of these concepts, presented at the top of the illustration, build the groundwork for the desired goal.

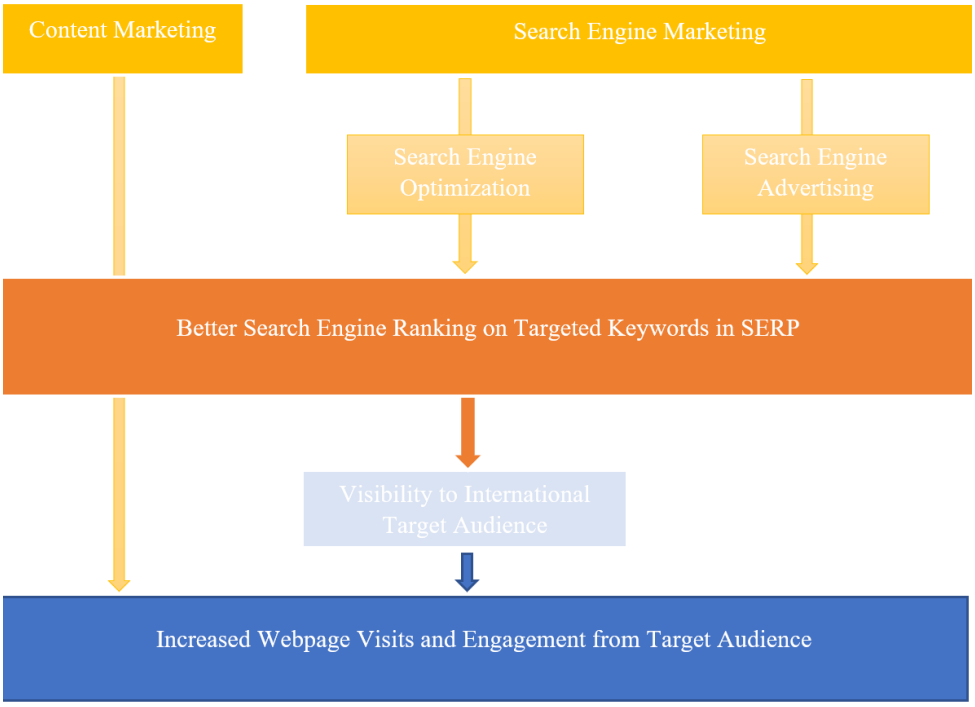

Figure 1. Theoretical Framework of the study

The literature of this thesis focuses on these relations and concepts and aims to explain how different actions in different phases will influence the search engine visibility and what their connection towards to the goal is. The quantitative study made in this research will focus on measuring how the concepts presented at the top of the figure change the number of website visitors as well as engagement with them after the implementation of these actions.

1.5 Key definitions and delimitations

In this chapter are the key definitions visible in the theoretical framework described through literature, and their theoretical meaning is defined as it will be used in this research.

Search engine marketing (SEM) form of online marketing, which relies on the visibility of the organisation in paid and organic search engine results (Xing & Lin 2006; Sullivan 2010; Opreana & Vinerean 2015) and it is an umbrella term including both paid and organic search results and related actions (Sullivan 2010).

Search engine optimisation (SEO)	includes modifying and designing web page with an aim to raise the ranking of a webpage in search engine results organically (Xing & Lin 2006; Kritzinger & Weideman 2013; Zhang & Cabage 2017).
Search engine advertising (SEA)	also known as keyword advertising, sponsored search, or paid search is the most used online advertising method (Buckli et al. 2008, 176; Rangaswamy et al. 2009; Jansen et al. 2011) and refers to technique that allows the webpage to appear in the sponsored search results and requires advertisers to pay for each click on their ads (Xing & Lin 2006; Kritzinger & Weideman 2013; Abou Nabout et al. 2014).
Content marketing	is digital inbound marketing (Holliman & Rowley 2014; Opreana & Vinerean 2015) and online pull marketing strategy, which aims to provide content for the target audience when they are looking for it (Lieb 2011, 1; Holliman & Rowley 2014) through publishing helpful content instead of selling and advertising (Holliman & Rowley 2014; Feng & Ots 2015).
Search engine result page (SERP)	is where the results of a web search are displayed for the web searcher after the search is made starting at the first page with 10 (Baye et al. 2016) organic results in a relevancy order (Gupta & Mateen 2014; Shenoy & Prabhu 2016) ranked by the search engine (Kritzinger & Weideman 2015; Luh et al. (2015) and varying

	amount of paid results at the top and bottom of the page (Gupta & Mateen 2014; Lo et al. 2014) to as many pages there are matching web results.
Keyword	"is a combination of words or terms that best describes the product, brand, or retailer being advertised" (Yang & Ghose 2010, 602).
Website engagement	is a process of developing individuals cognitive, affective and behavioural commitment and participation in an active relationship with the brands website characterized by dynamic and sustained interactions which give instrumental and relevant experiential value to existing and prospective customers (Mollen & Wilson 2010; Vivek et al. 2012; Demangeot & Broderick 2016).

This research is done based on the needs of the case organisation, which sets some practical delimitations, including the industry of the case company (higher education institution) and the international focus market. This research only covers one website, which means that the results can't be generalised to cover every business and website, merely the concept of a higher education institution's international target audience. In addition to this, the research is done by utilizing Google Analytics and focusing on only Google as a search engine, which might exclude the generalisation of the results for other search engines. The language studied in this research is English, which also excludes other languages from generalisation.

This thesis will not focus on the traditional marketing techniques such as TV/radio or print media marketing. Alongside that will most of the online marketing techniques such as email, video/blog, banner and social media marketing be limited from the focus of this study due to the focus on search engine marketing and content marketing. Measuring financial results (for example return on investment of search engine advertising) is not included in this

research, because it takes a longer timeframe to get exact results and this is not possible considering the timeframe of this thesis. In addition, this thesis will not cover the theoretical viewpoints of building a search engine marketing strategy or budgeting search engine marketing strategy.

1.6 Research methodology and data collection

The quantitative data for this study will be collected through an experimentation of search engine optimisation, advertising and content marketing to generate change in the ranking, traffic and engagement from search engines. The data collection will be twofold process divided between search engine optimisation tactics and search engine advertising campaigns and the results will be compared to each other as well as to the starting point before experimentation. The data will be collected through Google Analytics.

Due to the research setting and the research questions the appropriate research method is a combination between experimenting and a case study, where the University of Helsinki and their websites represents the case the study is done on. Due to the newness of the topic of the research and the lack of established methods in the literature to examine search engine marketing processes in addition to the concepts being new to academia, the thesis is exploratory in nature (Hirsjärvi, Remes & Sajavaara 2013, 138). The research performed in this thesis will be cross-sectional by nature, studying the chosen phenomena at a specific point in time due to the time constructions (Saunders, Lewis & Thornhill 2009, 155). The study focuses on pinpointing the process of search engine marketing tactics to increase engagement and awareness of the website among target groups and that is why the previously described methods for this research were chosen. The research methods are presented in more detail in Table 1.

Table 1. Research design

Research Question	Concept	How is it measured	Action
How can search engine optimisation techniques be used to increase visibility in search engines?	Visibility	Measuring the change of ranking in search engine results page and change in traffic to website on chosen topics.	Chosen content will be altered according to SEO recommendations from literature.
How can search engine advertising be used to gain awareness on specific topics among target group?	Awareness	Measuring the impressions, click-through-rates and conversions from the text ad campaign.	Content is chosen to be marketed through Google AdWords, including keyword bidding.
How can search engine marketing alongside content marketing be used to increase engagement and conversions?	Engagement	Measuring the quality of the traffic which has been brought to the website via previous actions through different Google Analytics measures such as conversions, time on site, bounce rate, pages per session	Providing unique and quality content, which is SEO friendly and engaging to the visitor. Ensuring that website includes actions which are counted as conversions.

Building from the research design and methods the working hypotheses are designed, which explain how the empirical actions will affect the measured concepts (Table 2.). Working hypothesis 1 focuses on the assumption that when keywords are inserted correctly in the websites and a concrete and explanatory meta description is presented in the search results, will the ranking algorithms value the websites better due to relation of keywords and search queries, resulting in a higher ranking and increase in traffic to the website. Working hypothesis 2 focuses on the search engine advertising and states that text ads are an effective channel to target specific audience looking for specific information and increase website traffic. Working hypothesis 3 tackles engagement and traffic quality by suggesting that when the content marketed is unique, helpful and search engine optimized will the traffic, and traffic quality and engagement increase.

Table 2. Thesis working hypotheses

Working hypothesis 1	By implementing content related keywords to websites headings, images, domain and content in addition with the designing of a meta description, will the ranking in search engines raise when those keywords are being used in the search query and the traffic to the website will increase (O'Neill & Curran 2011; Gudivada, Rao & Paris 2015; Luh et al. 2015; Lukito et al. 2015; Zhang & Cabage 2017).
Working hypothesis 2	With search engine advertising campaign can target audience be reached effectively and traffic to advertised content will increase (Rutz & Trusov 2011; Kobylanski 2012; Haans et al. 2013; Lo et al. 2014).
Working hypothesis 3	By providing unique, helpful content with the combination of search engine marketing will the traffic to the website be in better quality and engage more with the website (Calder, Malthouse & Schaedel 2009; Pulizzi 2013; Opreana & Vinerean 2015; Demangeot & Broderick 2016; Pažėraitė & Repovienė 2016)

Increase in visibility is best measured through ranking changes in search engine result pages. Ranking changes will be measured through measuring the positions in SERP for chosen keywords, before and after keyword and metatext implementation. Keywords will be chosen specifically to match the content that has been chosen for marketing activities keeping in mind the target audience and what kind of search queries would they perform to gain specific results. Ranking can be measured through testing the change in rank in Google results page with chosen search query and the data from there will provide the information how the search engine optimisation actions effect the ranking and in other words visibility. Traffic increase, which should result from better ranking will be measured with Google Analytics.

Google AdWords provides a lot of data concerning the effectivity of the text ad campaign including impressions, click-through-rates, bounce rates and cost per clicks. These metrics will be utilized to assess the effect of a text ad in reaching targeted audience in chosen topic. The increase in traffic will be measured through comparison between the traffic before the campaign and after the campaign, identifying how much traffic did the camping attract to the website. The quality of the traffic is also important, and it will be measured both in search engine optimisation and advertising perspectives. Quality traffic is engaged and therefore engagement is used as the main measure of traffic quality and it is measured through different Google Analytics metrics such as bounce rate, time on site and pages per session.

1.7 Structure of the thesis

The structure of this study follows the traditional order of a master thesis and it can be seen in Figure 2. In the first chapter is the research presented and background information of the topic given. The first part of the thesis focuses on building up a theoretical base of the topic and discussing what is known and being researched in the academia about this topic in detail and in connection with the concepts. The focus is on illustrating what is theoretically applicable in this topic and each of the main theoretical concepts of this thesis are presented in chapters 2-4.

After the theoretical part the focus shifts to empirical testing of the topic in a case organisation specific experimentation. To begin with, the current situation and research context are described, which are the base for the study and in addition for the search engine marketing and content marketing improvement suggestions. In addition to this, the data collection methods and analysis methods will be described, which include discussion of how the improvements could be performed and measured. Empirical details are discussed in chapter 5. Results and analysis will be presented in chapter 6 followed with discussion and conclusions in chapter 7.

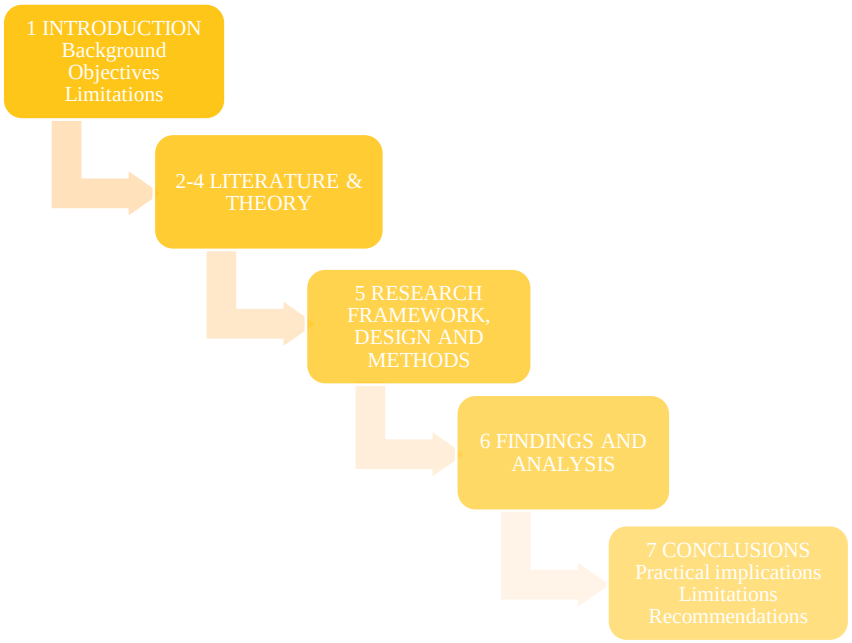

Figure 2. Structure of the thesis

2 INCREASING VISIBILITY IN SEARCH ENGINES

Search engine marketing relies on the visibility of the organisation in paid and organic search engine results (Xing & Lin 2006; Sullivan 2010; Skiera et al. 2010; Opreana & Vinerean 2015) and it has developed into a dominant online marketing channel and a multibillion-dollar business (Haans et al. 2013; Zenetti et al. 2014, 7) being the most popular channel for online marketing (Skiera et al. 2010; Yang & Ghose 2010). Google, Yahoo! and Bing are the biggest search engines and Google is by far the most popular (Shenoy & Prabhu 2016, 9, 11) consisting 75% of global searches made in 2017 (Mangles 2018). The power and reach of search engine marketing is remarkable, for example 61% of US citizens use search engines prior to purchase compared to 9% and 10% of print and TV (Haans et al. 2013) and in April 2014, 197 billion search queries were performed around the world (Enge et al. 2015, 44). According to Enge et al. (2015, 45) "Search is undoubtedly still one of the best and most important ways to reach consumers and build a business, regardless of that business's size, reach, or focus".

Throughout literacy, paid search engine results are referred as search engine advertising (SEA) (Ghose & Yang 2009; Yang & Ghose 2010; Haans et al. 2013) and search engine marketing (SEM) (Skiera et al. 2010; Yang & Ghose 2010; Pan 2015), which highlights the confusion between the use of these terms. Definition of sponsored search engine results according to Haans et al. (2013, 151-152) is "placement of advertisements alongside organic (non-sponsored) Web search results, in which advertisers pay a fee per click on the advertisement". Search engine advertising refers to paid-results (Xing & Lin 2006), whereas search engine optimisation is about appearing in organic (non-sponsored) search results when related keyword is typed in search engine and about methods that improve that ranking in, such as efficient website structure, appropriate web content and management of inbound and outbound links to and at your website (Xing & Lin 2006; Xiang & Pan 2011; Kritzinger & Weideman 2013; Zhang & Cabage 2017).

2.1 Digital inbound marketing in search engines

Inbound marketing can be defined as a marketing strategy that focuses on making connection to potential consumers through materials and experiences they find useful and which they

seek by themselves (Patrutiu-Baltes 2016). Bleoju et al. (2016, 5525) state that "inbound marketing deals with creating memorable content". Digital marketing is a connecting term to inbound marketing, emphasizing the choice of channel in inbound marketing (Patrutiu-Baltes 2016). Therefore, Opreana and Vinerean (2015, 30) suggest the following definition "Digital Inbound Marketing represents the process of reaching and converting qualified consumers by creating and pursuing organic tactics in online settings". Digital marketing refers to online and offline digital technologies, whereas internet marketing/online marketing refers solely on marketing online (Atshaya & Rungta 2016). Online marketing enables marketers to utilize consumer's online behaviours to help them to target their customers with more customized and relevant advertising (Johnson 2013) and it shows understanding of people's problems and provides answers to them on the correct moment (Opreana & Vinerean 2015).

Online marketing is still not equal to inbound marketing (Opreana & Vinerean 2015) because it can still intrusive, when advertisements disable user from browsing or from navigation activities (Edwards et al. 2002). The main problem in traditional marketing, is that it relies on disruptive elements (Opreana & Vinerean 2015), focuses too much on the product (Patrutiu-Baltes 2016) and it is not tailored based on customer's situation on information search (Zenetti et al. 2014). Multiple researches state that online advertising is also intrusive and online ads are viewed as disruptive and irritating, resulting in increased advertising avoidance (Edwards et al. 2002; Baek & Morimoto 2012). Intrusive advertisements affected negatively the attitudes and intentions among online users about the advertised product and the website (Goodrich, Schiller & Galletta 2015) which highlights the need for inbound marketing techniques in online setting (Opreana & Vinerean 2015). Several studies have also concluded that online advertising is experienced so irritating, that the act of advertising avoidance is at the same level as what is done with traditional advertising (Bellman, Schweda & Varan 2010; Prendergast, Tsang & Cheng 2014).

Search engine marketing is one of the channels for inbound marketing used by organisations (Opreana & Vinerean 2015; Patrutiu-Baltes 2016) and it has a very dominant role in online marketing, since it is a gateway for other inbound marketing channels (web sites, blogs, social network accounts) to appear in search engine results (Patrutiu-Baltes 2016). Inbound marketing according to Holliman and Rowley (2014, 270) "actively encourages brands to

take a customer-centric perspective on their propositions and engenders higher levels of trust from those customers and prospects that seek it out". From 2006 inbound marketing has been the most effective way to do online marketing (Patrutiu-Baltes 2016) by attracting the customer towards the organisation and the product or service which they naturally want (Holliman & Rowley 2014; Hubspot 2016) due to the appearance of business's website when the consumer performs the search (Enge et al. 2015, 42).

2.2 Theory behind the search engines

Su et al. (2014, 1) states "Search engines have greatly influenced the way people access information on the Internet, as such engines provide the preferred entry point to billions of pages on the Web", which highlights the importance of visibility in search engines (Kritzinger & Weideman 2013). Search engines are essential in the task of finding significant content from the almost infinite available online information (Burguet, Caminal & Ellman 2015), explaining why search engine marketing has become a business (Su et al. 2014) and why search engines' main revenue is coming from paid-advertising (Enge et al. 2015, 42). The definition of a search engine is according to Shenoy and Prabhu (2016, 9) "a tool that searches the Web for websites relevant to real-time queries entered by users" whereas Green (2000, 126) described search engine as a service using retrieval software which examines and indexes the websites into a listing based on their accuracy against the search term.

After the search made by the user, the search engine returns with up to ten (Baye et al. 2016) organic results on the search engine results page (SERP), providing the most relevant results on the top of the page (Gupta & Mateen 2014; Shenoy & Prabhu 2016) according to the search engine's own ranking system (Kritzinger & Weideman 2015; Luh et al. 2015). In addition to organic results, the search engine provides a list of paid placements typically on the top, right or bottom of the search results page (Gupta & Mateen 2014; Lo et al. 2014), which are clearly marked apart from the organic listings (see Figure 3.) (Jansen & Spink 2009; Lo et al. 2014).

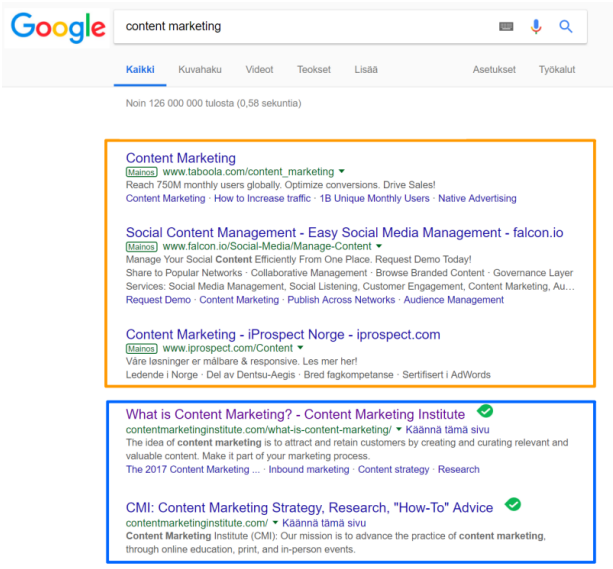

Figure 3. Illustration of organic and sponsored search results in Google SERP

Upon search request search engine crawlers search and index website content to determine the ranking of SERP (Shenoy & Prabhu 2016, 9, 11). The task of a search engine can be divided into three parts, web crawling, indexing and ranking before search process happens (Enge et al. 2015, 78; Shenoy & Prabhu 2016, 9, 13). The crawlers visit the websites by following links between the websites (Enge et al. 2015, 78; Kritzinger & Weideman 2015), but due to the huge amount of content, they download only a portion of the webpage and focus on sites that are popular, relevant and contain quality links (Shenoy & Prabhu 2016, 9, 13). During the process data is collected and stored in datacentres order to enable the search engine to give the user information fast and effectively (Enge et al. 2015, 78-80). One of the best kept secrets of our time is the algorithms used in information retrieval and indexing of search engines and which attributes effect the ranking of search engine results page (SERP) (Shenoy & Prabhu 2016, 9, 13). Widely agreed among academics is that the following concepts effect the ranking: title of webpage, relevance of meta description and keywords, value of content for user, number of authority links to the web site, page load time, social media reach, structure of URL / navigation, XML sitemap, alt attribute for images, headings, robots.txt and mobile compatibility (Agarwal & Verma 2016).

2.2.1 The importance of the first results page

According to Pan (2015, 80) “The underlying assumption is that users will most likely view and click on the results at the top of the SERP”, which leads to explain why search engine

optimisation has become the main channel for organisations to ensure maximized visibility of their products and services on their target audiences (Lee et al. 2016). Visibility is the core of search engines, the higher visibility as in higher rank reached, the higher will the traffic be to the website (Lorigo et al. 2006; Killoran 2013). The results shown in the top of search engine pages have a bigger click-through-rate than the results lower (Ghose, Ipeirotis & Li 2014) and get most viewed by the users (Lorigo et al. 2006). The first page of search results gathers 92% of all the clicks and the number one search result gets 33% of the clicks (Lee 2013) whereas in 96% of the searches made, the users only looked at the first result page (Lorigo et al. 2006).

The ranking algorithms for search engine results are both complicated and kept secret (Visser & Weideman 2011). What is known is that the ranking algorithm is based on keyword density and frequency, hyperlink structure and click-through-rate data (Pan 2015). For organisations it is as important to know how to gain better ranking in search engines and how to maintain this position through SEO (Shenoy & Prabhu 2016, 21), as the benefits which are connected to the position over the fold in the SERP (Agarwal, Hosanagar & Smith 2011). It is as important to gain first page position with your search engine advertisement, because the keyword ads on first SERP attract 70% of the overall traffic (Brooks 2004a). Second page locations are not worthless to companies, they give visibility with a lower bid price and increase visibility among web searchers (Jansen, Liu & Simon 2013).

2.2.2 Organic vs. paid results and why it matters

Search engine optimisation and search engine advertising (Barry & Charleton 2009, 114) can also be referred as organic search and paid search (Gauzente & Roy 2012; Kritzinger & Weideman 2013; Lo et al. 2014). Paid search can also go by term sponsored search (Lo et al. 2014; Skiera et al. 2010) or keyword advertising (Jansen & Schuster 2011). Organic search results refer to the ranking which is done by the search engine through its general searching and indexing (Skiera et al. 2010; Gauzente & Roy 2012; Lo et al. 2014), whereas paid search results are the results which ranking marketers can influence by placing for example a Google AdWords campaign and bidding on most relevant keywords against other offers (Gauzente & Roy 2012; Baye et al. 2016). Paid search results are normally located on top of the page just above the organic results and on the right side of the page in a separate column, or at the bottom of the page (Jansen & Schuster 2011; Gauzente & Roy 2012; Lo et

al. 2014). Clear identification of the sponsored listing might help in building trust towards the sponsored results, because if the online searchers had an assumption that the search engine was trying to hide the sponsored results, would the online searchers less likely click on them (Hansen 2002). Controversially study made by Kobylanski (2012, 179) discovered that online users do not have bias towards sponsored results when compared to organic results. Normally a limited amount of paid results is displayed to maintain credibility (Feng, Bhargava & Pennock 2003).

There are several methods to achieve position in the sponsored links, including pay-per-click (Kwon 2009). Paid results are often referred as Pay-Per-Click (PPC) due to the business model, that the advertiser only pays per click made on the paid search results (Jansen & Schuster 2011; Gauzente & Roy 2012; Zhang et al. 2014), meaning that if the web searcher doesn't click on the ad shown in paid search section, the advertiser will not be charged (Kwon 2009). Through sponsored links the advertiser can rely on that, if the relevance, quality score and bid price of the keyword is in the top three among other bids, the website will be listed immediately (Kritzinger & Weideman 2013; Lo et al. 2014) and benefit from the positive relationship between higher slot-position and higher click-through-rates (Naldi, D'Acquisto & Italiano 2010). In short, the ranking is determined by the quality score and bid price (Visser & Weideman 2011; Baye et al. 2016). The downside of sponsored links is that it can quickly become an expensive marketing method if the keywords used are among the most competitive and popular ones (Kritzinger & Weideman 2013). Focusing on longtail and detailed keywords can offer a solution to this issue (Skiera et al. 2010). Another issue that rises with sponsored links is called the position paradox, which refers to the fact that sponsored links that are positioned in a lesser slot, receive higher click-through-rate than links in top-slots (Jerath et al. 2011). This is connected to the assumption that web searchers prefer organic search results and therefore after they have checked the top position in organic links they move on to the sponsored link section above the organic results (Lo et al. 2014). Contrasting view is also supported by literature, suggesting that online users are under position bias, meaning that they are less likely to click on a link positioned at the bottom, due to their unsureness if it has as high quality as links above (Bian et al. 2013).

Aiming to gain top position in the organic listing is possible through search engine optimisation (Kritzinger & Weideman 2013; Zilincan 2015), but SEO doesn't ensure top

rankings straight handed like sponsored links (Visser & Weideman 2011). SEO is cheaper to implement (Kritzinger & Weideman 2013) and the implementations done on-page and off-page (Luh et al. 2015) will carry out providing good rankings in the long run, whereas investments in SEA provides results only if you keep on investing in keyword bidding (Malaga 2007; Shenoy & Prabhu 2016, 2-3). Search engine advertising gives fast results when they are needed (Yang & Ghose 2010; Kritzinger & Weideman 2013; Kritzinger & Weideman 2017) generates bigger conversion rates and would be preferred if marketing budget was minimal (Kritzinger & Weideman 2017). Even though a lot of research suggests that organic listings are preferable among online searchers, sponsored search should not be left out of the marketing portfolio, for instance Yang and Ghose (2010, 618) found out in their research that paid and organic listings have a positive interdependence and therefore they support each other's click-through-rates. The best practice is to use both optimisation and advertising tactics in sync in a long-term approach, to ensure increase in rankings and traffic to the website in addition to higher return on invest (Kritzinger & Weideman 2013).

2.3 Search Engine Optimisation

Search engine optimisation (SEO) includes modifying and designing webpages with an aim to raise the ranking of the webpage in search engine results organically (Xing & Lin 2006; Kritzinger & Weideman 2013; Zhang & Cabage 2017). Several researches point that search engine users prefer to click on organic search results instead of sponsored listings (Jansen & Resnick 2006; Xing & Lin 2006; Sherman 2007; Jansen & Spink 2009; Yang & Ghose 2010) and online searchers would view organic results first 82% of the time (Jansen & Resnick 2006). Search engine optimisation is defined by O'Neill and Curran (2011, 62) as "the process of improving the visibility, volume and quality of traffic to website or a web page in search engines via the natural search results". Most of the previous academic literature on search engines has been focusing only on paid links, even though most of the traffic to websites is still generated through organic listings (Jerath et al. 2014). Organic listings are generated by the search engine, meaning that appearing in these listings is free for marketers (Kennedy & Kennedy 2008) and they are ranked based on the assumption of relevance (Li et al. 2010; Baye et al. 2016). From a search engine point of view SEO can be described as series of techniques and modifications, which optimize the page for search engines, making it easier for them to crawl, index and understand the content of the website (Google 2010),

resulting in a higher rank in SERP and therefore increasing volume of traffic (Zilincan 2015; Zhang & Cabage 2017).

According to Lee et al. (2016, 198) search engine optimisation includes "structured and goal-driven techniques that would streamline website structures, languages used, and site interaction mechanisms, and others, all of which are designed to promote the site to land itself at the top of search engine listings in light of the keyword(s) entered by the user". Search engine optimisation doesn't only include webpages and their attributes, it also includes image search, local search, and industry-specific vertical search engines (O'Neill & Curran 2011; Kritzinger & Weideman 2013). Search engine optimisation has been developed hand in hand with the biggest search engines (Lee et al. 2016) and for example Google provides guidelines for search engine optimisation (Google 2010; Killoran 2013). Search engines encourage organisations to optimize their websites (Killoran 2013) but also hide and often change the factors and algorithms behind their ranking systems to prevent code cracking and losing the credibility of organic search results (Killoran 2013; Luh et al. 2015). Google itself uses around 200 ranking factors in their algorithms (Evans 2007), including for example title, meta description, anchor text, and various other on-page content-based factors (Google 2010).

The goal of SEO is to raise the ranking of a webpage as high as it can be, which is crucial (Luh et al. 2015) because if your website's ranking is not in the top 30, there is next to zero chance it will be seen by the searcher (Clay 2006a). Multiple academic researchers have indicated that majority of online search users only click on the links the search engine provides on the first page and the percentage of users that view the fourth page is only marginal (Lorigo et al. 2006; Spink et al. 2006; Baye et al. 2016). There are numerous guidelines of which techniques and actions result in a higher ranking provided both by the academia, SEO-practitioners and search engines themselves (Killoran 2013). Theoretical discussion has focused on the ranking algorithms used by search engines (Derhami et al. 2013) and it can be the key to understanding how search engines work but lacks in providing straightforward guidelines for organisations performing search engine optimisation (Luh et al. 2015). Based on previous observation and experimentation search engine optimisation practitioners have implemented different tactics into use (Luh et al. 2015), but according to Evans (2007, 35-36), based on a research which examined 50 specially optimized webpages,

the most popular search engine optimisation techniques used by practitioners aren't effective.

2.3.1 Search engine optimisation tactics

Search engine optimisation can be divided into 2 rough categories; on page, which is about modifying the web pages structure, and off page optimisation, including techniques independent to the structure of website (Luh et al. 2015; Zilincan 2015; Zhang & Cabage 2017). On page as well as off page techniques need to be considered to achieve success in search engine optimisation efforts (Shenoy & Prabhu 2016, 7) and they can be divided into two categories, Black Hat and White Hat (Berman & Katona 2011; Zhang & Cabage 2017; Gudivada et al. 2015; Enge et al. 2015, 515). White Hat SEO is according to Scott (2015, 1) "the practice of publishing web pages that are useful to humans, while enabling search engines and web applications to better understand the structure and content of your website", which will result in a better ranking at the results page (Shenoy & Prabhu 2016, 6). These actions are ethical (Enge et al. 2015, 948) include quality link building with other websites (Luh et al. 2015; Zhang & Cabage 2017), user-engaging content (Shenoy & Prabhu 2016, 87), and optimal performance of the website for users (Google 2016). Black Hat SEO is deceptive techniques (Shenoy & Prabhu 2016, 5) used to gain higher ranking in the results page (Berman & Katona 2011; Enge et al. 2015, 932) by affecting the ranking process but not the quality of the website (Gandour & Regolini 2011; Enge et al. 2015, 932). Black Hat SEO might give results in short term (Malaga 2008), but these techniques will lead penalizes and discrediting of the website (Malaga 2008; Berman & Katona 2011; Shenoy & Prabhu 2016, 6; Enge et al. 2015, 513).

On page SEO includes website's code, meta tags and meta descriptions, headings, title tags, internal links within the site, sitemaps, page-load time, semantics, and ease of navigation (Shenoy & Prabhu 2016, 7) and the aim of it is to create a search engine-friendly website (Enge et al. 2015, 259). Inserting desired keywords into the website's code (title, snippets and the URL) is a way to connect your online presence to correct keywords (Luh et al. 2015; Zhang & Cabage 2017). Traditional on page SEO actions aren't anymore enough to make the website rank at the top, in addition to them the search engines place value also on user experience, responsive design, link profile and social presence (Zhang & Cabage 2017). The focus of the organisations on page SEO should be that the website is good and pleasant to

use for readers, which also often leads for it to be preferred by search engines (Egri & Bayrak 2014) and easier for crawlers to index (Shenoy & Prabhu 2016, 7). On page optimisation can also be divided into two subcategories: components that are visible for the viewers and components that are visible for the search engine crawlers (Malaga 2008; Shenoy & Prabhu 2016, 57). Off page SEO includes inbound and outbound links (Gudivada et al. 2015; Shenoy & Prabhu 2016, 8). The building of backlinks with relevant and credible websites increases domain and page-level authority and credibility (Luh et al. 2015; Gudivada et al. 2015; Zhang & Cabage 2017) and through social networking is created a positive online reputation, trust and credibility, which is valued by search engines (Shenoy & Prabhu 2016, 8; Enge et al. 2015, 419).

Black Hat strategies are keyword stuffing, link farming and doorway pages and cloaking (Gudivada et al. 2015; Shenoy & Prabhu 2016, 5; Zhang & Cabage 2017) and stealing or duplicating content (Malaga 2008; Zhang & Cabage 2017). Keyword stuffing is a tactic of inserting large number of keywords into your content to achieve short-term increase in ranking (Gudivada et al. 2015; Shenoy & Prabhu 2016, 6). Link farming refers to buying links from other websites and having them pointing back to your website (Malaga 2008; Gudivada et al. 2015; Enge et al. 2015, 516). Search engines will catch the unauthenticity of the links (Shenoy & Prabhu 2016, 6; Enge et al. 2015, 516) leading to being delisted (Berman & Katona 2011). Doorway pages (Malaga 2008; Gudivada et al. 2015; Shenoy & Prabhu 2016, 6; Enge et al. 2015, 182, 616) include keywords and phrases (Shenoy & Prabhu 2016, 6; Enge et al. 2015, 616; Malaga 2008) which are recognized by search engines to gain good rankings (Malaga 2008; Shenoy & Prabhu 2016, 6; Enge et al. 2015, 813). Cloaking makes the website invisible for users but visible to search engines (Malaga 2008; Shenoy & Prabhu 2016, 6; Enge et al. 2015, 182, 933) including only optimized text, and these websites are set up for search engines, to attract indexing of the web page to lift the ranking (Malaga 2008; Kumar & Gupta 2016; Shenoy & Prabhu 2016, 6). Duplicated content will not lift ranking (Enge et al. 2015, 328), because content is stored in indexes and duplicates will not be valued as new content (Shenoy & Prabhu 2016, 13). Copying content from other websites is even more risky than re-using your own content, because Google penalizes sites that use duplicate content (Malaga 2008; Shenoy & Prabhu 2016, 27; Enge et al. 2015, 327).

2.3.2 Importance of search engine optimisation

By ranking higher in search engine results page (SERP), the more online searchers will visit the website (Lorigo et al. 2006; Kritzinger & Weideman 2013; Lukito et al. 2015). SEO has been proven to be the most effective way to perform online marketing (O'Neill & Curran 2011; Huang 2012) and online users value organic search engine visibility (Xing & Lin 2006; Sherman 2007). With the increased amount of traffic to the website, will the conversion rate of the website also increase (Kritzinger & Weideman 2015). Online searchers seem to be suspicious of sponsored listings and view them not as relevant as organic links (Jansen & Spink 2009). According to a study with 425 respondents 77% of them preferred the organic links over the sponsored links (Jansen & Spink 2009). According to Clay (2006b) when compared to pay per click-listings, organic search results get 3 to 1 click-through-rates and gain higher conversion rates, which might be generated by the fact that searchers consider organic results more objective and unbiased when compared to sponsored results (Xing & Lin 2006). There is an enormous difference also in click-through-rates between positions, the first and tenth position on the SERP means 20-30% drop in conversion rates and 90% in conversion potential (Brooks 2004b). Visibility in organic search results is very important for organisations especially in the long run (Shenoy & Prabhu 2016, 3). Advantage of SEO is that visibility in organic results is free (Kennedy & Kennedy 2008). Optimizing the website requires investments but if done following the White Hat principles, it will secure good ranking in the long run and sustainable results (Baye et al. 2016; Shenoy & Prabhu 2016, 3).

Search engine strategy should focus on a wider image of the organisation, it should include site quality and brand awareness and on top of that focus should also be on the organisations brand equity (Baye et al. 2016). Research has shown that visibility in search results and search engine advertising had significant effect on brand awareness even with consumers who did not convert to a click-through (Zenetti et al. 2014). Good SERP ranking can also build up trust on the brand and therefore result in better brand development (Gudivada et al. 2015). Having a strong brand also benefits the organisation in the ranking, since the algorithms tend to place stronger brands higher in the results, which will lead to more organic clicks and impressions (Baye et al. 2016). Brands with lower brand awareness should aim to reach higher rankings in SERP, due to the possible increase of brand awareness (Yoo 2014). Another research proved that brand awareness goes to both directions, according to Baye et

al. (2016, 8) “brand equity of an online retailer is an important driver of organic clicks” pointing out that organisations should also invest in brand awareness as a vital part of their search engine optimisation strategy. Consumers have the tendency to click on retailers/websites which are more recognised and trusted and therefore have more brand awareness (Baye et al. 2016).

Improving your website with search engine optimisation in mind most often leads to also having a more user-friendly website (Egri & Bayrak 2014; Zhang & Cabage 2017), also referred as website usability (WU) (Visser & Weideman 2011). This works in favour of ranking, since user-friendly websites are more accessible for search engine crawlers (Shenoy & Prabhu 2016, 64) and are valued by the ranking algorithms (Zhang & Cabage 2017). When SEO is aimed at search engine crawlers, WU is aimed at the website visitors (Visser & Weideman 2011). The importance of a user-friendly website can’t be highlighted enough, because 68% of web users exit the web page because the website lacks user-friendliness (Egri & Bayrak 2014). Search engine optimisation should be done with website visitors in mind, since in the end they are the customers instead of search engines, although sometimes these actions disregard the other audience (Visser & Weideman 2011; Google 2016). Through on page optimisation actions such as controlling the size of documents to ensure optimal loading time, cleaning webpage of dead-end links and creating a sitemap to enable the visitors to navigate without trouble on the website, the usability increases alongside the ranking on search engines (Chotikitpat et al. 2015).

According to a research, search engine optimisation strategy proved to be more cost effective when compared to pay-per-click search engine advertising strategy and in this specific study the return on invest (ROI) was 30% (Malaga 2007). Controversially to this, according to Sen (2005, 9) “even if SEO and paid placement cost the same, and SEO always produced high rankings, paid placement would still be the search engine marketing (SEM) strategy of choice for most online sellers”. Based on the website's traffic information, search engine optimisation also provides trackable and quantifiable results and it is possible to for example track increase in rankings, traffic and conversions (Malaga 2007).

2.3.3 Search engine optimisation as a tool to increase visibility

Well planned SEO actions can organically raise the ranking of the website in SERP and lead to more traffic to the website through increased visibility (Zhang & Cabage 2017). From search engine techniques the ones that are in control of the marketers are on page optimisation (Shenoy & Prabhu 2016, 21) and White Hat techniques (Scott 2015). On page optimisation includes as mentioned website's code, meta tags and descriptions, headings, title tags, internal links within the site, sitemaps, page-load time, semantics, and ease of navigation (Matošević 2015; Agarwal & Verma 2016; Shenoy & Prabhu 2016, 21). According to Enge et al. (2015, 43) the most important element in SEO is to fully understand the needs and thoughts of the targeted audience and how they would use specific keywords and concepts to find the information that your website is providing and targeting towards them.

Simplest on page optimisation can be done through keyword implementation to the websites title and meta tags as well as the meta descriptions and headlines (Luh et al. 2015; Zhang & Cabage 2017). The implementation of target primary keywords, identified by using Google AdWords keyword planner, into the websites title, meta description and content, led to a significant increase in Google SERP ranking rating from 38% to 540% (Zhang & Cabage 2017). During keyword selection and research should longtail and less competitive, but still relative keywords be considered to match specialized searches in addition to the more popular and generic ones (Killoran 2013). Because crawlers prefer HTML-language should the keywords be placed in the <HEAD> area utilizing meta tags and then repeated in <BODY> area and in addition they should be located also in <h1> or <h2> title tags and in early text content of the webpage in question (O'Neill & Curran 2011).

In addition, should keywords be implemented in the description of images because search engines are not able to read images as they are (Figure 4.) (O'Neill & Curran 2011). Keyword checking should be done regularly to ensure that the chosen keywords are still relevant or if new ones need to be added (Grappone & Couzing 2011, 53). According to a survey collected from SEO professionals, including the keyword in the site domain name is weighed with 11% by Googles algorithm (Killoran 2013), suggesting that naming individual site domains meaningfully with the keyword in mind, would increase ranking in SERP (Gudivada et al. 2015). Precise and content related keywords on the website and metatags will signal

relevance and significance for search engine algorithms and result in a higher ranking (Malaga 2007; Zhang & Cabage 2017). To summarize keywords should be included in the title of the post, the domain of the page, meta tag/description, first paragraph of the content, images (Lukito et al. 2015).

Figure 4. Example of a bad image description from HY website

In addition to keyword implementation, useful and quality content is agreed to be one of the best tactics to increase ranking (O'Neill & Curran 2011; Agarwal & Verma 2016). One of the most significant parts of search engine optimisation is the creation of valuable content (Agarwal & Verma 2016) which includes the chosen keywords in the previously discussed locations (Lukito et al. 2015). From content creation viewpoint, it should be made sure that each page's title describes understandably in 8-12 words the content of the page and that the beginning of the text content (20-30 words) also includes the information what the site is about (O'Neill & Curran 2011). Relevant keywords should be included there, since they will be bolded by the search engine when visible in SERP (see Figure 5. for reference of bolded keywords marked with a blue square) (Killoran 2013) and therefore attract they eye of the web searcher and increase visibility (Lorigo et al. 2008). Each website under the domain should have their unique title because they represent the most significant on-page SEO actions for search engines (O'Neill & Curran 2011; Agarwal & Verma 2016) and because duplicates will be ignored in search results (Malaga 2008; Shenoy & Prabhu 2016, 27; Enge et al. 2015, 327).

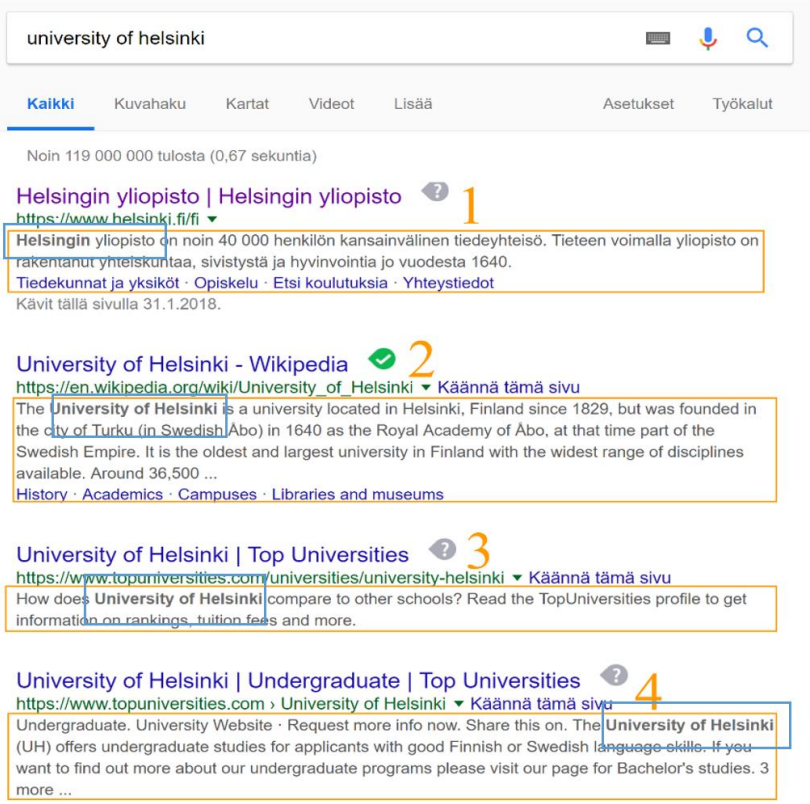

Figure 5. SERP with University of Helsinki search term. Meta description highlighted

Another content creation issue is the designing of meta description and meta tags for each website, which is visible in search engine results and should be unique, summarize the content and be less than 160 words to be shown fully in search engine results (Figure 5.) (O'Neill & Curran 2011; Gudivada et al. 2015; Lukito et al. 2015; Agarwal & Verma 2016). In Figure 5. it is visible that in search results for University of Helsinki only number 1 and 3 have their own meta description. According to Agarwal and Verma (2016, 7) the creation of meta tags (Figure 6.) can lead to good response from search engines and they should describe the site in few keywords (Lukito et al. 2015).

<meta name="keywords" content="
your,set,of,keywords"> and <meta
name="description" content="Precise
description of the content of the web page

Figure 6. Example of a meta tag (Agarwal & Verma 2016, 7)

3 TARGETED KEYWORD ADVERTISING IN SEARCH ENGINES

Search engine advertising (SEA) also known as keyword advertising, sponsored search, or paid search is the most used online advertising method (Buckli et al. 2008; Rangaswamy et al. 2009; Jansen et al. 2011; Jansen et al. 2013) and refers to technique that allows the webpage to appear in sponsored search results and requires advertisers to pay for each click on the ad (Xing & Lin 2006; Jansen et al. 2013; Kritzinger & Weideman 2013; Abou Nabout et al. 2014). Search engine advertising is according to Kobylanski (2012, 179) "based on the approach of relevance of the generated links to the keywords typed by the searcher". SEA according to Yang and Ghose (2010, 602) has "become the most predominant form of online advertising in the marketing world". SEA creates the main revenue stream for the biggest search engines, including Baidu, Google, Yandex and Bing (Xing & Lin 2006; Yang & Ghose 2010; Lo et al. 2014; Jansen & Clarke 2017) and the business model's viability is based on the perceived relevance of the sponsored result for the web searcher (Jansen & Resnick 2006). The forces behind the creation of search engine advertising are related to search engine technology development and the consumer behaviours behind searching (Li et al. 2010). Jansen and Resnick (2006, 1950) state that "sponsored links are primarily transactional", which means that sponsored listings are aimed for consumers with transaction in mind, now or in the future. Similarly, according to Burguet et al. (2015, 44) when consumers are looking for products, are sponsored results more important and relevant. Search engine advertising is, in addition to attracting users to websites, a powerful tool to share information for online searchers (Pažėraitė & Repovienė 2016). Previous research has been unified on the importance of performing search engine optimisation and search engine advertising simultaneously (Gudivada et al. 2015; Lee et al. 2016).

SEA is very targeted form of advertising if compared to other more traditional channels because it can be targeted specifically towards certain customers using paid keywords (Zenetti et al. 2014) and sponsored links are more relevant compared to organic links in e-commerce online searches (Jansen 2007). According to Kobylanski (2012, 179) online searchers were more influenced by the information quality and match with the searched keyword on the search engine results, than their characteristic of organic or sponsored and in addition viewed SEA as a credible channel. Search engine advertising is also one of the best tools to reach consumers online (Rutz & Trusov 2011) making it possible for advertisers

to connect and reach their potential customers when they are looking for information, products or services online (Yang & Ghose 2010; Zenetti et al. 2014) and as they are more open to marketing messages (Sääksjärvi & Pol 2007). In all online searches sponsored links gather 15% of the clicks (Jansen & Spink 2009). Consumers start their buying process online (Opreana & Vinerean 2015), which leads to believe that organisations should make sure to be visible in search results when potential customers are looking for them (Opreana & Vinerean 2015), specifically at research-phase on the buying funnel (Jansen & Schuster 2011). Through SEA can the organisation meet the consumers' needs more accurately and satisfy the web user's goal orientation in more successful manner (Yang & Ghose 2014; Lo et al. 2014; Zanetti et al 2014) by promoting content that is adapted to the consumer's needs and upon that create a personal relationship with the consumer (Patrutiu-Baltes 2016).

3.1 Search engine advertising in practise

In practise SEA works through selection of relevant keywords and text ads designed around them, which will be shown in the sponsored search results after the web searcher has done a search query using these keywords (Jansen & Schuster 2011; Rutz & Trusov 2011). The slots in sponsored search are provided by the search engines and the keyword advertising can be done through search engines advertising programs such as Google AdWords, Microsoft AdCenter, and Yahoo! Search Marketing (Lo et al. 2014). Sponsored search results are marked clearly from organic search (Jansen & Spink 2009) and are in their designated areas (Lo et al. 2014). Search engines offer limited slots for sponsored search results to gain competition and ensure the visibility of the most relevant results (Naldi et al. 2010). The number of slots available is usually always smaller than the number of organisations who are interested in placing their website on the sponsored search result section, which is why the rank is based on keyword auctions (Muthukrishnan 2009).

In a basic sponsored search result there are three elements: headline, main body text and a display of the URL of the website (Jansen & Schuster 2011; Rutz & Trusov 2011). Optimal for the organisations is that the ad contains the keyword, which the user has searched for and which was bid for, to gain clicks on the ad (Atkinson, Driesener & Corkindale 2014) and therefore companies design ads for each of their keywords (Rutz & Trusov 2011; Zhang et al. 2014). After selection of keywords and phrases and the designing of the ads, the

maximum willingness to pay for the clicks on the ad needs to be decided (Rutz & Trusov 2011; Abou Nabout et al. 2014; Jansen & Clarke 2017) and it should be based on the value of the visitor for your webpage and the cost of the acquisition (Jansen & Schuster 2011). This is called the bid price and careful consideration needs to take place before determining how high bid price is for each keyword (Zhang et al. 2014). The amount that needs to be paid to get your text ad visible on the results page is determined through the demand of the keyword chosen (Jansen & Schuster 2011) and it can vary from cents up to tens of dollars (Gupta & Mateen 2014). After the search made by the web user, an automatic auction-type algorithm runs and decides which ads it will display regarding the keyword or phrase and what position they get (Rutz & Trusov 2011).

When the ad is displayed by the search engine due to a search with a matching keyword, it is called and impression (Jansen & Schuster 2011; Zhang et al. 2014; Jansen & Clarke 2017). The most traditional business model with search engines is that the advertiser is invoiced only when the consumers clicks on the advert and this is called cost-per-click (CPC) (Jansen & Schuster 2011) or pay-per-click (PPC) (Edelman, Ostrovsky & Schwarz 2007; Kritzinger & Weideman 2013; Lo et al. 2014) and if the consumer while visiting the advertiser's webpage makes a desired action, is that called a conversion (Agarwal et al. 2011; Jansen & Clarke 2017). The conversion can vary from a purchase, registration, adding something to the shopping cart to subscribing into an email list (Agarwal et al. 2011; Jansen & Schuster 2011; Zhang et al. 2014). If conversions are measured in sales revenue, the amount of revenue from the single customer will define the value of the customer (Jansen & Schuster 2011). Another way to determine the effectiveness of the search engine advertising according to Yang and Ghose (2010, 603) is “the likelihood of the same advertiser appearing in the natural or organic listings of the search engine, and its position on the organic listings for a given keyword”. The success of search engine advertising if often measured through the conversion rate and in an online business this usually means the direct sales or registering for a service (Agarwal et al. 2011). It should be considered that SEA has other benefits to advertiser than only direct sales (Lu & Zhao 2014). Sponsored results can also be used to generate traffic to the website, instead of aiming for high rate of conversions (Haans et al. 2013). Visible position in search engine can result also in advertising awareness and if the advert is clicked it increases also brand awareness (Zenetti et al. 2014), which then can lead to indirect sales of other offered products (Lu & Zhao 2014).

According to Sen (2005, 9) most of online businesses tend to prefer investing to search engine advertising instead of search engine optimisation to get better rankings in the results pages. Achieving high ranks in sponsored search results seems appealing and a relatively easy way to acquire new consumers, but it needs to be kept in mind that the price per click on high ranks is higher, meaning a higher acquisition cost per customer (Skiera et al. 2010). The benefits of search engine advertising according to the literature are the possibility to generate targeted messages, with low costs, possibility to edit the ad immediately, tracking information and pay-for-performance mechanisms (Kobylanski 2012). Keyword advertising is according to Lo et al. (2014, 222) "more precise in exposing product information to potential customers than are other types of advertising" and therefore through search engine advertising can organisations target the consumers more effectively (Qiao et al. 2017; Wang et al. 2018). Furthermore, the main finding in the research of this area is that advertisements in higher ranking will receive more clicks (Jerath et al. 2011) but depending on the design and the goal of the ad, high position might only generate traffic to the website (Haans et al. 2013).

3.2 Winning the keyword auction

Sponsored search is not a shortcut to visibility, although with high enough bidding price and good quality score you will gain appearance in the sponsored search results (Kritzinger & Weideman 2013; Zhang et al. 2014; Baye et al. 2016). Search engines use different methods and weighing to determine the ranking, but the method of the auction of the two market leaders Google and Bing are similar (Abou Nabout et al. 2014). Search engines consider in addition to the bidding price the click-through-rates and relevance when ranking the results (Baye et al. 2016) and this forms the quality score (Yoon 2010; Zhang et al. 2014). Google for example considers factors such as the relevance of the webpage to the keywords searched, the quality of the landing page and the historical performance of the advertiser such as click-through rates (Yoon 2010). As mentioned above, when the web searcher conducts a web search with a keyword phrase, the search engine performs simultaneously an auction which decides what ads will be displayed and in which order based on the bids made by the advertisers on that specific keyword (Feng et al. 2003; Muthukrishnan 2009; Yoon 2010; Gupta & Mateen 2014). The account with the highest bidding and quality score will win the auction and get their ad displayed (Zhang et al. 2014; Baye et al. 2016), which

according to a study made by Jansen et al. (2013, 2121) will lead to significantly more clicks than ads placed in a lower position. The quality score of Google consists of the quality of the landing page (Li et al. 2010; Zenetti et al. 2014), the quality of the advert (Jensen & Clarke 2016), click-through-rate and relevance (Baye et al. 2016).

Third factor to be considered in the auction process and in the quality score, is the relevance of the website when compared to the keyword (Feng et al. 2003; Zhang et al. 2014) and if the relevancy is low enough will the ad be filtered out from the rankings (Zhang et al. 2014). Advertisements with a good relevancy score stand a higher chance to be ranked high enough to be visible on the sponsored search results (Jain & Garg 2014) because if the ad contains good relevance the probability of it to get clicked is high and the search engine will benefit from it in the form of a payment (Zhang et al. 2014). Price per click and the slot rank of the ad are decided based on a continuous, generalized, second-price, sealed-bid auction (Abou Nabout et al. 2014). The most popular search engines use an auction mechanism called the generalized second price (GSP) (Edelman et al. 2007) in which the cost of a click from consumer to the advertiser is set by the bid price and the relevance score of the next advert in the ranking (Naldi et al. 2010; Zhang et al. 2014). When the shown advert is clicked by the consumer, the pay-per-click amount charged is the amount equal to the bid of the position below (Edelman et al. 2007; Zhang et al. 2014).

Web searchers might presume that sponsored results are arranged according to relevancy or quality and therefore will prefer top positioning adverts (Agarwal et al. 2011). Individuals are also known to scan lists from top to bottom, focusing more on the advertisements on the top of the page (Sherman 2005). Since the top-ranking search result gets the biggest share of attention from the search engine users, are the top positions therefore the most preferable and should be as the aim of search engine advertising strategy (Sherman 2005; Skiera et al. 2010). On the other hand, study made by Agarwal et al. (2011, 1058) found that the top position in sponsored search results didn’t always maximize the revenues of profits leading into suggestion that taking part in bidding wars for the top ad positions should be considered again (Abou Nabout et al. 2014). This is called the position paradox, meaning that sponsored results in a lower location received higher click-through rates than top ranking ads (Jerath et al. 2011).

3.3 Importance of keyword selection

Search engine advertising relies on one factor: the chosen keywords, whilst the number of possible keywords is almost infinite (Li et al. 2010). The search engines allow advertisers to bid simultaneously at tens of thousands of keywords (Li et al. 2010; Skiera et al. 2010). According to a study by Zhang et al. (2014, 511) almost half of the search traffic is not utilized at all by sponsored search and close to 88% of the search traffic is only partly used. Only 12.4% of search traffic include 8 or more ad groups in their auctions, which shows how much more potential there is to exploit in search engine advertising (Zhang et al. 2014).

To appear in sponsored results, the organisation needs to decide on which keywords they are willing to bid on (Yang & Ghose 2010; Jansen & Schuster 2011; Zhang et al. 2014). The selected keywords should describe the advertised item as good as possible (Yang & Ghose 2010) and the other goal is to have the selected keywords to match with the terms the consumers use while performing online searches as much as possible (Lu & Zhao 2014). To effectively reach and engage your target audience it is crucial to understand how they perform query-based searches (Enge et al. 2015, 43). Keyword selection has an enormous effect on the success of advertising in search engines (Zhang et al. 2014) and if keyword selection is unsuccessful will the advertisers target the wrong consumer group and use up their marketing budget with slim results (Lu & Zhao 2014; Zhang et al. 2014). As already mentioned above, the bid price to get the organisations ad visible of each keyword depends on the overall demand of this specific keyword or phrase (Jansen & Schuster 2011). Therefore, it can be concluded that the more popular and highly demanded the keyword is, the more the advertiser must bid for it to win the auction and get an advert on the sponsored search (Skiera et al. 2010; Agarwal et al. 2011; Jansen & Schuster 2011).

When choosing the keywords to bid, the advertiser should consider their relevance compared to the webpage and mission (Zhang et al. 2014). Web searchers use very different types of keywords, even when searching for the same thing (Li et al. 2010) and it is crucial that the selected keyword and the keyword that the web searchers search for are matching (Lu & Zhao 2014). Consumers perform online searches in very different phases of their purchase process, which again affects the choice of keywords (Moe 2003; Jansen & Schuster 2011; Haans et al. 2013; Jerath et al. 2014). In early search phases, consumers use broad search terms aiming to gather information and not to purchase and therefore the conversion rates

are lower with broader keywords (Rutz & Tursov 2011). Study made by Jansen and Schuster (2011, 1) found out that searches made in awareness-phase generated more sales revenue and the key phrases were cheaper to bid on than in purchase-phase. During a later phase in the search process, consumers use narrow keywords including specific and sometimes brand related information and at that phase consumers are readier to commit a purchase leading to higher conversion rates (Rutz & Trusov 2011; Haans et al. 2013). Advertisers, when creating keyword portfolios, might choose multiple different keywords, which are related to their service or product in some degree (Lu & Zhao 2014) based on the purchasing phase the advert is targeting (Moe 2003; Jerath et al. 2014). Selection can be made between very general keywords that can also refer to other brands or even different products or very specific product and brand related keywords (Lu & Zhao 2014). The portfolio should include keywords from both categories because consumers are influenced by both aspects (Agarwal et al. 2011). In the end, in any phase or focus of the consumer, the online searcher is coming to the advertiser with a search goal in mind, which is reflected in the search query decisions (Wang et al. 2018).

Depending on the purchasing phase of audience targeted should their click tendency and use of keywords in search be considered (Moe 2003; Jerath et al. 2014). General and popular keywords are used by consumers who are low-involved with their search process or not so close to making a purchasing decision, while highly-involved consumers perform online search with specific and brand related keywords, which tend to be less popular and they also focus more on sponsored links (Jerath et al. 2014). According to Jansen and Schuster (2011, 1) more general and broader keywords might be a very profitable segment for sponsored search. General keywords, according to Lu & Zhao (2014, 302) perform more effectively than specific keywords in resulting in indirect sales revenue but have a higher cost to the advertiser than branded specific keywords (Rutz & Bucklin 2011). This more effective performance of general keywords might result from the fact that most of the online searches are performed in the research-phase of buying funnel (Jansen & Schuster 2011). Generic search creates a spill-over effect on subsequent specific branded search (Rutz & Bucklin 2011), which in other words can be described as indirect sales-revenue (Lu & Zhao 2013). Spill-over effect can be described as awareness of the brand's relevance to the search mission, generated by the generic search and eventually leading into making a branded search (Rutz & Bucklin 2011). Jansen and Schuster (2011, 12) suggest a traditional 80-20

rule for choosing between generic and branded keywords, where 80% is generic and 20% is branded keywords.

It would be beneficial for advertisers to consider bidding on relevant but less-competitive keywords, instead of competing about the popular keywords and through this strategy can the revenue be optimized (Zhang et al. 2014). This technique is an adaption from the longtail theory, which applies according to Zhang et al. (2015, 509) "aggregated popularity of a large numbers of less-competitive (sometimes tail) items can make a large fraction of the total popularity". Only less than 30% of the searches made are done by using the most popular keywords, which leaves up to 70% of the searches for long-tail keywords (Enge et al. 2015, 194). It has been claimed that the success behind in search engine marketing is generated by the longtail (Skiera et al. 2010). Specific keywords which in other words are longtail keywords, are found to perform better compared to generic keywords (Yang et al. 2018). Longtail keywords refer to choosing keywords which obtain less competition or answer to a niche market (Shenoy & Prabhu 2016, 58). Longtail keywords can be described as the less popular search terms users use when performing an online search (Skiera et al. 2010; Killoran 2013). It has been discovered in the previous literature that in search engines the query volume follows a distribution in a longtail form (Zhang et al. 2014).

3.4 How to build a good keyword advertisement

Each ad needs an optimal ad design which is tailored regarding to the specific product and market conditions it faces (Rutz & Trusov 2011). The appearance of the paid search doesn't always lead to a good click-through rate (CTR) making the design elements an important factor in the SEA process and success (Atkinson et al. 2014). The academic literature is still scarce regarding how design elements affect the CTR of SEA (Rutz & Trusov 2011) but in contrary there is a vast amount of industry publications, including for example Google's own guidelines on how to "write successful text ads" (Google 2017). Search engine ads are generally four text line advertisements (Atkinson et al. 2014), consisting of a headline, main body text, and a display URL (Rutz & Trusov 2011). The tactics available for advertisers to attract more clicks are limited and can be divided into four main categories: brand related, calls to action, marketing appeals, and punctuation (Atkinson et al. 2014). In addition to these Google offers ad extensions, which can be used to improve performance and they

include for example sitelink extensions, where advertiser can include multiple links to their website and offer choice for the searcher as well as obtain larger space on the listing and receive maximum attention (Gupta & Mateen 2014).

To start a text ad campaign, the advertiser needs to choose their main keyword, which is related closely to the content, and create a set of keywords, which are closely related to the specific keyword and act as an expanded description of the content or topic (Qiao et al. 2017). Distinction between generic and specific keywords should be made, since they are used in different situations by the online searchers, depending on what kind of information they are looking for and how educated they are about their search query (Yang et al. 2018). According to a study made by Haans et al. (2013, 160-161) high-involvement and low-involvement web searchers differ in the way they presume ads. High-involvement searchers use more time to analyse the advert whereas low-involvement searchers prefer ads with heuristic cues like source credibility and attractiveness (Haans et al. 2013).

To optimize the performance of the SEA there is multiple interrelated decision variables, including which keyword are used, what is the target position on the results page, maximum bid amount on each keyword, what is included in the text content, layout of the advert and finally the landing page design (Rutz & Trusov 2011) (Figure 7.). According to Google (2017) the text ads should be specific, relevant, attractive and empowering to be able to attract the correct potential customers. The goal of each text ad should be attracting the gaze of the web searcher, then generating attention and making a convincing offer and finally urging them to act (Rutz & Trusov 2011). Especially with high-involvement searchers the possibility of conversion is high after click-through (Haans et al. 2013). To attract gaze and generate attention, the text ad needs to be relevant when compared to what the online searcher has searched for, and an easy step to take to make the text ad more relevant feeling, is to include the searched and bid keyword into the actual text ad (Atkinson et al. 2014). Sponsored search position could alone bring attention and interest to the text ad and the relevance, uniqueness and informativity of the text ad will influence the decision of click-through, highlighting the importance of these factors in the text portion of the ad (Pažėraitė & Repovienė 2016).

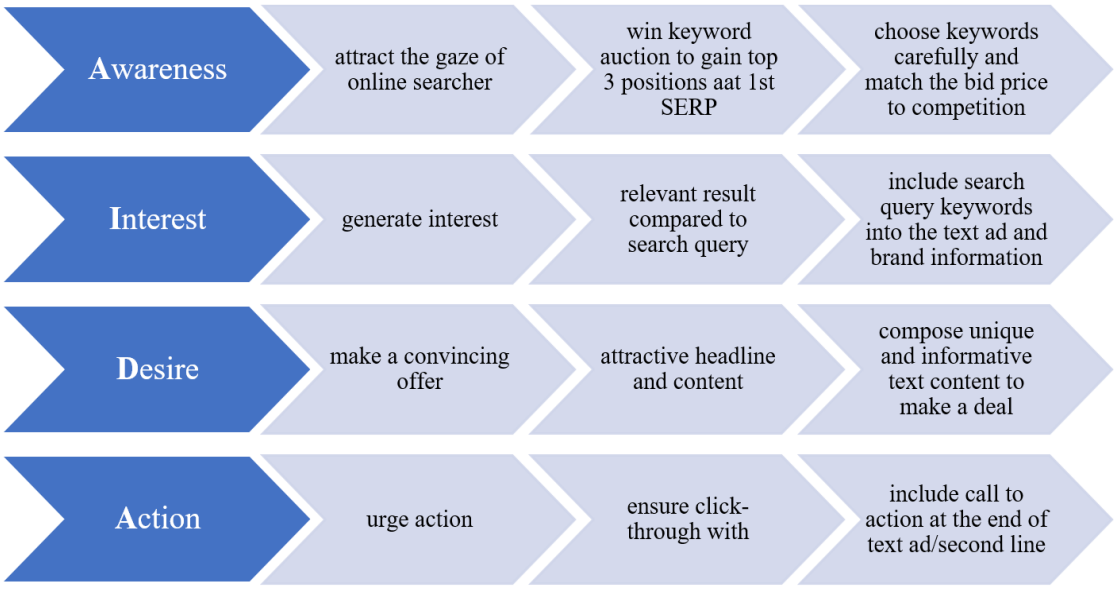

Figure 7. Illustration of consumer AIDA-funnel in connection with search engine advertisement design and actions. Adapted from Rutz and Trusov (2011), Atkinson et al. (2014) and Pažėraitė and Repovienė (2016)

The next phase of making a convincing offer is crucial to be able to generate clicks and this relies on the content of the text ad and how well the ad and the firm behind the ad matches the search query made by the consumer (Rutz & Trusov 2011). There are varying guidelines of what the text portion of the advert should include and for example Google (2017) urges companies to highlight what makes them unique, include prices and promotions and to include one of the keywords to the text ad. The text body is the most visible element for the consumer and tactics to alter that include attractive headline and conviction or desire creation (Rutz & Trusov 2011). Text body should be written as descriptive as possible and in a monologue or dialogue form (Pažėraitė & Repovienė 2016) and it should either be generic or specific in connection to how specific or generic the bid keywords are (Yang et al. 2018).

Based on the text body will the customer make the decision to click or not to click on the advert especially with high involvement consumers (Haans et al. 2013). When online search was made with more generic keywords, the advert with abstract content would generate higher CTR, opposite to situation when online search was made by using specific keywords, then CTR of the concrete text ad would be higher, suggesting that online searchers looking for specific information are more likely to click on text ads, which provide concrete information (Yang et al. 2018). When designing an ad campaign should online users in both

the beginning and end of search processes be considered and the combination of concrete and abstract information in text ad should be included for both specific and generic keywords (Figure 8.) (Yang et al. 2018). The final step of customer acquisition at the end of the text ad is called call to action and it means including action focused phrases into the text ad, such as "Join now!" (Rutz & Trusov 2011; Pažėraitė & Repovienė 2016; Google 2017).

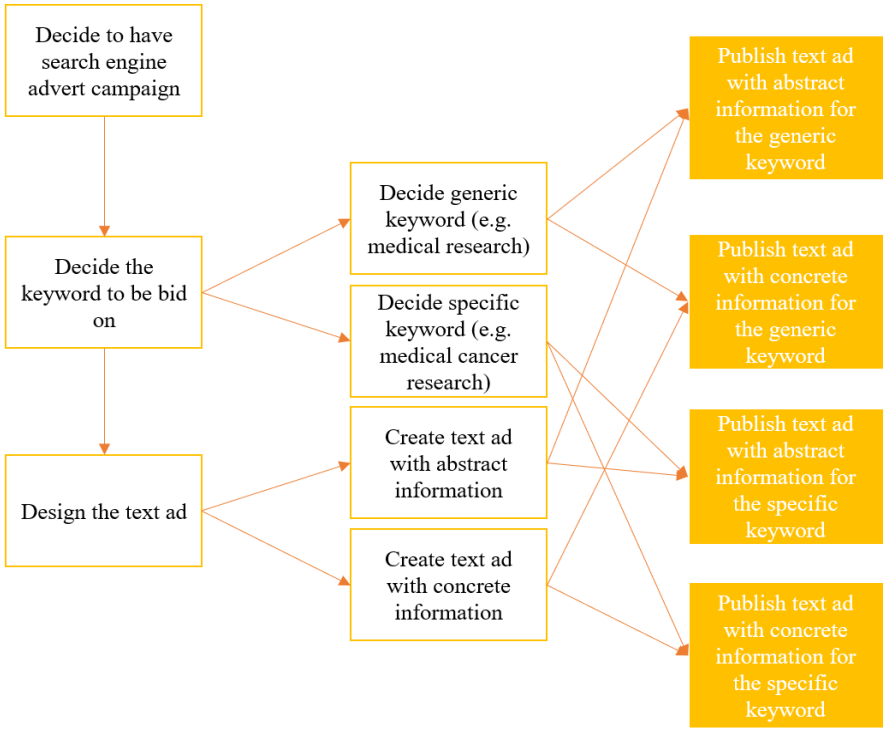

Figure 8. Building a sponsored text ad with generic and specific focus on keywords and content. Adapted from Yang et al. 2018

Based on the research performed by Rutz and Trusov (2011, 798) online searchers do take the position of a sponsored search result into account and the consumers who are more responsive about the position will more probably click the paid result ranking in first position versus the result in position 5. Frequent clickers are more effected from the position of the advertisement and 10% of web searchers perform 90% of the clicks (Yao & Mela 2011). It was also found that these online searchers are more price sensitive than online searchers who are not taking the ranking into account (Rutz & Trusov 2011) and therefore it is advisable to offer more aggressive price incentives alongside paid results ranking in the top 2 to simulate conversion. Adding the price of the marketed product can also increase click through rate (CTR) (Atkinson et al. 2014).

Research made by Atkinson et al. (2014, 28) studied the effect of punctuation in title, brand, call to action, value puffery, choice, promotion, price and the use of questions in the paid result. Google recommends the use of capital letters in paid results, but Atkinson et al. (2014, 28) found that it didn't have a significant effect on the CTR. According to Rutz and Trusov (2011, 798) the use of call to action and keyword used by the consumer in the headline had an increasing effect on the CTR's, but according to Atkinson et al. (2014, 28) the use of call to action had a positive effect on the CTR only when used in the second line and a very negative effect if used in the first line. The practice of including product benefits or specific reasons to purchase the item in the first line had a negative effect on the CTR, but if a promise of a "deal" was made, the effect was mostly positive (Atkinson et al. 2014).

Offering a choice has been a popular technique mentioned in trade publications to gain higher CTR and according to Atkinson et al. (2014, 28) adding the choice in line 1 had an increasing effect on the CTR's. Google (2017) guides to include promotions, prices and exclusives into the text ad, but according to Atkinson et al. (2014, 28) including promotion had a negative influence on the CTR's whereas including price in the second line had the most positive effect on the CTR's. Adding a question was found to have a negative effect on the CTR's and it can be assumed that the use of questions is not effective since web searchers are looking for answers and not for more questions (Atkinson et al. 2014). Brand can be included in search engine advertisements and it helps distinguishing the advertised brand and their product from their competitors (Jansen et al. 2011). According to Atkinson et al. (2014, 28) when brand appeared in the advertisement it had an increasing effect on the CTR, due to the benefits of successful branding and the identifying prospect of what the company is offering. Branded keyword advertising, including both the key phrase and advertisement, was found to lead to more clicks as well as increase in sales, items sold and orders (Jansen et al. 2011). Similarly, brand-specific information in paid advertisement was significantly connected to increase in conversions (Yang & Ghose 2010). In search engines brand awareness plays an important role in CTR, due to the impact of known brand on generating trust and familiarity among users, suggesting that brand should be included in the design (Gupta & Mateen 2014).

4 ONLINE SEARCH BEHAVIOURS AND ENGAGEMENT

People perform online searches to find relevant information by using a set of keywords and making a search query in a search engine (Enge et al. 2015, 43). Content marketing is a form of digital inbound marketing (Holliman & Rowley 2014; Opreana & Vinerean 2015) and closely connected to search engine optimisation tactics (O'Neill & Curran 2011). By writing unique and quality content in desired topic, will the content published appear highly in search engine results (O'Neill & Curran 2011; Agarwal & Verma 2016).

4.1 Content marketing in search engines

Content marketing is publishing instead of advertising (Feng & Ots 2015) or helping instead of selling (Holliman & Rowley 2014; Patrutiu-Baltes 2016) and therefore a perfect example of digital inbound marketing (Holliman & Rowley 2014; Opreana & Vinerean 2015) where the aim is to create a valuable experience for the viewer (Rose & Pulizzi 2011, 12). Content marketing can be defined as a pull marketing strategy, which aims to provide content for the target audience when they are looking for it (Lieb 2011, 1; Holliman & Rowley 2014) and it offers another solution compared to the ineffective disruptive traditional marketing (Holliman & Rowley 2014). Pulizzi (2013, 5) defines content marketing as "the marketing and business process for creating and distributing valuable and compelling content to attract, acquire, and engage a clearly defined and understood target audience with the objective of driving profitable customer action". Whereas Content Marketing Institute (2017) defines content marketing as "a strategic marketing approach focused on creating and distributing valuable, relevant, and consistent content to attract and retain a clearly defined audience — and, ultimately, to drive profitable customer action". Currently content marketing is a newcomer in scientific research, resulting in wide spread definition (Patrutiu-Baltes 2016; Pažėraitė & Repovienė 2016).

Companies try to focus on making meaningful content and sharing it in blogs and social media (Feng & Ots 2015) to connect with their target audiences on a deeper level (Opreana & Vinerean 2015) and to gain and sustain brand awareness (Holliman & Rowley 2014). By "showing what you know" stated by Gagnon (2014, 68) organisations can position themselves uniquely against their competitors and generate lasting and positive impression

of the organisation in the minds of the online user. The digital content market has been increasing in size rapidly (Azad, AliAkbar & Zomorodian 2016) and it can be stated that content marketing is the basis of digital inbound marketing (Opreana & Vinerean 2015). Through content creation organisations can be found in search engines since it helps the website with visibility and discoverability (Opreana & Vinerean 2015). Search engines prefer good quality content in their ranking algorithms (O'Neill & Curran 2011; Agarwal & Verma 2016) and therefore search engine marketing, especially advertising, and content marketing are connected in the eyes of the academia (Pažėraitė & Repovienė 2016). Content marketing is a critical part of search engine marketing, both in organic (O'Neill & Curran 2011) and sponsored results (Pažėraitė & Repovienė 2016) and unique quality content should be created and shared constantly and over time (Opreana & Vinerean 2015; Harad 2016). In organic results content marketing ensures higher rankings and visibility for your website (O'Neill & Curran 2011; Agarwal & Verma 2016), whereas in paid results, content is used as a landing page enabling the web user to engage with the content and in the text ad as an attention and interest building tool (AIDA) to gain traffic (Pažėraitė & Repovienė 2016).

The goal of content marketing can be summarised as to educate, inspire and entertain the targeted audience in online locations where they can engage with content (Harad 2016) and raise awareness of the brand among the target audience and increase their loyalty or in other words engagement to the brand (Patrutiu-Baltes 2016). Content marketing is a tool to engage the online users, since they have the possibility to engage with the content offered (Wang et al. 2017) and access the website to learn more (Opreana & Vinerean 2015). Online searchers are not interested in reading something that doesn't add value or knowledge (Agarwal & Verma 2016). Content marketing requires the knowledge of the target audience's information needs and how their purchasing decision patterns work as well as adapting the role of a publisher (Holliman & Rowley 2014). Content should be relevant, informative, reliable, unique, provide value, awake emotions in the reader and lastly be intelligent to pass as quality content (Pažėraitė & Repovienė 2016). Current knowledge base of content marketing, like search engine marketing is saturated with advice from consultants and practitioners (Feng & Ots 2015) whereas peer reviewed academic literature is almost non-existent (Holliman & Rowley 2014). Definitive is that this will change in the future because content marketing is the future of digital marketing (Patrutiu-Baltes 2016).

4.2 Online marketing avoidance

Hann et al. (2008, 1094) describe marketing avoidance as "consumer efforts to conceal themselves and to deflect marketing" and Speck and Elliot (1997, 61) as "all actions by media users that differentially reduce their exposure to ad content". When technologies improve and generate new ways for marketing, it also creates new possibilities to avoid marketing (Hann et al. 2008), making marketing avoidance a dominant factor in online marketing (Edwards et al. 2002; Baek & Morimoto 2012; Lo et al. 2014). The reason behind search engine advertising avoidance is according to Li, Yuan and Liu (2017, 1005) a negative perception of the advertisement based on perceived goal impediment, advertising clutter, and prior negative experience to advertising. In addition to that online adverts are viewed intrusive and irritating, which results to advertising avoidance (Edwards et al. 2002; Baek & Morimoto 2012). During the last years consumers have started to implement ad blocking software to stop advertisements from interrupting their online experiences (Johnson 2013; Del Rowe 2016; Parra-Arnau 2017), which can be describes as behavioural avoidance (Cho & Cheon 2004). In behavioural avoidance, in addition to ignoring actively and having negative associations with adverts, customers act to avoid seeing advertisements by scrolling down, using ad-blocker and leaving the webpage (Baek & Morimoto 2012). It was estimated that in 2015 ad-blocking cost advertisers about 22$ billion (PageFair 2015). Companies are trying to find ways to go around the ad-blocking software's by either implementing their own software, which disables user's ad-blocking in their webpages or preventing users with AdBlock software to use their websites (Del Rowe 2016, 13). According to Parra-Arnau (2017, 96) "Web tracking is the key enabling technology of modern online advertising and, at the same time, the source of serious privacy concerns".

Online marketing avoidance is due to two different reasons, first consumers are not willing to see ads on their webpages and second, they are concerned about privacy issues (Hann et al. 2008; Baek & Morimoto 2012). Privacy concerns and ad irritation have a positive effect on ad avoidance according to Baek and Morimoto (2012, 59). Using AdBlock services allows the consumer to browse web pages ad-free and opt out from tracking (Parra-Arnau 2017). In relation to search engine advertising, the use of AdBlock doesn't affect organic search engine results, which again highlights the importance of search engine optimisation (Munoz-Bates 2016). Search engine advertising can be free from advertising avoidance

because most of the online users (57,4%) do not pay attention to if the link clicked is organic or sponsored (Kobylanski 2012).

4.3 Click tendencies of low- and high-involved searchers

Online searchers can be divided into two categories: goal-directed and non-goal-directed (exploratory) (Hoffman & Novak 1996; Moe 2003) or in other words high-involvement and low-involvement consumers (Jerath et al. 2014). Distinction between searchers who are either familiar with the topic of their search or not should also be made (Joo et al. 2016). The goal-directedness of online user is an important consumer characteristic, which influences the effectiveness of the advertising strategies (Wang, Wang & Farn 2009) and information processing behaviours (Hoffman & Novak 1996). Based on the involvement and goal-directness, the interaction with advertisement and preference division between organic and sponsored listings changes (Figure 9.) (Moe 2003; Wang et al. 2009).

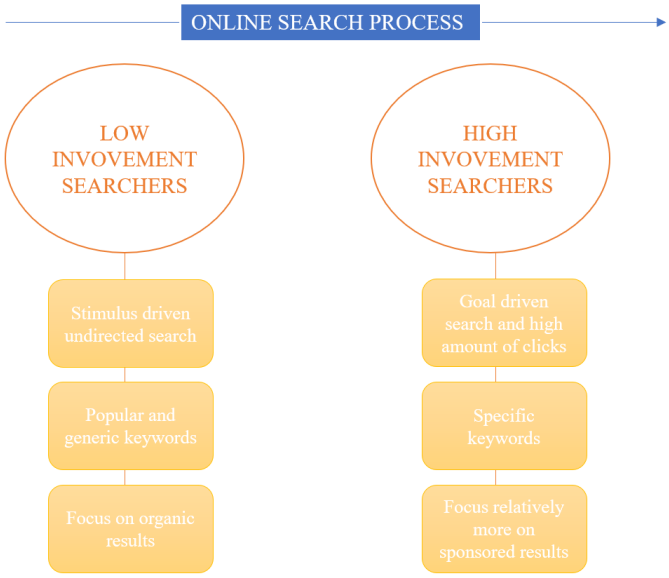

Figure 9. Comparison of behaviours of low and high involvement searchers in online search process. Adapted from Moe (2003), Jansen and Spink (2009) and Jerath et al. (2014)

High-involved consumers use more specific and less popular keywords in their searches, click on more links per search and click on sponsored links more than low-involvement consumers (Jerath et al. 2014) and they act in a very focused manner moving towards making a purchasing decision (Moe 2003). Another research confirms that when the online search process is more focused, the probability of clicking on the sponsored link increases (Jansen

& Spink 2009). Low-involvement consumers use more popular and general keywords and pay more attention towards the organic listings (Jerath et al. 2014) and their online search is undirected and stimulus-driven (Moe 2003). Even though low-involvement searchers might not do an online search with a goal of making a purchase, the online search can contribute to the purchasing decisions later (Moe 2003). The involvement of the searcher affects the clicking tendencies upon search results (Jerath et al. 2014). In different types of searches, organic and paid results play a different role; when online searchers are looking for online content, the organic listings have more important role, whereas when looking for products online, searchers refer to sponsored listings (Burguet et al. 2015).

The level of specificity has also an effect on the advertiser's cost per click on the sponsored links and this can differ hugely between the generic and specific branded keywords (Rutz & Bucklin 2011). Research suggests that sponsored search advertising should be focused on the less popular keywords and therefore search engine optimisation actions should be done with keeping in mind the most popular keywords (Jerath et al. 2014). Rutz and Bucklin (2011, 88) state that the cost per click is lower for branded and more specific keywords and higher for generic keywords. Users who search for less popular keywords are putting in more effort in their search for information and therefore are closer to a purchase, making this group of web users more targetable for sponsored search engine marketing (Jerath et al. 2014). Web searchers who are close to conversion use more specific and branded keywords (Rutz & Bucklin 2011). Web users also perform online searches in different stages of their processes (Moe 2003) and therefore keywords can vary from very generic to brand-related (Joo et al. 2016). According to a research made by Jansen and Schuster (2011, 12) web searchers performed most of their online searches (more than 50%) in research-stage of buying funnel compared to purchase-stage (around 4%). The clicking behaviour of the web searcher is affected with the relevance of the search engine results when compared to the use of specific keywords (Jerath et al. 2014).

4.4 Online engagement in search engine marketing setting

Engagement has numerous definitions in the academia as well as among the practitioner literature, but still lacks a formal consistently agreed upon definition as well as agreement of engagements role in marketing (Vivek et al. 2012; Mosteller & Mathwick 2014).

Previously engagement has been mostly studied in psychology but more recently engagement in marketing has gained popularity in academia (Vivek et al. 2012) especially in the form of research about brand engagement on social media (Yang et al. 2016). Among academics there is a lot of variance when it comes to the nature of engagement, whether it is behavioural construct or strictly organismic construct, or even a process or a state during an ongoing process (Demangeot & Broderick 2016). Literature has not yet studied online engagement in a setting other than from a viewpoint that the website is presenting a brand (Mollen & Wilson 2010), that the website is an advertising medium (Calder et al. 2009), that the website is a platform where online users engage with each other instead of the website itself (Pagani & Mirabello 2011) or in retail context (Demangeot & Broderick 2016).

According to Mollen and Wilson (2010, 923) "Online engagement is a cognitive and affective commitment to an active relationship with the brands website characterized by dynamic and sustained interactions which give instrumental and relevant experiential value to existing and prospective customers". Vivek et al. (2012, 127) in addition define consumer engagement as "an individual's participation in and connection with an organisation's offering which is composed of cognitive, emotional, behavioural, and social elements". In contrary Martínez-López et al. (2017, 33) define engagement in an online community from an active point of view, stating that "acting in three ways: honestly and credibly, with authentic, useful content on the brand; responsibly, avoiding manipulation and deletion of content contrary to the brand's opinion; and creating an atmosphere of freedom" will increase online engagement. In addition to online engagement, an important definition is the definition of a customer website engagement, which is "the process of developing cognitive, affective and behavioural commitment to an active relationship with the website" (Demangeot & Broderick 2016, 814).

Online engagement has been highlighted in academia as a key influencer in online participation (Martínez-López et al. 2017) and active online participation from the user base is a crucial factor in a websites success (Filson Moses et al. 2016). What makes building engagement challenging, is the reality that websites usually need to manage to engage the online user in a single visit (Demangeot & Broderick 2016). Online users are more likely to actively participate during website visit if they are engaged with the website and the content they are visiting (Filson Moses et al. 2016). Conversions are one of the measurable metrics

that can be followed in a search engine marketing campaign (Malaga 2007; Agarwal et al. 2011) and they can represent an engaging online user performing a desired action (Agarwal et al. 2011; Jansen & Clarke 2017). According to Demangeot and Broderick (2016, 821) "commitment at the end of a single navigation experience represents the customer's behavioural engagement with the site in future" in where commitment in the end of a navigation is a conversion. Making a sale is not always the end goal of engagement and therefore measuring the return on engagement initiatives (RoEI) is a complex metric (Gill, Sridhar, & Grewal 2016).

Engagement is not as straightforward as it has been painted in academia and often the definitions are mixed between actual engagement and the consequences of engagement (Calder et al. 2009). Engagement can be described as a process between the online user and the website (Webster & Ahuja 2006; Martínez-López et al. 2017) and the cumulative active experiences and connection the online user has with the website (Figure 10.) (Calder et al. 2009; Demangeot & Broderick 2016). The online engagement can be built upon different sources, for example being utilitarian or intrinsically enjoyable and different websites can be still engaging even though they give the online user a different experience (Calder et al. 2009). Important source of engagement is the so-called interaction engagement, which builds up for example when the website includes content which the online user anticipated after finding the link in search engine results (Demangeot & Broderick 2016) making metatexts in search engine results an important factor when considering engagement. Behavioural engagement is natural continuum from interaction engagement, making the online user feel stronger identification with the website and therefore returning in the future (Demangeot & Broderick 2016). Third form of engagement is activity engagement or call to action engagement, where the involvement with the task is made through actions, for example clicking on link, making this also a vital part of SEM, where the metatext can include calls to action and therefore engage the online user (Demangeot and Broderick 2016). Bian et al. (2013, 2167) define engagement in search engines in a similar fashion, stating that clicking on a link (click event) on the offered content shows engagement, because it reveals that the user viewed the link and its location on the web page.

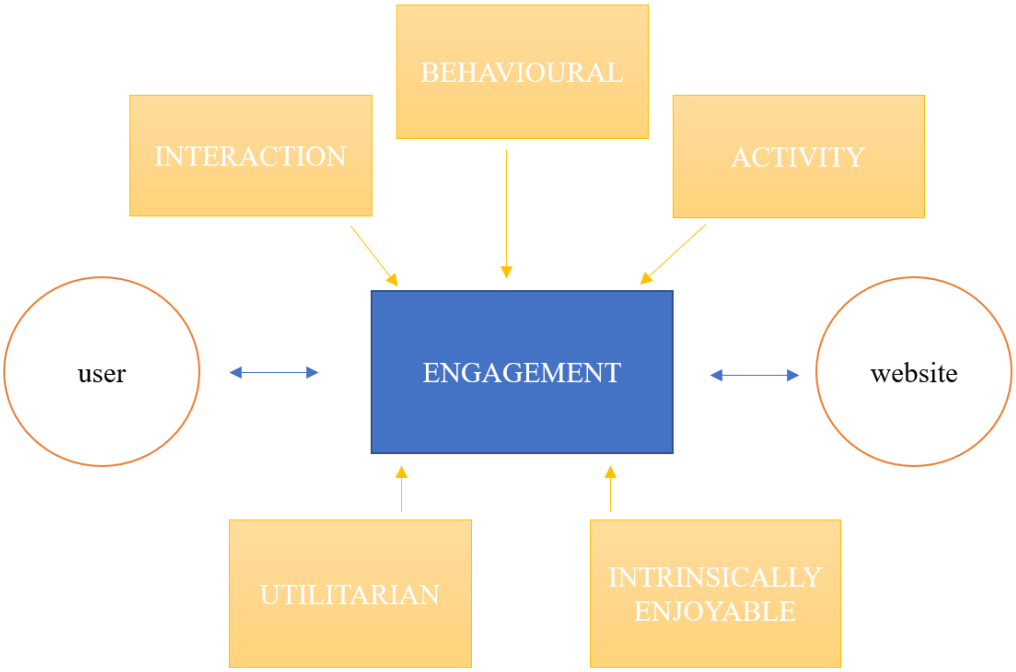

Figure 10. Framework of engagement as an ongoing process between user and website and constructs building up engagement during this process. Adapted from Calder et al. (2009) and Demangeot and Broderick (2016)

Online media experiences are different from traditional media experiences (Calder et al. 2009) and there lies also the biggest difference between traditional and online marketing. Online marketing focuses on engaging the consumer through the marketing process (Opreana & Vinerean 2015), whereas in traditional marketing the consumer is only a target (Huang 2012; Chiu et al. 2014). Online media contains according to Calder et al. (2009, 324) a form of engagement, which again influences the advertising effectiveness. The goal of engagement is also contrary from traditional marketing interventions, since the aim of the engagement initiatives is to conduct a strong, long lasting relationship with the online user, which enables interactive and participative experiences, instead of closing a sale (Gill et al. 2016).

Lehmann et al. (2012, 166) suggest following factors for measuring engagement; popularity (number of users visiting the website), loyalty (the frequency of returning user) and activity (including total dwell time/time on site and pages visited during session). Even though these measure web usage, they are commonly seen as a proxy for online user engagement (Figure 11.) (Lehmann et al. 2012; Lehmann et al. 2013). In connection to these metrics is stickiness, which explains how users regularly spend time on a website, which can be also explained as

engagement and measured through click-through rates, time spent on a site (dwell time), page views, return rates, number of unique users (Lehmann et al. 2013).

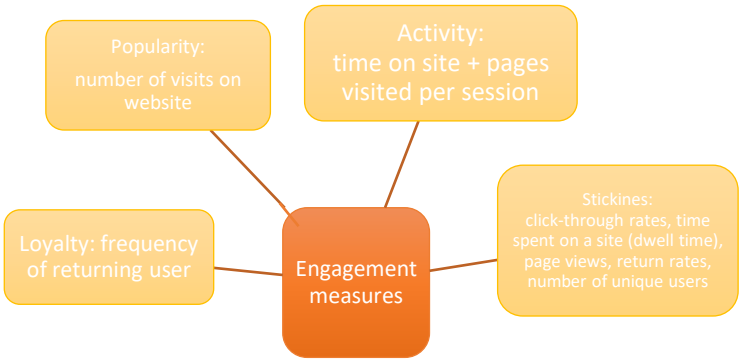

Figure 11. Illustration of different factors creating engagement measures. Adapted from Lehman et al. (2012) and Lehman et al. (2013)

There are several ways to increase online engagement and based on a literature review conducted by Garett et al. (2016, 3) there are altogether seven different aspects, that are agreed upon literature, on website design that enhances user engagement. Having a user-friendly website is fundamental for organisations who want to success in an online setting (Lee & Kozar 2012). In addition to website design aspects, there are several other factors influencing engagement such as trust (Martínez-López et al. 2017), identification (Yeh & Choi 2011) and emotional and less cognitive ties to the brand represented by the website (Franzak et al. 2014). According to Demangeot and Broderick (2016, 814) there exists 2 main channels of engagement; experiential exploration and informational exploration, which can both be enhanced through the website content and design. To increase the value for informational exploration, the websites should make sure that the website visitor is given the information they came there to look for (Demangeot & Broderick 2016). The other form of engagement, which might be even more crucial for websites, is experiential exploration and it can be enhanced though enjoyable navigation experience and through experimental intensity of the website (Demangeot & Broderick 2016). The website design aspects include navigation, graphical representation, organisation, content utility, purpose, simplicity and readability (see Appendix 14) (Garett et al. 2016).

5 RESEARCH DESIGN AND METHODS

This chapter will introduce in detail the case organisation and describe the empirical research of experimenting with search engine marketing techniques alongside content marketing to answer the research questions. The goal of this research is to identify and test the search engine optimisation and search engine advertising tactics used with content marketing to increase visibility and awareness of case organisation in search engines, which will result in increase in the quality of the traffic. The used search engine optimisation and advertising tactics are chosen based on the previous academic literature. The academic goal of this research is to provide analysis of how chosen search engine optimisation and advertising actions can be utilized to increase visibility, awareness and engagement in search engines and websites. To perform the research and gain results, keyword research will be done accordingly to the content and then implemented to the existing material, to measure the effect on ranking/visibility. In addition, search engine advertising camping will be designed based on the suggestions from literature to measure what will its effect be in the awareness/traffic of the website. Lastly, the engagement will be measured through the results gained on the above tests, utilizing different engagement measures available in Google Analytics and based on literature suggestions. The research methods are presented in detail in Table 7. in chapter 5.2.3.

5.1 Research context

The University of Helsinki is the oldest and biggest institute of academic education in Finland, founded already in 1640 (Helsinki University 2018). It ranks better than 99,5% of all universities globally, ranking 56th 2017 in Shanghai Academic Ranking of World Universities (Shanghai Ranking 2017). In 2016, HY had 32 033 students and 7600 employees (Helsinki University 2018). The core duties of the case organisations are research, teaching and community relations (Helsinki University 2018), in which the latter the content ownership comes in focus. Since this research doesn’t focus on the traditional aspect of marketing in higher education institutions, which is often stated as applicant marketing, the motives and settings behind the study are slightly different than usual.

The main target group HY wants to reach with their search engine and content marketing actions are researchers working in universities abroad. The aim of targeting these individuals is to influence their opinion about HY when they are rating them for the university rankings and to gain their interest to make them job applicants or collaboration partners for the university. The target audience of researchers in universities abroad is a focused group of people, who again are very focused in their own faculty of science, meaning that they will most likely be focusing their search actions concerning their own topics with very specific search terms and keywords, making them demanding about the quality of the results as well as the content. Researchers view commercial information very sceptically and they prefer content with proof of the quality (including correct referencing). HY also aims to gain a leading role as a content provider in specific scientific areas, which is also the reason behind the focus of gaining visibility and awareness through search engine marketing.

5.1.1 Research focus

The full website of HY offers a wide range of options as well as two language settings (Finnish/English), but in this study the focus will be placed on the specific content topic of health and more specifically cancer research in English, which will limit the target group to the academic workers focusing on this area and in searches made in English. The choice of health and cancer as the focus content topic was made based on the interest of the case organisation and their desire to profile themselves as a leading content provider in cancer research news. In this study the assumption will be made, that these topics are searched in search engines by the academic workers who are already interested in the specific topic and therefore use very specific keywords to find the information they are looking for. In search engine marketing it is not possible to determine who has performed the search and afterwards entered the website through the search engine results, which makes it harder to identify if the marketing actions are reaching the correct target audience. Due to this limitation will the study assume that scientists will use specific keywords in their searches, compared to the public who do not possess as comprehensive understanding of the topic.

The choice of articles from the topic of health and cancer was made based on the current visibility of the articles. Both articles had been written and published in 2018, which indicates that they are both current and relevant. Scientific research is evolving constantly and choosing relatively new articles was important to ensure the validity of the content. The

two articles chosen were already gaining traffic from search engines, which enables comparative measures before and after. The articles varied in terms of composition when focusing on sub-titles and videos in the text, which can provide this research with insight on how the engagement varies. Since the other article included two videos, is watching them a metric for engagement. Both articles also contained links to other pages and possibility to share the article. The articles had been shared previously and this is a metric for engagement. In Table 3., data from both articles prior to changes is presented.

Table 3. Data of the chosen articles prior to keyword implementation or campaign

Page	Page Views	Unique Page Views	Avg. Time on Page	Entrances	Bounce Rate	% Exit
organic google	154 % of Total: 0.03% (588,166)	144 % of Total: 0.03% (457,953)	00:02:09 Avg for View: 00:01:35 (35.86%)	101 % of Total: 0.05% (210,950)	82.69% Avg for View: 55.59% (48.75%)	67.74% Avg for View: 35.87% (88.88%)
paid google	12 % of Total: 0.00% (588,166)	11 % of Total: 0.00% (457,953)	00:02:15 Avg for View: 00:01:35 (42.17%)	4 % of Total: 0.00% (210,950)	25.00% Avg for View: 55.59% (-55.03%)	23.08% Avg for View: 35.87% (-35.66%)
1. /en/news/health/personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-four-studies-leading-towards-more-effective-cancer-treatment						
organic google	**39** (25.32%)	31 (21.53%)	00:01:05	13 (12.87%)	61.54%	46.15%
paid google	**5** (41.67%)	4 (36.36%)	00:00:15	0 (0.00%)	0.00%	20.00%
2. /en/news/health/oral-health-may-have-an-important-role-in-cancer-prevention						
organic google	**32** (20.78%)	31 (21.53%)	00:02:05	20 (19.80%)	75.00%	59.38%
paid google	**4** (33.33%)	4 (36.36%)	00:03:37	3 (75.00%)	0.00%	0.00%

Although visibility in search engine results has been stated as one of the research questions, it is only a prerequisite for the actual goal of the search engine optimisation activities for the case organisation. Visibility in the ranking, even though it can be brand building, is not valuable for the case organisation if it does not lead to conversion, which in this case is clicking the link and entering the website and performing desired actions while visiting. To include this in the setting, will also the increase of traffic be measured after search engine optimisation tactics implementation. In addition, will the quality of the traffic be measured, focusing on their engagement and conversions.

5.1.2 Current situation of the website

Currently HY is performing content marketing and an odd search engine advertising campaign, but not taking specific focus in search engine optimisation techniques. The website has been optimized and the design of the website has been done with search engine optimisation in mind and therefore the focus of this research is on the keyword tactics, which are closely connected to the content marketing. Through content is the target group targeted

and to succeed in that better than currently, search engine actions will need to take place. In Figure 12., the current situation of the university's website regarding audience metrics from 2 weeks' timeframe (22 February – 8 March) is presented. The view focuses solely on organic traffic from Google and paid traffic from Google, excluding traffic from direct and referral sources as well as other search engines and CPC-models (Facebook).

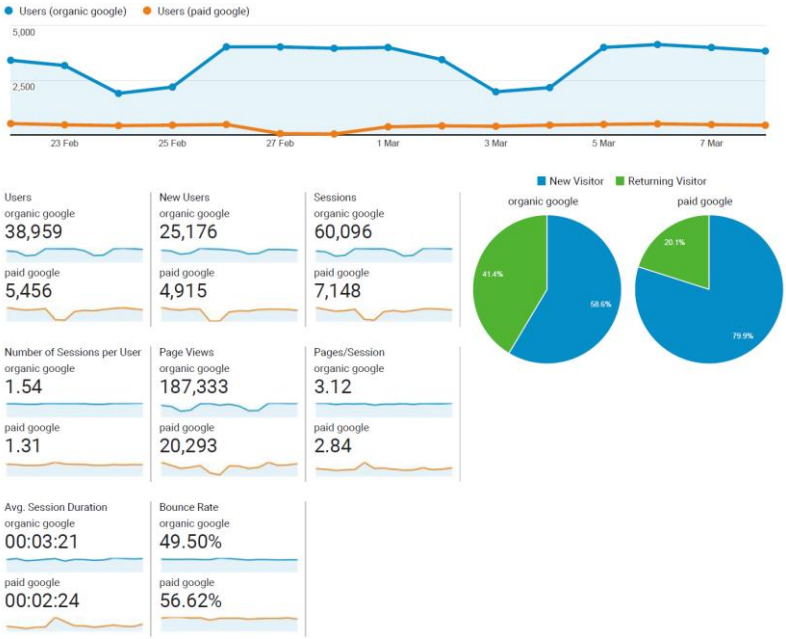

Figure 12. Overview of the audience report from 2 weeks

Approximately 51% of all the traffic to the website arrives through organic search, which indicates that the university's website is well presented in search results in general. Paid search is performed slightly at the university, resulting in approximately 7% of all the traffic. From 51% of organic traffic, 59% are new visitors, meaning that they are visiting the website for the first time and 41% returning visitors, meaning that they have visited the website previously. From 7% of paid traffic, 80% are new visitors and 20% returning visitors, indicating that visitors who come through search engine advertising might not be as inclined to return to the website as organic traffic visitors. When measuring engagement, the number of pages per session and bounce rate are important (pages per session should be as high as possible and bounce rate as low as possible). Pages per session represents how many pages the website visitor on average visits during one session, whereas bounce rate is the percentage of visitors who had no interaction with the website other than the page they landed on in the first place. In organic traffic, the pages per session is 1.54 compared to paid traffic's 1.31, suggesting that visitors through unpaid results are slightly more engaged to

the content and visit more pages per session compared to paid search visitors. Another viewpoint could be that website visitors from paid search visit less pages per session since they find the information they are looking for faster due to targeted keyword advertising. The second metric indicating engagement is average time per site, which collects the data of how long the visitor stayed on the website before exiting. For organic traffic the number is 3 minutes and 21 seconds compared to paid traffic's with 2 minutes and 21 seconds. Bounce rate for organic traffic is 49.50% compared to paid traffic's 56.62% suggesting similarly the engagement as pages per session metric.

Since the research is focusing on the specific area of the website, which focuses on news articles on different scientific themes, it is important to compare these numbers together and focus the research on them. The news section works as a landing page attracting audience from all the content topics and health content topic has also its own landing page, collecting all the health news and press releases.

Table 4. Comparison of all website data, news and health section data on audience

Page path level 2	Page Views	Unique Page Views	Avg. Time on Page	Bounce Rate	% Exit
organic google	187,291 % of Total: 62.66% (298,910)	141,910 % of Total: 61.10% (232,249)	00:01:35 Avg for View: 00:01:35 (0.15%)	49.50% Avg for View: 54.42% (-9.06%)	32.05% Avg for View: 35.75% (-10.35%)
paid google	20,274 % of Total: 6.78% (298,910)	15,259 % of Total: 6.57% (232,249)	00:01:18 Avg for View: 00:01:35 (-17.40%)	56.62% Avg for View: 54.42% (4.03%)	35.21% Avg for View: 35.75% (-1.49%)
6. /news/					
organic google	6,609 (3.53%)	5,713 (4.03%)	00:02:40	77.01%	61.08%
paid google	379 (1.87%)	257 (1.68%)	00:02:46	58.00%	29.82%
Page path level 3 /news/	Page Views	Unique Page Views	Avg. Time on Page	Bounce Rate	% Exit
organic google	6,603 % of Total: 2.21% (298,910)	5,708 % of Total: 2.46% (232,249)	00:02:40 Avg for View: 00:01:35 (68.32%)	77.01% Avg for View: 54.42% (41.50%)	61.08% Avg for View: 35.75% (70.88%)
paid google	377 % of Total: 0.13% (298,910)	254 % of Total: 0.11% (232,249)	00:02:46 Avg for View: 00:01:35 (75.00%)	58.00% Avg for View: 54.42% (6.57%)	29.82% Avg for View: 35.75% (-16.59%)
2. /health/					
organic google	992 (15.02%)	871 (15.26%)	00:03:06	84.17%	68.15%
paid google	111 (29.44%)	75 (29.53%)	00:02:08	50.00%	31.53%

The news section gathers the 6th highest amount of page views compared to other sections. Organic page views sum up to 3,53% whereas paid traffic generates less than 2% of page views, which can be explained with the current situation and the lack of CPC-campaigns. In page path level 3, which the health section of Table 4. represents, how much of the traffic does the health articles gather can be seen. Health gathers 15% of organic traffic and 30% of paid traffic at the time of measuring. Health is the second most popular content topic in the news section, which backs up the choice of it in the study. Average time on page raises with over a minute when analysing health section almost, which can indicate that the content provided is interesting and engaging.

Where things get interesting is when these results are compared to the site average, which tells how well this specific section is performing against the average of all pages in this website (Table 5.). The metrics chosen in this comparison are page views (how many page views in total the section gathers) and bounce rate (how big is the percentage of online users which leave the site without making any interaction). In Table 5., the results for both news and health sections are presented, stating that page views are better than site average, but bounce rate is worse compared to site average. The biggest differences to site average are in page views for organic (4 420%) and paid traffic (2 294%) in news, and for health in organic traffic 786% and 1 637% for paid traffic, which are both enormously bigger than site average. When looking at the bounce rates it can be stated that they are not as good as the site average numbers and the biggest difference is in the news-landing page with a 55% lower bounce rate. Health-lading page bounce rate is not that hugely different from the site average, which is relatively low. This implicates that these sections gather a lot of audience, but the site struggles with engaging the audience and encouraging them to place actions on the website.

Table 4. Comparison between site average of page views and bounce rate

	Page Views	Page Views (compared to site average)	Page Views	Bounce Rate (compared to site average)
organic google	187,291 % of Total: 62.66% (298,910)	187,291 % of Total: 62.66% (298,910)	187,291 % of Total: 62.66% (298,910)	49.50% Avg for View: 54.42% (-9.06%)
paid google	20,274 % of Total: 6.78% (298,910)	20,274 % of Total: 6.78% (298,910)	20,274 % of Total: 6.78% (298,910)	56.62% Avg for View: 54.42% (4.03%)
/news/				
organic google	**6,609**	4,420.31%	**6,609**	55.60%
paid google	**379**	2,294.69%	**379**	2.43%
	Page Views	Page Views (compared to site average)	Page Views	Bounce Rate (compared to site average)
organic google	6,603 % of Total: 2.21% (298,910)	6,603 % of Total: 2.21% (298,910)	6,603 % of Total: 2.21% (298,910)	77.01% Avg for View: 54.42% (41.50%)
paid google	377 % of Total: 0.13% (298,910)	377 % of Total: 0.13% (298,910)	377 % of Total: 0.13% (298,910)	58.00% Avg for View: 54.42% (6.57%)
/health/				
organic google	**992**	786.38%	**992**	9.30%
paid google	**111**	1,637.14%	**111**	-13.16%

Engagement has not yet been conceptualised in search engine marketing, which would have led to a metric for measurement. There are multiple measures available which represent the engagement of the website visitor such as websites bounce rate, pages per session, returning users and frequency of visits. These are behavioural metrics implicating whether the online user spends measurable time on the website in question. On the other hand, these metrics don’t consider any of the actions which might indicate the engagement of the online user,

which is why engagement is measured with a combination of the metrics already mentioned and a set of conversions, which are actions the website visitor is taking during the visit.

Search engine advertising campaigns have also been performed previously for scientific content, aiming at increasing awareness and visibility among target groups of the university (Appendix 1). It was stated that compared to other CPC-campaigns (Facebook) search engine advertising was relatively cheap and the click-through-rate (CTR) was noticeably bigger compared to social media channels, which confirms the base suggestion that search engine advertising is an efficient channel for target audience targeting and engaging. Since search engine advertising has been performed previously, the effect of it will be relatively easy to compare, even though the marketed content will be different, and the focus of this study is to map how to identify correct keywords and what is the role of text ad design in CTR and traffic quality (bounce rate, pages per session and average time per session). Click-through-rate also represents the metric of how well the keyword and text ad design matches, if the CTR% remains low, it can be stated that even though the ad has been visible on the chosen keywords, the ad has not been engaging enough or relevant to the keyword to generate a click.

5.2 Methodology and research methods

The empirical research done in this thesis can be divided into three different segments, which each focus on different aspects of the main research question. The first aspect is search engine optimisation and its effect on visibility in search engines, which will be measured through ranking analysis on chosen specific keywords. The second aspect is search engine advertising and its capability to raise awareness on chosen topics, which will be measured through gained impressions, clicks and CTR%. The third aspect is how search engine marketing connected to content marketing can build engagement among the target audience, and it will be measured with different website traffic analysis metrics. These three aspects will be measured from data which has been collected via Google Analytics.

5.2.1 Search engine optimisation

To answer the first research question, how to increase visibility and in other words the ranking of the website in search engine results, the ranking of the chosen article on chosen

keywords will be measured before search engine optimisation actions and afterwards. Search engine optimisation includes two different techniques, which are implemented simultaneously to the chosen websites because search engine optimisation techniques should be done as a complete set instead of separate actions. These actions include keyword implementation to the content and meta description design, which have been chosen based on the literature and the current situation of the case organisation. The website itself had been optimised for search engines previously, and the content used has been published already. Keyword optimisation is a process, which should be kept in mind with all content publishing, and it is the most crucial part of search engine optimisation tactics, apart from technical changes on the website, which affects the search engine rankings and traffic.

Search engine optimisation will be done through keyword implementation into the websites content, titles, domain and images. Keyword research to choose the most relevant keywords will be done by studying the article content to identify the main concepts (visible in the existing title, introduction and sub-titles), and from each main concept will several general and specific longtail keywords be chosen. By choosing specific keywords (avoiding general and abstract keywords such as *cancer*) in relation to the content, it was ensured that the chosen keywords would represent keywords used by the target audience. These suggestions will be discussed with the case organisation to ensure that the choices represent the keywords they want to rank high with and that the identification was done correctly. After identification of the most relevant keywords, they will be implemented into the articles, and alongside that will the meta description be designed based on the chosen keywords (See Appendices 2 and 3). The domains of both articles are edited to be shorter and simpler (currently they included the title of the article) and to contain relative keywords. It is assumed that since the meta description will give a more holistic image of the content of the page, the ranking will raise, traffic will grow and in addition to that engagement will increase. After implementation will the effect on ranking be measured and in addition will the effect on traffic from organic search to the website be measured. In Table 6., the actions are illustrated with information about the chosen articles.

Table 5. Search engine optimisation actions for chosen articles

SEO	ACTIONS	ARTICLE 1 **Personalised leukaemia treatment and faster adoption of new drugs: four studies leading towards more effective cancer treatment**	ARTICLE 2 **Oral health may have an important role in cancer prevention.**
KEYWORD IMPLEMENTATION	keywords	Personalised leukaemia treatment Adoption of new drugs Effective cancer treatment Genetics of cancer Genetic mutations in cancer tumours Genetic variations increasing risk of cancer Fifth letter cancer susceptibility Personalised drug treatment Effective cancer treatment studies Genetic changes in cancerous tumours Mutations in cancerous tissue	Cancer prevention Oral health in cancer prevention Onset of pancreatic cancer Periodontitis role in cancer Link of periodontitis and cancer mortality Periodontitis' role in oral cancer Oral cancer prevention Treponema denticola effect on cancer Td-CTLP proteinase in pancreatic cancer
	The article should have a clear main headline (title tag 1) and sub headlines (title tag 2). The headline should include the main keyword for the article and the sub headlines should include the secondary keywords	**headline:** *Personalised leukaemia treatment and faster adoption of new drugs: four breakthroughs leading to more effective cancer treatment.* **sub headlines:** *DNA's fifth letter reveals information about cancer susceptibility* *Blood cancers as a key to personalised leukaemia treatments* *Personalised cancer drug treatment on the horizon* *Clinical testing of cancer drugs to be adopted faster*	**headline:** *Oral health may have an important role in cancer prevention* **sub headlines:** *Treponema Denticola might have an effect on onset of cancer.* *Virulence factors such as Td-CTLP proteinase can spread from mouth*
	The images should be named with the chosen keywords, which ensures visibility in the image search. In addition, should the image description include the main keywords.	Name of the photo: genetics-of-cancer-enables-personalised-cancer-treatment.jpg Photo title when mouseover: DNA-analysis enables personalised cancer treatment Photo caption: By understanding the genetics of cancer are personalised and more effective cancer treatments possible.	Name of the photo: oral-health-important-for-cancer-prevention.jpg Photo title when mouseover: oral health plays an important role in cancer prevention Photo caption: Good oral health might prevent oral cancers as well as pancreatic cancer.
	In the first chapter of the article, should the keywords appear naturally in the content.	Our understanding of the genetics of cancer is constantly increasing. At the same time, we are accumulating more information of the genetic variations which increase cancer susceptibility, allowing the development of more effective cancer treatments. These four breakthrough studies about fifth letter in cancer susceptibility, adoption of new cancer drugs, personalised cancer treatment and blood cancers were achieved by the University of Helsinki's cancer researchers during the past year.	The bacteria that causes periodontitis seems to have a role in the onset of oral cancers and other cancers such as pancreatic cancer. Oral health and early diagnosis of periodontitis plays a role in cancer prevention.
	The article URL should contain the main keyword and be short and simple.	www.helsinki.fi/en/news/health/personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-leading-to-effective-cancer-treatment	www.helsinki.fi/en/news/health/Oral-health-and-periodontitis-role-in-cancer-prevention
META TEXT	Articles should have their own metatext visible in SERP. Meta text should be short, comprehensive and include the main keywords.	Understanding of the genetics of cancer and its variations increasing cancer susceptibility is growing, leading to development of more effective cancer treatments. 4 studies about fifth letter in cancer susceptibility, adoption of new drugs, personalised cancer treatment and blood cancers were achieved by the University of Helsinki's cancer researchers	The bacteria that causes periodontitis seems to have a role in the onset of oral cancers and other cancers such as pancreatic cancer. Oral health and early diagnosis of periodontitis might play a role in oral and also other types of cancer prevention.

5.2.2 Search engine advertising

Search engine advertising and its effect on increasing awareness on desired topics will be measured through keyword campaigns using Google AdWords. This phase of the research will be performed after the search engine optimisation actions on the same articles. Correct keyword implementation will boost the quality score of the website, which is why the same articles are used also in this phase. This also allows the comparison between the increase in traffic and changes in engagement between SEO and SEA actions due to the same content.

The most relevant keywords for the ad campaign will be recognized utilizing Google AdWords Keyword Planning Tool, which indicates the search volumes for the keywords during the chosen time period. The chosen keywords in the SEO phase will be tested and based on the search volumes and suggestions given by the keyword tool, main keywords will be chosen (3-5) in addition to related keywords (10). One text ad will be designed to go with the related keywords and in addition to this, will each of the most relevant keywords be designed a unique text ad to go with. This is done to ensure that when the main keywords are searched, an ad with the most relevant information will be presented. From the campaign information various metrics such as click-through-rate, bounce rate, traffic, impressions and traffic quality will be measured.

5.2.3 Engagement

The hypothesis is that with unique and helpful content, which is already provided by the case organisation, and search engine marketing, the engagement will increase as well as the ranking and the traffic to the website. The literature suggests that content should include thoughtful keyword usage, correct titles and headings, which will be edited already in the search engine optimisation phase. Through unique content and keyword actions the ranking in SERP should increase as well as the ability to reach the target audience, leading to an increase in traffic and engagement. The base assumption is that the target audience will be engaged with the content provided when it meets their expectations and is helpful to them.

Measuring engagement will be done with a combination of different metrics amongst all the above data collections. Measuring engagement is not yet done in academic literature in a search engine setting, and a model for engagement measuring will need to be designed for this purpose. There are some engagement measures used among practitioners, and these will be used as a starting point for the building of engagement measures. One possible set of metrics available on Google Analytics is the combination of time on site, bounce rate and page visits, but it can be argued that these might also tell the story of different behaviour than engagement. For example, long stay on site can imply that the user is not able to find what they are looking for and hence staying long on the website. One fitting metric for engagement is pages per session, measuring how many pages unique user visits per session, which can translate into engaged online visitor. In addition, can conversion measures such as clicking the link from SERP and signing up for a newsletter act as metrics for engagement.

Table 6. Illustration of research tactics, working hypothesis and measurement methods

FOCUS	TACTIC	HYPOTHESIS	MEASUREMENT
SEARCH ENGINE OPTIMIZATION	VISIBILITY		
	Performing keywords research to find the most relevant and implementation of them into the website's titles, content, images and domain. Modification of meta descriptions and meta tags of chosen websites including the chosen keywords.	This will lead to increase in ranking in SERP due to correct use of keywords, which match the search made and addition of meta description, which is valued by search engine algorithm. It will also lead into increased traffic and engagement due to better matching the search terms and the online searchers anticipation of content.	Studying the effect of these actions in the rank in SERP with ranking analysis. Noting the rank before actions and after. Using Google Analytics to measure if the actions lead to increase in traffic from organic search on the chosen keywords to the modified websites.
SEARCH ENGINE ADVERTISING	AWARENESS		
	Creation of an ad campaign based on chosen content theme/keywords via Google AdWords	This will lead to increased awareness and traffic to the website through good position of ad in SERP. Through targeted keyword marketing, it is possible to reach targeted audience based on keyword selection/topic, which will increase also engagement.	Measuring text ad performance through Google AdWords, combining click thorough rates and the engagement of website visitors.
CONTENT ENGAGEMENT	ENGAGEMENT		
	By providing content that matches the keywords searched and that is visible in SERP, will the audience be engaged to the content and content provider. Websites modified in SEO actions will be used to measure engagement and conversions.	When online searcher is presented with search results that match their search they will be more engaged with the content and the website, leading to longer dwell times, more pages per session and lower bounce rates.	The engagement will be measured through several components provided by Google Analytics, including dwell time, bounce rate, pages per session and conversions.

5.3 Data collection and analysis methods

Data was collected in two sessions, prior to the implementation of search engine optimisation and advertising techniques, and after. The chosen implementations were made in two phases, first search engine optimisation followed by search engine advertising, and the engagement was measured in both settings. The research consisted of two sets of actions for both search engine optimisation and search engine advertising. In the first phase for SEO, the specific articles to be marketed was chosen. Based on the chosen articles, relevant keywords were identified and implemented into the website to increase visibility in Google search results. Focusing on the same specific articles, a Google AdWords campaign was designed for the articles to gain awareness among the target audience. In the second phase for SEO, the ranking change was recorded, as well as the increase in traffic. For SEA, the results from the AdWords campaign included traffic increase analysis as well as increase on awareness. In addition to both SEO and SEA, engagement measures were analysed prior and post implementations.

5.3.1 Ranking on keywords in Google results page

The case organisation's website is full of unique and meaningful content, from which two articles were chosen. These articles are written by professionals in their own scientific area, which explains the lack of search engine optimisation and content marketing focus. From these articles, main keywords were identified and added into the website as described in Table 6. These keywords appeared naturally in the content, but their location in titles and subtitles as well as metatext and image description was modified. Based on the identified keywords, the query phrases were created and tested (Table 8. and 9. where the most relevant keywords in bolded text). The testing was performed in Google.com via an incognito-window to ensure that the results were not compromised due to location or personal search history.

Table 7. Illustration of ranking changes of Article 1 prior and post keyword implementation

Personalised leukaemia treatment and faster adoption of new drugs: four studies leading towards more effective cancer treatment			
keyword / phrase used	ranking prior	ranking after 1 week	ranking 2 weeks after
Personalised leukaemia treatment	3rd	1st	1st
Fifth letter cancer susceptibility	1st	1st	1st
Fifth letter susceptibility	4th	5th	4th
Personalised drug treatment	4th	3rd	6th
Adoption of new drugs	16th	10th	19th
Adoption of new cancer drugs	6th	1st	4th
Effective cancer treatment studies	24th	15th	19th
Effective cancer treatment	-	33rd	46th
Effective personalised cancer treatment	9th	4th	7th
Genetics of cancer	-	-	-
Genetic changes in cancerous tumours	-	-	-
Genetic mutations in cancer tumours research	-	-	-
Mutations in cancerous tissue	-	-	-

The query phrases, on which ranking was tested, were chosen based on the assumption of what would a scientist who is familiar with the subject use as keywords. The aim was also to choose phrases with varying ranking positions to see how these would evolve and if the implementations would for example be able to raise the website into the first 4 pages when it didn't rank that high prior to testing. Keywords chosen were very specific and most of them belonged to the longtail, because the focus of the case organisation is to gain awareness amongst the scientific population abroad. The keyword ranking research was performed manually after the most important keywords were identified from both articles. The ranking

was studied amongst the 4 first pages of results, because it is very unlikely that anyone would go through more than the two first pages. The keywords, which were implemented into the chosen articles, and which ranking was tested, were connected and in relation with each other's (Appendices 2 and 3). It was measured additionally, how much the traffic to the articles increased through search engine optimisation actions via Google Analytics.

Table 8. Illustration of ranking changes of Article 2 prior and post keyword implementation

Oral health may have an important role in cancer prevention			
keyword / phrase used	ranking prior	ranking 1 week after	ranking 2 weeks after
oral health in cancer prevention	1st	1st Finnish article	1st
oral cancer prevention	29th	19th Finnish article	-
pancreatic cancer prevention	24th	19th Finnish article	34th
oral cancer	-	-	-
periodontitis role in oral cancer	14th	3rd Finnish article	-
treponema denticola effect on cancer	2nd	2nd	4th
Td-CTLP proteinase	4th	4th Finnish article	4th Finnish article
Td-CTLP proteinase in pancreatic cancer	1st	1st Finnish article	1st
periodontitis role in pancreatic cancer	3rd	1st Finnish article	-
link between periodontitis and cancer mortality	4th	5th	2nd
periodontitis cancer mortality	5th	5th Finnish article	-

5.3.2 Google AdWords campaign

After one week of the test period for search engine optimisation, search engine advertising campaign was used the same articles. The campaign ran from 16.3 to 21.3, and total cost of the campaign was 108€. During and after the search engine advertising period, optimisation influence can also be measured through Google Analytics, since it is possible to separate these two metrics in the data. Keywords chosen to be included in this AdWords campaign were chosen based on the articles, keeping the target group in mind, but also taking into consideration the volume of searches made according to Google keyword planner. Multiple of the more specific longtail keywords related to the articles collected next to zero searches, meaning that bidding on these keywords would not generate the aimed audience. Therefore, specific but more competitive keywords were chosen for the campaign, to ensure the visibility of the text ads during the test period. Another important aspect in keyword selection was not to bid on keywords which were related to the content but would not offer the information the searcher would assume. Since the content of the articles was research

focused, popular keywords such as *cancer cure* was edited to *cancer cure research* to avoid misleading the online searchers. The keywords chosen for each article can be found in Tables 10. and 11.

Table 9. Keyword choices and ad designs for Article 1

Personalised leukaemia treatment and faster adoption of new drugs // keywords	Text ad for keywords.	Type of text ad
Genetics of cancer	**Genetics of cancer – Cancer genetics research** Understanding the genetics of cancer leads to development of effective treatments	**relevant (keyword included)** **specific information** **specific keyword**
Personalized cancer treatment	**Personalised cancer care study – Helsinki University research** Four studies by Helsinki University of effective personalised cancer treatment	**relevant (keyword included)** **specific keyword** **brand related**
Leukaemia	**Leukaemia treatment - Blood cancer research** Leukaemia provides a model for studying effective, personalised cancer treatment	**relevant (keyword included)** **specific information** **specific keyword**
Blood cancer	**Blood cancers – Personalised cancer care study** Blood cancers enable the studying of effective, personalised cancer treatments	**relevant (keyword included)** **specific information** **specific keyword**
DNA base pairs	**DNA fifth letter – Cancer susceptibility** The DNA's "fifth letter" reveals information about cancer susceptibility	**relevant (keyword included)** **specific information** **specific keyword**
Effective cancer treatment research	**Personalized cancer care study – Leads to effective cancer care** Four recent breakthroughs by University of Helsinki's cancer research team	**general text information for generic keywords** **brand related** **informative** **creates interest**
Cure for cancer research		
Cancer treatment study		
Cancerous tissue		
Cancer genetics research		
Leukaemia treatment research		
Cancer cure research		
Cancer research		
Genetic mutations		
Human genome		

The text ads were designed according to the suggestions from the literature in chapter 3.5, with some adjustments due to the specific target audience. Current literature in this area focuses on commercial adverts, which is not the case in this research. Therefore, it was decided to exclude the commercially shaped ad designs from the tested text ads, such as price (price information was also not available) and call to action (CTA). It was assumed to be more effective to insert a second related keyword on the second line instead of CTA to increase interest, make a convincing offer and through that keep the text ads as informative and scientific as possible. Based on the search volumes and specific keywords, 15-16 keywords altogether were chosen for both articles, from which 5 main keywords were separated. As suggested by the literature, an abstract text ad was created for the generic keywords and for the main keywords (5) a specific text ad with specific information in relation to the keyword was designed (Table 10. and 11. for text ads).

Due to the nature of the target audience and the content of the advertised articles, the tone of the text ads remained very informative, related to the content and keywords and lacking marketing actions, which might work in commercial settings. The target audience is demanding of the quality of the content as well as looking for scientific information, which gives the text ads a different angle compared to commercial text ads. It is assumed that the target audience is relatively highly-involved using specific keywords and spending longer time looking at the text ads and the content. That is why the text ads were created focusing on relative and specific information as well as kept informative and unique. The awareness of the web searcher is aimed to be gained through a high position in the sponsored search results, and to generate interest the specific keyword used in the search query was included also in the title and content of the text ad. This ensures that the text ad feels relevant compared to what the searcher searched for. Google, in addition, bolds the keyword searched in their results, which will further increase the possibility of creating interest towards the content.

Table 10. Keyword choices and ad design for Article 2

Oral health may have an important role in cancer prevention // Keywords	Text ad for keywords	Type of text ad
Pancreatic cancer	**Pancreatic cancer – Oral health as prevention** Oral health may have an important role in cancer prevention	**relevant (keyword included)** **specific information** **specific keyword**
Oral health	**Oral health preventing cancer – Periodontitis effecting cancer** Oral health and early diagnosis of periodontitis plays role in cancer prevention	**relevant (keyword included)** **specific information** **specific keyword**
Periodontitis	**Periodontitis behind cancer – Oral health as prevention** Bacteria causing periodontitis seems to connect to onset of pancreatic cancer	**relevant (keyword included)** **specific information** **specific keyword**
Oral cancer	**Oral health factoring cancer – Oral cancer and Periodontitis** Bacteria in periodontitis has role in the development of oral and other cancers	**relevant (keyword included)** **specific information** **specific keyword**
Cancer prevention	**Cancer prevention research – The importance of oral health** Oral health may have a big role in prevention of oral and other cancers	**relevant (keyword included)** **specific information** **specific keyword**
Gastro intestinal	The importance of oral health – Research on cancer prevention Helsinki University's research found a connection between oral health and cancer	**general text information for generic keywords** **brand related** **informative** **creates interest**
Pancreatic enzymes		
Healthy gums		
Onset of pancreatic cancer		
Mouth cancer		
Virulence factors		
International journal of cancer		
Cancer treatment		
Oral cancer prevention		
Treponema denticola		

To gain click-through, the text ad should create a desire and need to know more-feeling about the content behind the link, which can be created with an interesting headline and unique, informative and descriptive content. The text ads for the 5 chosen specific keywords were designed to include two highly specific and relevant keywords in the headline and with content related to the keyword, whereas the text ad with generic information for the more generic keywords includes brand related information and aims to create interest towards the topic. Since it was chosen not to include any call to action to these text ads, the main goal is to make a convincing offer with the content (Tables 10. and 11.).

The AdWords campaign was targeted at native English-speaking locations (USA, Canada, UK, Australia, New-Zealand), Belgium (due to EU-hub), Russia and China (due to the case organisations interest in these locations and large estimated search volume), and the search language was set to English only. The language of the scientific community and scientific research is English and therefore the location of the web searcher does not play as major role as it would in other cases. It will be considered, when analysing the results that in Russia and China there are other major search engines used, which will affect the visibility from these countries. The campaign will run for 6 days and each of the articles have their own campaign. The bid amount was chosen to be in total 10€ per day, which will be the maximum amount spent per day, and it will ensure through Google AdWords the highest possible impressions.

5.3.3 Engagement measurements

The online engagement has not been fully established in academic literature in connection to SEM and content marketing, and therefore previous engagement measures were not found during the research. Engagement measures are highly common in practitioner literature. In addition, Google Analytics states certain measures as engagement measures as well as the case organisation has been measuring engagement of their audience through certain metrics, which guides the engagement measuring in this thesis. Thus, the measuring of engagement to the website and its content has been developed based on previous knowledge and metrics provided by Google Analytics. As has been previously stated, metrics such as bounce rate, returning visitors, time on site and pages per session will be used to determine the engagement of the audience.

Bounce rate is the most common metric when measuring engagement, since it tells how big the percentage of users who leave the website without making any connection is. The higher the bounce rate, the higher is the number of people visiting the website and deciding not to engage with its content. For content sites, the average bounce rate is between 40% and 60% according to Kissmetrics (2018). The second common engagement metric is the time that the users spend on site. Time on site gives straight feedback on how engaging content is, or if it is something the online user is interested to consume. For Article 1, the estimated reading time is 6 minutes and for Article 2, the estimate is 2 minutes 20 seconds. If time on page metric indicates for each article a noticeably shorter time on page than average reading time, it can be assumed that the visitor is not engaged to the content. The third engagement measure is pages per session, which calculates how many pages user visits on average per visit. The goal of engaging content is that it generates interest in the online user, leading them to browse further from the entry site. The result of engaging content in the end is that the new visitors should transfer into returning visitors, suggesting that the site has succeeded in providing engaging and interesting content. In addition to this, there will be certain conversions inside the articles, which can be seen as engagement, such as watching the included video, sharing the text or clicking the link to researcher's TUHAT-profile for more information.

Engagement will be measured after keyword implementation, and then compared to the reference period to calculate if the keyword implementation and its leading to higher ranking in SERP will lead to more engaged website visitors. Secondly, engagement will be measured from the Google AdWords campaign to determine if sponsored results will gain engaged visitors or if the traffic only will increase. The assumption is that the target audience, due to their relation to the topic, would be engaged to the content they would enter through Google.

5.4 Metrics used to measure visibility, awareness and engagement

During the previous chapters there has been multiple mentions of different metrics, which will be used to analyse the change, and in this chapter, they will be collected into a comprehensive list (Table 12). Visibility is a straightforward concept to measure in this research because increase in visibility is stated as increase in the SERP ranking. Increase in visibility is assumed to affect page views, which will be measured as stated in Table 12.

Table 11. List of metrics

	metric	what it measures	relation to concept measured
VISIBILITY	change in raking	effect of keyword implementation on ranking algorithms	increase in ranking leads to increased visibility since the higher the ranking the higher the time the link is viewed
	change in page views	effect of change in ranking in page views	increase in ranking leads to increase in page views since the higher the ranking the higher the number of clicks
	change in entrances	effect on change in ranking in entrances to the website through this link	increase in ranking leads to increase in entrances to the website through the link
	landing page	percentage of page views in which the content acted as a landing page	measuring the effect of increased visibility in landing page versus page views percentage
AWARENESS	impressions	times the text ad was visible in paid results upon a search query	the higher the impressions the higher the possibility to generate clicks
	clicks	times the text ad was clicked by an online user after a search query	the higher the clicks the higher the awareness of the topic
	click-through rate	the relation between impressions and click indicating the ads performance in generating traffic	indicates the effectivity of the text ad, the higher the CTR% the better performing the text ad is
	avg. CPC	average cost of one click, calculated from bid price and number of clicks	the cost of generating awareness
	change in page views	effect of text ad campaign in page views	effect of increased visibility in paid search on page views
ENGAGEMENT	bounce rate	number of visitors with no action during visit	the ability of the content to generate action while visit
	pages/session	number of pages on average visited during session	engaged visitors visits more than one page per session
	avg. time on page	average length of page visit	engaged visitor spends on average half of the reading time of the content on the site
	new vs. returning visitor	comparison of one time or returning visitor	returning visitor is engaged to the content provided
	engagement conversions	chosen actions performed during visit	indicating whether the visitor is engaged to the content
	second page	next page the visitor continued their user flow to	continuing to a second page indicates engagement to the content and website

Awareness is a bit more complex concept to measure, but in this research increase in awareness is measured as increase in clicks to the website and change in page views. The concept of awareness illustrates the visitor's knowledge of the case organisation, which is increased/created through a visit to the website. As the clicks to the website increase, the awareness of the case organisation increases among the target group. Supporting measures are the impressions of the text ads and CTR%, which implicate the effectivity of the text ad campaigns and average CPC giving insight to the financial performance of visitor acquisition. Engagement, as stated before, has not been measured in this setting previously. Therefore, multiple metrics were chosen to illustrate the engagement of the visitor to create a holistic picture of which actions indicate engagement. The chosen main indicators of engagement in this study are continued user flow to second page (measured through bounce rate, pages/session and second page), number of returning visitors and how long the visitor spends on the site. It is assumed that engaged visitor continues their user flow, returns to the website in the future and spends on average relatively long time focusing on the content provided.

6 FINDINGS

The goal of this study was to identify if search engine optimisation and advertising actions were fit to increase visibility and awareness of the chosen content in Google, and if in combination with content marketing it would engage the visitors. The theoretical concepts to assess the research goal were search engine optimisation, search engine advertising, content marketing, online engagement, online visibility and awareness. The aim of the study from the viewpoint of the case organisation was to identify the successful actions and steps in search engine marketing with content marketing to enable them to continue with these actions to increase the visitors and engagement on their website amongst the target audience. This chapter will present the main results from this experiment, divided into sections based on the research questions.

The data was collected from Google search result pages, via Google Analytics and through Google AdWords. The testing period was during March 2018, and the dates varied for the different techniques. The data was tested against a reference period from 22nd of February to 8th of March. For search engine optimisation, the test period lasted from 9.3 to 23.3, and for search engine advertising the Google AdWords campaign ran from 16.3 to 21.3. At the end of the testing period, engagement measures were collected and compared to the reference period.

6.1 Search Engine Optimisation results

The empiric part concerning search engine optimisation was performed during March 2018, from 9.3 to 23.3. It started with keyword implementation on the 9th and continued with keyword ranking analysis in Google results page the following weeks, on the 16th and the 23rd, which were compared to week 0. In addition, the influence on traffic was collected from the testing period and compared to previous period. The first working hypothesis suggests that content related keywords implemented correctly to the website in combination with meta description design, will raise the ranking when a search is made using those keywords. Based on the literature suggestions, implementation of keywords to websites title, content, domain, image texts and modifying the meta description visible in search results was done for two specific articles. To perform testing how these changes affected the ranking of the articles with different search queries, multiple Google searches were made prior and after

the implementation. To test the impact on traffic and website visitors, data from Google Analytics was analysed.

6.1.1 Ranking changes after keyword implementation

Each of the articles had their own set of keywords which were tested in Google (Tables 8. and 9.). For Article 1, keyword implementation provided expected results, where ranking raised for most of the keywords or remained the same after week 1 (Figure 13.). For the key phrase *adoption of new cancer drugs*, the rank raised from slot 6 to 1, and for the *effective cancer treatment* keyword, implementation was able to raise the article to slot 33 compared to not being visible prior. On average, the keyword implementation was able to raise the rank with 4,66 slots. For keywords such as *personalised leukaemia treatment*, *fifth letter cancer susceptibility*, *fifth letter susceptibility*, *adoption of new drugs*, *adoption of new cancer drugs* and *effective personalised cancer treatment*, the article gained position on the first result page. Other keywords gained rank either on the second page (*effective cancer treatment studies*), or third page *(effective cancer treatment*), or didn't rise in the first 4 result pages due to the competitiveness of the keywords and the limited possibility to add the keywords to the title and beginning of the text.

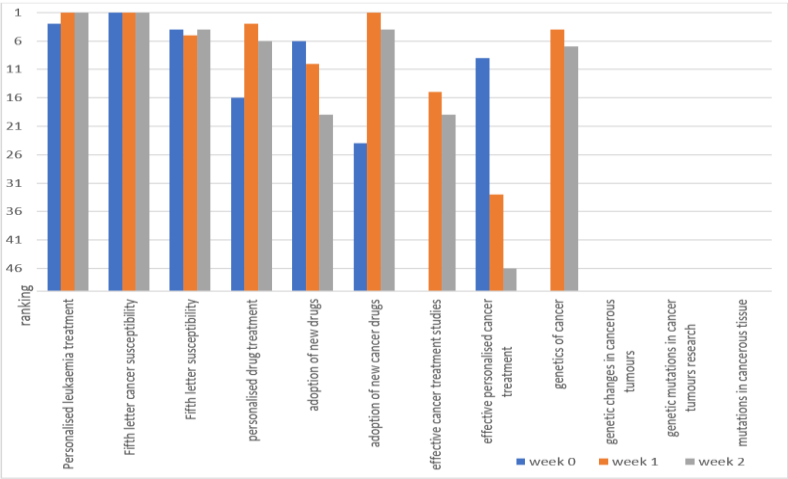

Figure 13. Illustration of ranking changes after keyword implementations on Article 1

After 2 weeks, the key phrases were tested again to see if they would hold their position against time, new published articles or search engine optimisation actions done by other publishers. Some of the keywords, such as *Personalised leukaemia treatment* and *Fifth letter cancer susceptibility*, held their position as top of the ranking (which was the case prior to

keyword implementation as well), but for the rest of the key phrases a slight drop in ranking was visible. Only the *Fifth letter susceptibility* key phrase managed to raise its position compared to the week before. The other rankings remained on the previous search result page, even though ranking shifted down 3-5 slots (Figure 13.).

For Article 2, keyword implementation didn't perform according to the working hypothesis, and the results from this article cannot be included without consideration into this experiment. Due to a bug on the case organisations website, the image description was also copied automatically to the Finnish language version of the chosen article as it was added into the English version, which lead to a significant raise in ranking for the Finnish version even though the search was made in English and the rest of the content in that article was in Finnish (Figure 14.). Although this result was not expected, it does show that with correct keyword implementation, the ranking can be raised on desired keywords even though the content is not optimised, or the language of the content does not match.

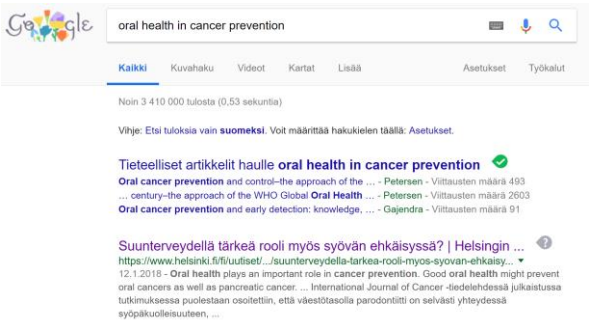

Figure 14. Finnish version of Article 2 at 1st position for chosen key phrase

In addition, and more regretfully, after 1 week of keyword implementation, the English article disappeared from the search engine results (first 4 pages) on all but two of the chosen keywords, which both represented longtail keywords (*treponema denticola effect on cancer* and *link between periodontitis and cancer mortality*) (Figure 15.). This might be because Google had not recrawled the website after the changes, which on the other hand would be unlikely since the new version of the article was visible on the two longtail key phrases. Google still has the website listed in their search index, which was tested by performing a Google search indicating if the website is still in the index "site: https://www.helsinki.fi/en/news/health/oral-health-and-periodontitis-role-in-cancer-prevention" (Sharma 2016). Another explanation could be that the article was implemented with too many longtail keywords, which is something Google seems to penalize content for,

as it indicates that the content is solely for search engines and not for users (Parsons 2014). A third possible explanation might be that the redirecting links on the website from the old URL to the new URL was not working properly, making it seem that this is duplicated content, which again is penalized by Google (Parsons 2014; Sharma 2016). The Finnish version of the article ranks high on the chosen keywords, and compared to the original version, the Finnish version ranks higher than prior to keyword changes. Even though these results are not valid or reliable, this gives a hint of how well White Hat optimisation techniques work. On average, the ranking raised 7 slots for the Finnish article or remained the same compared to the previous ranking of the English version.

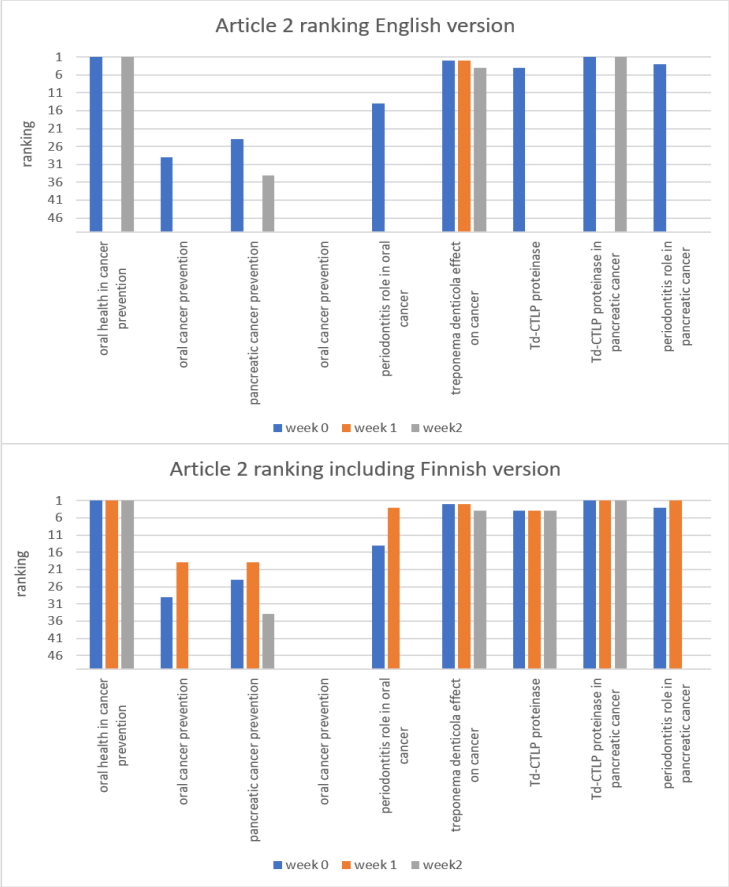

Figure 15. Ranking changes after keyword implementations on Article 2 comparing to Finnish article version

The situation changed after 2 weeks from the keyword implementation (Figure 15.). For most tested key phrases, the Finnish version disappeared from the rankings, and the English version ranked within the first 4 pages. The only remaining key phrase ranking the Finnish version was *Td-CTLP proteinase*, and its rank remained the same. For the key phrases *oral*

health in cancer prevention, pancreatic cancer prevention, treponema denticola effect on cancer, Td-CTLP proteinase in pancreatic cancer and *link between periodontitis and cancer mortality*, the English version ranked again in the first 4 pages, but the previous ranking for the key phrases *oral cancer prevention, periodontitis role in oral cancer* and *periodontitis role in pancreatic cancer* was lost. This might still change as time passes, since the ranking has been returned for most of the keywords after 2 weeks.

6.1.2 Effect of increased visibility on traffic

When comparing the reference period's (22nd February to 8th March) organic traffic from Google, to the testing period's (9th March to 23rd March) organic traffic, it can be stated that during this time period metrics of users (+7.58%), new users (+6.48%), sessions (+9.34%), number of sessions per user (+1.64%), page views (+9.93%) and pages/session (+0.54%) have increased and bounce rate decreased (-0.88%). The only metric that changed negatively was average session duration (-3.50%) (Figure 16.). Based on these numbers, during the test period, visits to the whole website as well as number of users increased from organic results in Google, which suggest that increased visibility in search results might have an impact on overall traffic.

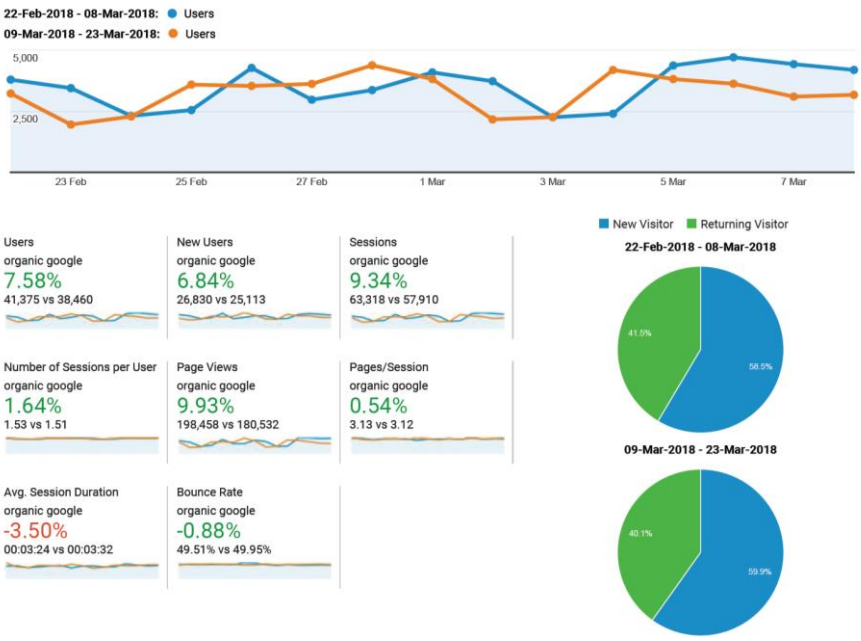

Figure 16. Audience report of organic traffic comparing reference period and testing period

Page views of the Article 1. increased during the test period with 200% (from 9 views to 27 views in two weeks' time), and unique page views with 150%. An interesting number when

focusing on the effect of increased visibility in search engine results to traffic is the entrances to the website. Entrances indicate how many views from total views were gathered when the user clicked to this article from organic search results, and for Article 1 they increased with 100% (from 3 to 6 views) (Table 13.). Page views for Article 2 increased with 350% (from 4 to 18 in two weeks' time) as well as the unique page views with 275%. The number of entrances increased with 233% (from 3 to 10), indicating that the visibility of the website in organic results lead to increased visits to the website.

Table 12. Article 1 and 2 audience metrics from testing period and reference period

Page	Page Views	Unique Page Views	Entrances
organic google	27 (% of Total: 0.01% (305,899))	20 (% of Total: 0.01% (238,910))	6 (% of Total: 0.01% (109,317))
1. /en/news/health/personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-leading-to-effective-cancer-treatment	23 (85.19%)	18 (90.00%)	5 (83.33%)
2. /en/news/health/personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-four-studies-leading-towards-more-effective-cancer-treatment	4 (14.81%)	2 (10.00%)	1 (16.67%)

Page	Page Views	Unique Page Views	Entrances
organic google	18 (% of Total: 0.01% (305,899))	15 (% of Total: 0.01% (238,910))	10 (% of Total: 0.01% (109,317))
1. /en/news/health/oral-health-and-periodontitis-role-in-cancer-prevention	15 (83.33%)	14 (93.33%)	9 (90.00%)
2. /en/news/health/oral-health-may-have-an-important-role-in-cancer-prevention	3 (16.67%)	1 (6.67%)	1 (10.00%)

Page	Page Views	Unique Page Views	Entrances
organic google	9 (% of Total: 0.00% (298,910))	8 (% of Total: 0.00% (232,249))	3 (% of Total: 0.00% (106,851))
1. /en/news/health/personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-four-studies-leading-towards-more-effective-cancer-treatment	9(100.00%)	8(100.00%)	3(100.00%)

Page	Page Views	Unique Page Views	Entrances
organic google	4 (% of Total: 0.00% (298,910))	4 (% of Total: 0.00% (232,249))	3 (% of Total: 0.00% (106,851))
1. /en/news/health/oral-health-may-have-an-important-role-in-cancer-prevention	4(100.00%)	4(100.00%)	3(100.00%)

Both articles gather more page views than site average (Table 14.), Article 1 with 349% more and Article 2 with 124% and when compared to the reference period, the percentage has risen for both articles (Appendix 10). Prior to keyword implementation, page views for Article 1 were 157% higher than site average, and for Article 2 they were 15% higher, which indicates that after keyword implementation the page views of chosen articles raise significantly when comparing to site averages. This suggests that the visibility in search engines lead to increased traffic to the website in comparison with site average.

Table 13. Page views of Articles 1 and 2 compared to site average

	Page path level 4	Page Views	Page Views (compared to site average)
	organic google	17.57% 1,265 vs 1,076	17.57% 1,265 vs 1,076
5.	/personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-leading-to-effective-cancer-treatment		
	09-Mar-2018 - 23-Mar-2018	28	349.33%
17.	/oral-health-and-periodontitis-role-in-cancer-prevention		
	09-Mar-2018 - 23-Mar-2018	14	124.66%

In addition to the above metrics, the landing page gives the information if page views were gained through links on different locations on the website or if the website acted as the first touch. The landing page reveals if the gained traffic from organic search came through the links for the researched articles or through other links at the website, hence did the visibility in organic search affect the increase in traffic. From all the views of Article 1, 33% are page

views where the article worked as a landing page. For Article 2, in comparison, the landing page percentage was 72% (Appendices 11. and 12.). During the reference period for Article 1, 33% of all the views were landing page views, which is similar as during testing period indicating no change resulted by keyword implication. For Article 2, landing page% prior to keyword implementation was 75% indicating a slight decrease during the testing period. This indicates that visibility in search engines organic results worked well for Article 2, but even though most of the page views was generated as landing page for Article 1, the low percentage of 33% suggests that linking from other locations had a major role in generating page views during the test period. The remaining 67% of page views for Article 1 and 28% of page views for Article 2 are cumulated from referring links in other locations of the website.

These results suggest that some of the recorded increase in organic traffic is due to the keyword implementation on these two articles because of increased page visits and entrance percentage on these specific articles and same landing page%. This means that even though the percentages remained the same, they included bigger numbers of the page visits.

6.2 Search Engine Advertising results

Search engine advertising was performed through Google AdWords campaigns during 16th to 21th of March 2018. The campaign was targeted to searches made in English in native English-speaking locations (USA, Canada, UK, Australia, New-Zealand), Belgium (due to EU-hub), Russia and China. Both articles had their own AdWords campaign, which included the chosen keywords (15-20) and text ads designed to go with them. The working hypothesis suggests that with a SEA campaign the target audience can be reached effectively, and the traffic to the website will increase. To test the working hypothesis, the impressions, clicks and click-through-rates of the campaign will be analysed and compared to location data available from Google Analytics, where it can be identified from which locations paid search users have entered the website, hence if the clicks have come from target audience locations.

6.2.1 Google AdWords campaign performance

For Article 2, almost all the keywords had impressions and clicks (Appendix 5.), but for Article 1, there was several keywords which remained at 0 (Appendix 4.), suggesting that the keyword choices were most likely too longtail to gain impressions during short timeframe. Both articles had 6 ad groups, where 5 had specifically designed text ads for the main keywords, and the last ad group had a general text ad to go with the rest of the relevant keywords. All the text ads for Article 1 gained 3251 impressions and 162 clicks, and the average click-through-rate for all the ads was 4,37% when calculated with ads which had clicks. Whereas Article 2 had 3887 impressions, 205 clicks and the average click-through-rate was 6,75% when calculated with ads which had clicks.

All the ad groups for both articles gained impressions and clicks, excluding the ad group for *personalized cancer treatment*, which gained only 4 impressions and 0 clicks, and *DNA base pairs*, which gained 1 click and 36 impressions (Figure 17.). All the ad groups, excluding *personalised cancer treatment*, had a CTR% between 1,97% and 10,98%, which is 10-513% higher when compared to Google AdWords Industry Benchmarks (Medical & Health). Most impressions were gathered by *leukaemia*, *general text ad for article 1* and *pancreatic cancer*, which are all competitive and general keywords. As these text ads gathered the highest number of impressions, they naturally were represented in the top three in clicks, *leukaemia* gained the highest number of clicks (104) alongside with *pancreatic cancer* (76) and *cancer prevention* (69). Text ads with the best CTR% was *cancer prevention* (10,98%), *genetics of cancer* (7,98%), *oral cancer* (6,93%) and *leukaemia* (5,92%), and their average cost ranged from €0,23-0,38 (Figure 17.). Based on CTR% (10,98%) and average CPC (€0,23), *cancer prevention* text ad was the best performing ad. If the measure is based on number of clicks, which was the main goal for the case organisation, the best performing ad would be *leukaemia* (104).

It could be stated that the *general article 1* text ad, in the sense of cost of accusation performed the worst among all the ad groups, due to its high impressions (988), but low number of clicks and high average cost per click €0,53, being the highest of all text ads with relatively low CTR% (2,71%). *General article 1* text ad gained a low number of clicks, when compared to number of impressions, suggesting that specifically designed text ads for each keywords would be more beneficial for generating clicks, whereas abstract text ad for

multiple keywords might work well when generating awareness due to its high amount of impressions, because multiple keywords trigger the ad. Abstract text ads might not gain clicks from highly involved searchers, due to their search for specific information. Controversially the *pancreatic cancer* text ad performed better in sense of CTR% (4,35%) and average CPC (€0,28), having almost double the impressions (1746) compared to *General article 1*, suggesting that specifically designed text ad for specific keywords would perform better with highly involved searchers.

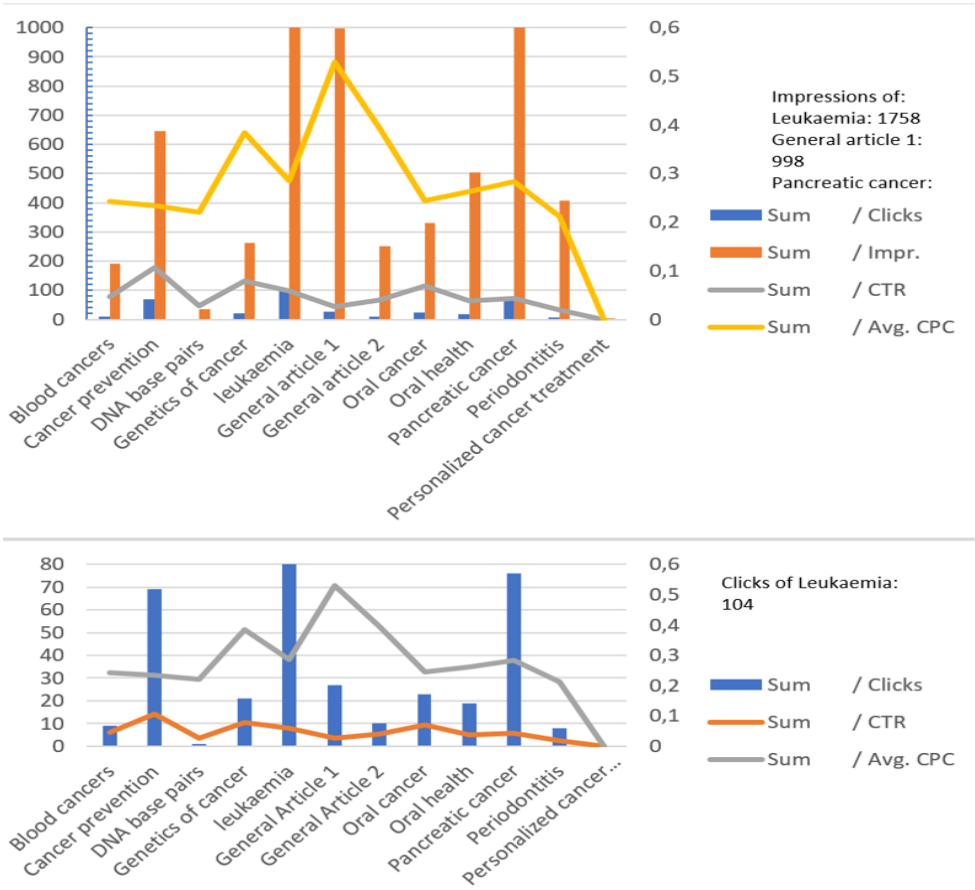

Figure 17. Ad group information comparing both campaigns

When considering the ad group performance for Article 1, *leukaemia* and *general Article 1* had the highest impressions and clicks, whereas *genetics of cancer* and *leukaemia* had the highest CTR% (Figure 18.). *Leukaemia* is the best performing ad group, with highest impressions and clicks, and relatively low average CPC and ranking among the highest in CTR%. The good performance of the *leukaemia* ad group could be due to general keywords, which is very relative compared to content in connection with a specific text ad triggered.

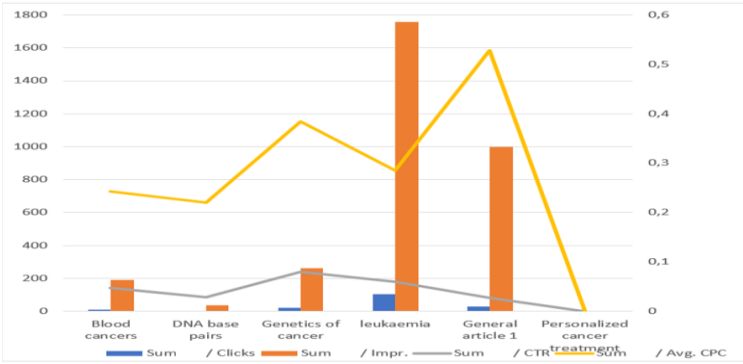

Figure 18. Text ad performance for different Article 1 ad groups

The best performing keywords by impressions for Article 1 are *leukaemia* (1758), *cancer research* (766), *genetics of cancer* (263) and *blood cancer* (104), but high impression rate does not always lead to good CTR% (Figure 19.). *Genetics of cancer* (7,98%), *human genome* (6,77%) and *blood cancer* (5,77%) have noticeable higher CTR% and lower impressions when compared to impressions and CTR% of *cancer research* (2,48%). Interestingly, from these high CTR%, the keywords *genetics of cancer*, *leukaemia* and *blood cancers* had their own specific text ads, and *human genome* did not. *Personalised cancer treatment* and *DNA base pairs* in addition had their own text ads but gained next to zero impressions. This could suggest that it is beneficial to design specific text ads for the main keywords, since it might lead to higher CTR%. For example, the keyword *cancer research* and its general text ad gained a lot of impressions, which lead to only small number of clicks, possibly because the general text ad was not informative enough to generate interest on this popular keyword.

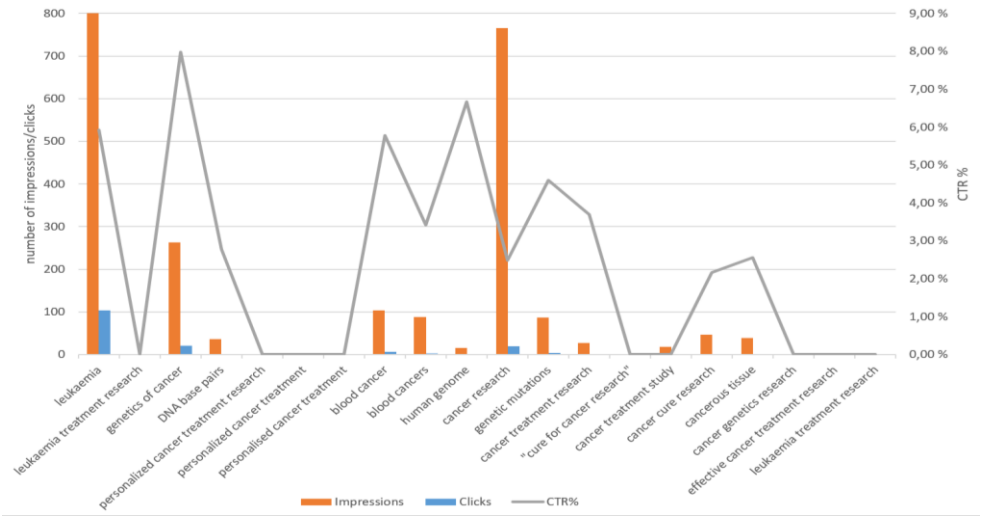

Figure 19. Impressions, clicks and CTR% for Article 1 keywords

The campaign for Article 2 succeeded well in gaining impressions and clicks on all the ad groups and keywords (Figure 20.). *Pancreatic cancer* and *cancer prevention* gained the highest number of impressions as well as clicks, while *cancer prevention* and *oral cancer*, had the highest CTR%. In this set of data, it is clearly represented how it can become costlier to acquire clicks via general abstract text ad design for multiple keywords, since the average CPC can rise higher compared to specific text ads, due to lower CTR%. Based on this data, CTR% tends to be higher with specific text ads, and the acquisition costs lower per click. The best performing ad group from Article 2, and from all the ad groups, based on combination of impressions, clicks, average CPC and CTR%, is *cancer prevention*. Even though its impressions aren't the highest, it has highest CTR% (10,68%), one of the lowest average CPC (€0,23).

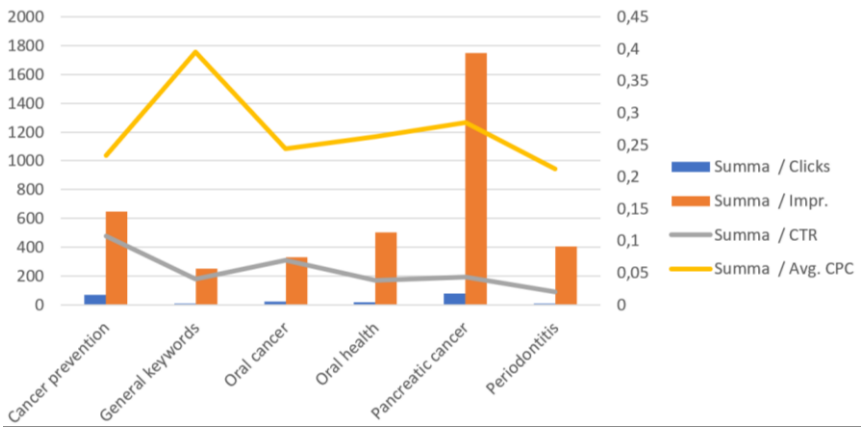

Figure 20. Text ad performance for different Article 2 ad groups

When focusing on a keyword level on Article 2, *pancreatic cancer* (1726), *cancer prevention* (631) and *periodontitis* (407) are the keywords with highest impressions, and *pancreatic cancer* (75) and *cancer prevention* (67) with highest clicks (Figure 21.). Surprisingly, these keywords don't have the best CTR%, but instead the keywords *onset of pancreatic cancer* (16,67%) and *oral cancer prevention* (13,33%) have the highest CTR%. This might suggest that more longtail keywords, with specifically designed text ads, can lead to higher CTR%, since highly involved online searchers use more longtail keywords and in addition spend more time reading the text ads before clicking. On the other hand, keywords located strongly in the longtail category might not reach audience in short periods of time, but then also due to CPC model, they don't generate costs. As in Article 1, average CPC was the highest amongst keywords showing the general text ad due to small number of clicks.

Figure 21. Impressions, clicks and CTR% for Article 2 keywords

6.2.2 Effect of increased awareness on traffic

Since search engine advertising increases straightforwardly the visibility of the website in search engine results if the keywords are correct, the traffic to the website will temporarily rise. During the time of the ad campaigns, both campaigns gained minimal percentage (0,7%) of the total visitors, which can be explained with strong organic presence of the website and their focus on only 2 sites of the website. Together, both ad campaigns for Article 1 and 2 gathered 366 clicks and 297 users entered the website through these text ads generating 313 sessions (Figure 22.). The ad campaign for Article 2 performed better, with 205 clicks, 166 users and 173 sessions compared to ad campaign for Article 1 with 161 clicks, 131 users and 140 sessions. The AdWords campaigns effected straightforwardly the traffic on the target content, but there is no proof that over this short period the keyword marketing and the generated awareness would have had any effect on the overall traffic to the website.

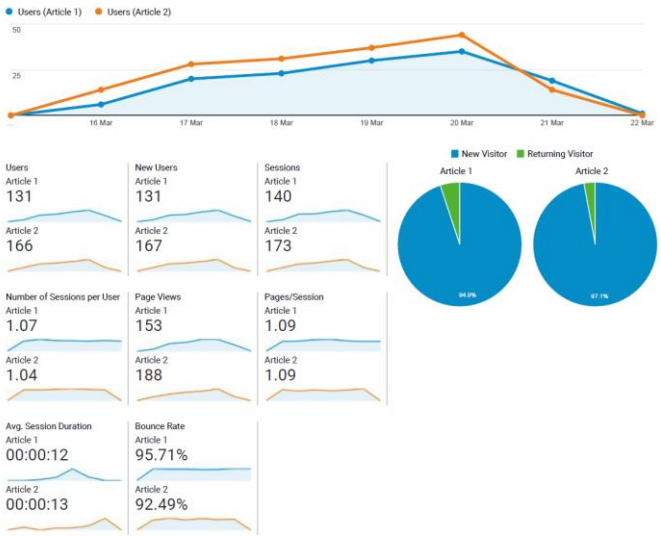

Figure 22. Audience overview for Article 1 and 2 ad campaigns

As stated earlier, the text ads were targeted to native English-speaking locations (USA, Canada, UK, Australia, New-Zealand) and additionally Belgium, Russia and China. From these locations the target audience was reached in UK (89 users), Canada (63 users), Australia (37 users), USA (23 users) and New Zealand (20 users), and in addition the ads gained significant number of visitors from India (28 users). As search language was set on English, there was no surprises that the language used by audience varied between different language versions of English, focusing on EN-GB with 48,85% for Article 1 and 45,78% for Article 2. (See Appendix 6.). It can be stated based on this data, that through the Google AdWords campaign it is possible to target specific target locations with campaign location and language selection.

For Article 1, *leukaemia* was the best performing text ad in sense of clicks and number of users (Table 15.), including the keywords *leukaemia* and *leukaemia treatment research*, which had a specific text ad connected. *Genetics of cancer* and *cancer research* gained both approximately 20 clicks, where *genetis of cancer* had specific text ad and *cancer research* was paired with the general text ad. This data suggests that a specific text ads worked better in gaining visitors to the website. For Article 2, the highest number of clicks and users were generated by text ads *pancreatic cancer* (including keywords *onset of pancreatic cancer*, *pancreatic cancer* and *pancreatic enzymes)* and *cancer prevention (*including keywords *cancer prevention* and *oral cancer prevention)* (Table 15.), which both had specific text ads. This suggests similarly to Article 1 results, that specific text ads work better in generating traffic to the website.

Table 14. Article 1 and 2 audience data per keyword

	Keyword	Acquisition					Behaviour	
		Clicks	Cost	CPC	Users	Sessions	Bounce Rate	Pages/Session
		161 % of Total: 24.39% (660)	US$66.57 % of Total: 28.71% (US$231.89)	US$0.41 Avg for View: US$0.35 (17.68%)	131 % of Total: 0.30% (44,176)	140 % of Total: 0.24% (59,127)	95.71% Avg for View: 53.55% (78.75%)	1.09 Avg for View: 2.87 (-61.87%)
1.	leukaemia	103 (63.98%)	US$36.15 (54.30%)	US$0.35	92 (70.23%)	98 (70.00%)	95.92%	1.07
2.	genetics of cancer	21 (13.04%)	US$9.92 (14.91%)	US$0.47	19 (14.50%)	19 (13.57%)	100.00%	1.00
3.	cancer research	19 (11.80%)	US$9.78 (14.68%)	US$0.51	11 (8.40%)	13 (9.29%)	84.62%	1.46
4.	blood cancer	6 (3.73%)	US$1.40 (2.11%)	US$0.23	3 (2.29%)	4 (2.86%)	100.00%	1.00
5.	genetic mutations	4 (2.48%)	US$2.99 (4.49%)	US$0.75	2 (1.53%)	2 (1.43%)	100.00%	1.00
6.	blood cancers	3 (1.86%)	US$1.28 (1.92%)	US$0.43	1 (0.76%)	1 (0.71%)	100.00%	1.00
7.	cancer cure research	1 (0.62%)	US$1.81 (2.72%)	US$1.81	1 (0.76%)	1 (0.71%)	100.00%	1.00
8.	cancer treatment research	1 (0.62%)	US$1.57 (2.36%)	US$1.57	1 (0.76%)	1 (0.71%)	100.00%	1.00
9.	cancerous tissue	1 (0.62%)	US$0.37 (0.55%)	US$0.37	1 (0.76%)	1 (0.71%)	100.00%	1.00
10.	dna base pairs	1 (0.62%)	US$0.27 (0.41%)	US$0.27	0 (0.00%)	0 (0.00%)	0.00%	0.00
	Keyword	Acquisition					Behaviour	
		Clicks	Cost	CPC	Users	Sessions	Bounce Rate	Pages/Session
		205 % of Total: 31.06% (660)	US$66.34 % of Total: 28.61% (US$231.89)	US$0.32 Avg for View: US$0.35 (-7.90%)	166 % of Total: 0.38% (44,176)	173 % of Total: 0.29% (59,127)	92.49% Avg for View: 53.55% (72.72%)	1.09 Avg for View: 2.87 (-62.08%)
1.	pancreatic cancer	75 (36.59%)	US$26.23 (39.54%)	US$0.35	64 (38.10%)	68 (39.31%)	95.59%	1.04
2.	cancer prevention	67 (32.68%)	US$19.29 (29.08%)	US$0.29	51 (30.36%)	52 (30.06%)	94.23%	1.06
3.	mouth cancer	12 (5.85%)	US$4.24 (6.39%)	US$0.35	11 (6.55%)	11 (6.36%)	72.73%	1.45
4.	oral cancer	11 (5.37%)	US$2.66 (4.00%)	US$0.24	8 (4.76%)	8 (4.62%)	100.00%	1.00
5.	healthy gums	10 (4.88%)	US$3.05 (4.60%)	US$0.30	10 (5.95%)	10 (5.78%)	100.00%	1.00
6.	oral health	9 (4.39%)	US$3.09 (4.65%)	US$0.34	8 (4.76%)	8 (4.62%)	75.00%	1.25
7.	periodontitis	8 (3.90%)	US$2.09 (3.15%)	US$0.26	6 (3.57%)	6 (3.47%)	83.33%	1.17
8.	gastro intestinal	7 (3.41%)	US$3.27 (4.93%)	US$0.47	4 (2.38%)	4 (2.31%)	75.00%	1.25
9.	cancer treatment research	2 (0.98%)	US$1.39 (2.09%)	US$0.69	2 (1.19%)	2 (1.16%)	100.00%	1.00
10.	oral cancer prevention	2 (0.98%)	US$0.50 (0.76%)	US$0.25	2 (1.19%)	2 (1.16%)	100.00%	1.00

6.3 Content marketing and engagement results

Engagement was measured utilizing bounce rate, time on site, returning visitors, pages per session and various engagement actions performed while visiting the website. The last working hypothesis suggests that when providing unique and helpful content with the combination of search engine marketing actions, the traffic to the website will be in better quality and engage with the website. To test the working hypothesis engagement measurements will be collected post search engine marketing actions and then compared to provided data prior to changes. It is not likely that keyword implementation and Google AdWords campaigns will affect the engagement measures of the full website, due to the wide range of content and the size of the website, but the engagement can be measured on the chosen articles as well as for the text ads.

6.3.1 Search engine result page visibility's role in engagement

When drilling down towards the changes made and focusing on the news section and health section of the website, it is more likely that the search engine optimisation changes have influenced the results. The news section is the landing page for all the provided news articles, and its sole purpose is to collect all the available content in one place and encourage the visitor to move forward from this site. The data in the health section is collected from all the content that is marked with a health-tag. Page views for news increased (9%), whereas for health they decreased (3%) (Table 16.). Average time on page for news increased with 8%, compared to noticeable decrease of 33% for health. Bounce rate for news increased with 7%, whereas for health it decreased with 6%. Bounce rate for health is very low compared to industry averages, and it indicates that the engagement in this category is high.

Table 15. Comparison of reference period and testing period on audience metrics

Page	Page Views	Unique Page Views	Avg. Time on Page	Entrances	Bounce Rate
organic google	9.43% ▲ 476 vs 435	2.17% ▼ 361 vs 369	7.62% ▲ 00:01:07 vs 00:01:02	5.66% ▼ 150 vs 159	6.71% ▼ 40.94% vs 38.36%
1. /en/news					
09-Mar-2018 - 23-Mar-2018	**476** (100.00%)	361 (100.00%)	00:01:07	150 (100.00%)	40.94%
22-Feb-2018 - 08-Mar-2018	**435** (100.00%)	369 (100.00%)	00:01:02	159 (100.00%)	38.36%
% Change	**9.43%**	**-2.17%**	**7.62%**	**-5.66%**	**6.71%**
Page	**Page Views**	**Unique Page Views**	**Avg. Time on Page**	**Entrances**	**Bounce Rate**
organic google	3.45% ▼ 84 vs 87	2.74% ▲ 75 vs 73	33.34% ▼ 00:01:11 vs 00:01:46	2.13% ▼ 46 vs 47	6.34% ▲ 23.91% vs 25.53%
1. /en/news/health					
09-Mar-2018 - 23-Mar-2018	**84** (100.00%)	75 (100.00%)	00:01:11	46 (100.00%)	23.91%
22-Feb-2018 - 08-Mar-2018	**87** (100.00%)	73 (100.00%)	00:01:46	47 (100.00%)	25.53%
% Change	**-3.45%**	**2.74%**	**-33.34%**	**-2.13%**	**-6.34%**

The information which gives the most insight of the actual effect of SEO actions on engagement, is the information extracted from the article level. Page views for Article 1 raised with 200%, due to search engine optimisation actions. Number 1 in Table 17. represents the new version of the article, and due to domain modification the two versions are separated in Google Analytics. It is also visible that due to forwarding protocols and linkages within the site, 15% of visitors has entered the article through the old domain during testing period. Bounce rate was 33% for the reference period, but due to minimal data available, they are not totally comparable. Therefore, a period of two weeks after the Article 1 publication was also checked for bounce rate (45%), indicating that after the search engine optimisation actions the bounce rate increased to 50%. A bounce rate of 50% is well within the industry average, indicating satisfactory levels of engagement. The average time on page for Article 1 after SEO actions was 2 minutes and 23 seconds, compared to the reference period's 2 minutes and 55 seconds, indicating that the time spend on the Article 1 decreased. When compared to the reading time estimate (6 minutes), it can be stated that users spend approximately 1/3 of the estimated reading time on the page, indicating slight engagement, but during this time they would have not been able to finish the article nor watch the videos included. Exit% indicates, in addition, how well the content manages to engage the customer to further actions on the website and for Article 1 it increased from 11% to 44%. This might be due to the increased page views, but it also indicates that the content on the website is not encouraging to continue with the user flow.

Table 16. Article 1 comparison of reference and testing period on engagement and audience

Page	Page Views	Unique Page Views	Avg. Time on Page	Entrances	Bounce Rate	% Exit
organic google	27 % of Total: 0.01% (305,899)	20 % of Total: 0.01% (238,910)	00:02:32 Avg for View: 00:01:38 (55.35%)	6 % of Total: 0.01% (109,317)	50.00% Avg for View: 54.67% (-8.54%)	44.44% Avg for View: 35.74% (24.37%)
1. /en/news/health/personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-leading-to-effective-cancer-treatment	23 (85.19%)	18 (90.00%)	00:01:57	5 (83.33%)	60.00%	47.83%
2. /en/news/health/personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-four-studies-leading-towards-more-effective-cancer-treatment	4 (14.81%)	2 (10.00%)	00:04:53	1 (16.67%)	0.00%	25.00%
Page	**Page Views**	**Unique Page Views**	**Avg. Time on Page**	**Entrances**	**Bounce Rate**	**% Exit**
organic google	9 % of Total: 0.00% (298,910)	8 % of Total: 0.00% (232,249)	00:02:55 Avg for View: 00:01:35 (85.03%)	3 % of Total: 0.00% (106,851)	33.33% Avg for View: 54.42% (-38.75%)	11.11% Avg for View: 35.75% (-68.92%)
1. /en/news/health/personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-four-studies-leading-towards-more-effective-cancer-treatment	9(100.00%)	8(100.00%)	00:02:55	3(100.00%)	33.33%	11.11%

For Article 2, page views increased from 4 to 18 (350%) due to search engine optimisation (Table 18.). As in Article 1, the domain in Article 2 was modified during the keyword

implementation phase, resulting in two different domains due to old linkages. Therefore, both numbers are included in the calculations of measurements. After SEO measures, the bounce rate for Article 2 decreased from 67% to 60%, which indicates increased engagement alongside with the significantly increased average time on page from barely 45 seconds to 3 minutes and 15 seconds. When comparing this to the estimated reading time (2 minutes and 21 seconds), it can be stated that the users were engaged to the content, spending on average more time on the page than it would take to read the content. Exit%, in addition, decreased from 50% to 39%, indicating that from the visitors who viewed the Article 2, 61% continued browsing to another site on the website. A combination of high average time on page, decreasing bounce and exit rates and increased page visits, might indicate that the audience reached through visibility in organic search engine results found what they were looking for in the content and therefore engaged with it.

Table 17. Article 2 comparison of reference and testing period on engagement and audience

Page	Page Views	Unique Page Views	Avg. Time on Page	Entrances	Bounce Rate	% Exit
organic google	18 % of Total: 0.01% (305,899)	15 % of Total: 0.01% (238,910)	00:03:15 Avg for View: 00:01:38 (99.02%)	10 % of Total: 0.01% (109,317)	60.00% Avg for View: 54.67% (9.75%)	38.89% Avg for View: 35.74% (8.82%)
1. /en/news/health/oral-health-and-periodontitis-role-in-cancer-prevention	15 (83.33%)	14 (93.33%)	00:03:55	9 (90.00%)	66.67%	46.67%
2. /en/news/health/oral-health-may-have-an-important-role-in-cancer-prevention	3 (16.67%)	1 (6.67%)	00:01:29	1 (10.00%)	0.00%	0.00%

Page	Page Views	Unique Page Views	Avg. Time on Page	Entrances	Bounce Rate	% Exit
organic google	4 % of Total: 0.00% (298,910)	4 % of Total: 0.00% (232,249)	00:00:45 Avg for View: 00:01:35 (-53.05%)	3 % of Total: 0.00% (106,851)	66.67% Avg for View: 54.42% (22.49%)	50.00% Avg for View: 35.75% (39.87%)
1. /en/news/health/oral-health-may-have-an-important-role-in-cancer-prevention	4(100.00%)	4(100.00%)	00:00:45	3(100.00%)	66.67%	50.00%

When comparing the testing period to the site average, insight is gained how the articles perform compared to other content available (Table 19.). Average time on site for Article 1 is -73% worse than site average, which is in addition worse than during reference period (-28%). For Article 2 average time on site is 13% higher compared to site average, which is a tremendous rise from the reference period (-82%). Bounce rates for both articles are better than site average. For Article 1, the bounce rate is -40% compared to site average, and for Article 2, it is -23%. Although these rates are better than site average during the testing period, performed both articles better during the reference period, where Article 1 had bounce rate of -58% compared to site average and Article 2 had -15%.

Table 18. Comparison of Article 1 and 2 bounce rate and avg. time on page to site average

	Page path level 4	Page Views	Avg. Time on Page (compared to site average)
	organic google	17.57% 1,265 vs 1,076	2.40% 00:02:49 vs 00:02:54
5.	/personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-leading-to-effective-cancer-treatment		
	09-Mar-2018 - 23-Mar-2018	28	-73.15%
17.	/oral-health-and-periodontitis-role-in-cancer-prevention		
	09-Mar-2018 - 23-Mar-2018	14	12.95%
	Page path level 4	**Page Views**	**Bounce Rate (compared to site average)**
	organic google	17.57% 1,265 vs 1,076	2.55% 80.76% vs 82.87%
5.	/personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-leading-to-effective-cancer-treatment		
	09-Mar-2018 - 23-Mar-2018	28	-38.47%
17.	/oral-health-and-periodontitis-role-in-cancer-prevention		
	09-Mar-2018 - 23-Mar-2018	14	-23.08%

Measurements revealing information of the user flow are the second page and page depth metrics. The most important requisition for engagement is that the user visits more sites than the site they entered, and the second page metric reveals which sites the user continued to browse to. For 11% of Article 1 page views and 33% of Article 2 page views, it was the end of the user flow journey and the users exited the website from the article, but the remaining 89% (Article 1) and 64% (Article 2) continued their browsing further by clicking links available on the articles, indicating that the majority of the users were engaged with the content. During the reference period the numbers were similar, 11% for Article 1 and 50% for Article 2, for the end of user journey. Second page information additionally revealed information about engagement conversions for Article 1, 15% (compared to 11% prior) of the visitors clicked on one of the engagement-measuring point (Figure 23.) "Helsinki Institute of Life science", and additionally 10% (0% prior) clicked on the link of "Faculty of Medicine". This indicates generated interest towards the subject and actors behind the article. Other link clicks (profile of scientist, articles/websites mentioned in the text) remained at 0 for both articles.

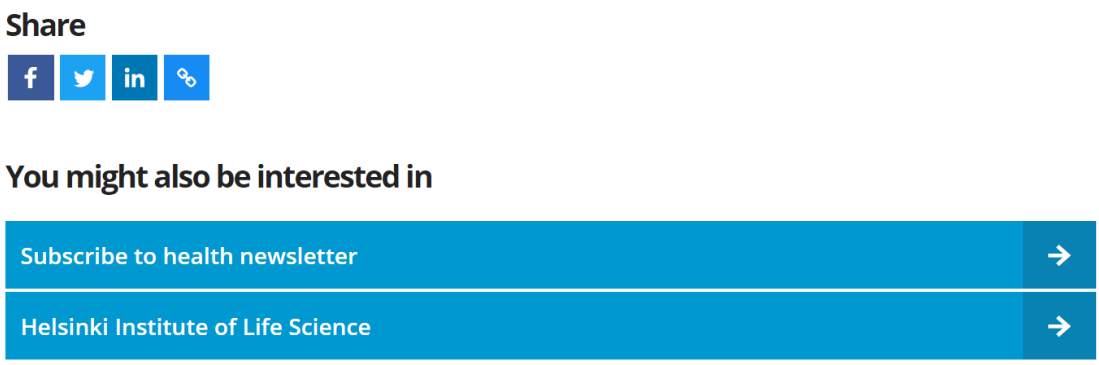

Figure 23. Engagement conversions for Article 1

For Article 2, all the second page information implied continuing to read more articles provided by the case organisation's website. During the testing period, other engagement conversions on the articles was also measured in, number of shares (0 during testing period both articles) and for Article 1, times the videos was watched. The first video on the page was watched 7 times and the second 1 time, indicating engagement, but it cannot be stated if the viewer came to the content through search engines or from other sources. In light of second page information, Article 1 performed better in generating clicks to next pages, but the performance remained similar compared to the reference period, whereas Article 2 performed better when comparing to the reference period.

The page depth reveals the percentage of views that lead to number of page views. Page depth is calculated through how many pages are visited in one session per user, and the more engaged the user is, the more pages they will visit. For Article 1, page depth analysis reveals that its visitors have been engaged with the content provided, since 89% (reference period 89%) of visits account to 2 or more page views, and only 11% of visits accounted for only 1 page view. For Article 1, 30% of visits accounted for 2 page views, and 19% of visits for 12 page visits and 11% for 9 page visits, which suggest high rates of engagement towards the case organisations website. For Article 2, all together 33% (reference period 50%) of the visits accounted to only 1 page view, 22% of the visits for 2 page views and 17% of the visits for 3 page views. Article 2 managed to reach few visitors who engaged highly with the website, since on the bottom end of visits, 22% visits accounted for 9-32 page views (See Appendix 11. and 12.). The information from page depth analysis suggests that Article 1 managed to engage its visitors better to the case organisations website, but the results remained similar compared to the reference period, whereas Article 2 performed better during testing period in page depth analysis.

During the test period, the number of new users rose with 5,2% and the number of returning visitors rose with almost 1%, whilst total number of users rose with 4,6%. This indicates that during the testing period, new users were gained through search engines. Returning visitors during the testing period were more engaged when compared to new users, with lower bounce rate (47% vs. 53%), bigger number of pages per session (3.26 vs. 2.87) and longer average time on page (00:04:13 vs. 00:02:31) (See Appendix 13.). Compared to the reference period, sessions generated during the testing period from returning users rose with 1,8%,

suggesting that a relatively smaller number of new returning visitors generated relatively bigger number of sessions (Table 20.). Bounce rate during testing period rose a minimal amount (0,3%) as well as pages/session (from 3.29 to 3.26), but average session duration increased with 14 seconds. When analysing the reference period and testing period, it can be stated that both periods contain engaged visitors with relatively low bounce rate, good number of pages per session and long average time per page. For scientific content sites it is not realistic to assume that visitors would visit a high number of pages during one session, when compared to for example online stores where the norm is that users commonly visit multiple pages before completing a purchase.

Table 19. Comparison of reference and testing period on returning users

User Type	Acquisition			Behaviour		
	Users	New Users	Sessions	Bounce Rate	Pages/Session	Avg. Session Duration
testing period returning visitor	17,858 % of Total: 22.73% (78,582)	0 % of Total: 0.00% (57,358)	35,545 % of Total: 32.49% (109,395)	47.37% Avg for View: 54.67% (-13.36%)	3.26 Avg for View: 2.80 (16.69%)	00:04:13 Avg for View: 00:02:56 (43.44%)
User Type	Users	New Users	Sessions	Bounce Rate	Pages/Session	Avg. Session Duration
Reference period returning visitor	17,693 % of Total: 22.97% (77,029)	0 % of Total: 0.00% (55,907)	34,922 % of Total: 32.66% (106,933)	47.23% Avg for View: 54.42% (-13.23%)	3.29 Avg for View: 2.80 (17.56%)	00:03:59 Avg for View: 00:02:51 (40.27%)

As search engine optimisation aimed to increase visibility in the search engine results page and gain through that increase in traffic, landing page information of both articles during testing period reveals information of engagement of users entering the article and the website through these articles and search engines. For Article 1 landing page, the bounce rate rose from 33% to 50% alongside with 100% increase in views (Table 21.). Pages per session decreased from 2.0 to 1.5, but controversially average session duration rose to 00:01:27 from 56 seconds. New sessions generated from Article 1 were 17%, indicating that visibility in search engines results in new sessions. For Article 2, bounce rate decreased slightly from 67% to 60% as the pages per session increased from 1.67 to 2.10, alongside average session duration which increased with three minutes. For Article 2, new session% was 20%, slightly higher than for Article 1.

Table 20. Landing page information of Article 1 and 2 from testing period compared to reference period marked in red

Landing Page	Acquisition			Behaviour		
	Sessions	% New Sessions	New Users	Bounce Rate	Pages/Session	Avg. Session Duration
organic google	6 % of Total: 0.01% (109,395)	16.67% Avg for View: 52.43% (-68.21%)	1 % of Total: 0.00% (57,358)	50.00% Avg for View: 54.67% (-8.54%)	1.50 Avg for View: 2.80 (-46.36%)	00:01:27 Avg for View: 00:02:56 (-50.63%)
1. /en/news/health/personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-leading-to-effective-cancer-treatment	5 (83.33%)	20.00%	1(100.00%)	60.00%	1.40	00:00:10
2. /en/news/health/personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-four-studies-leading-towards-more-effective-cancer-treatment	1 (16.67%)	0.00%	0 (0.00%)	0.00%	2.00	00:07:54
1. /en/news/health/personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-four-studies-leading-towards-more-effective-cancer-treatment	3(100.00%)	33.33%	1(100.00%)	33.33%	2.00	00:00:56

Landing Page	Acquisition			Behaviour		
	Sessions	% New Sessions	New Users	Bounce Rate	Pages/Session	Avg. Session Duration
organic google	10 % of Total: 0.01% (109,395)	20.00% Avg for View: 52.43% (-61.86%)	2 % of Total: 0.00% (57,358)	60.00% Avg for View: 54.67% (9.75%)	2.10 Avg for View: 2.80 (-24.90%)	00:06:12 Avg for View: 00:02:56 (111.28%)
1. /en/news/health/oral-health-may-have-an-important-role-in-cancer-prevention	1 (10.00%)	0.00%	0 (0.00%)	0.00%	9.00	00:48:18
2. /en/news/health/oral-health-and-periodontitis-role-in-cancer-prevention	9 (90.00%)	22.22%	2(100.00%)	66.67%	1.33	00:01:32
1. /en/news/health/oral-health-may-have-an-important-role-in-cancer-prevention	3(100.00%)	66.67%	2(100.00%)	66.67%	1.67	00:03:12

The results indicating engagement for both articles vary a lot between them, and different engagement measures vary among each article. Article 1 performed often better in terms of engagement, but Article 2 performed better when comparing change to reference period. It is not realistic to hope to gain a clear engagement measure with search engine marketing due to the combination of different metrics. The lack of research of which measures are more relevant than others or what numbers indicate engagement challenges the result analysis.

6.3.2 Engagement on search engine advertising campaign

The Google AdWords campaign data gives insight to how engaged the users who have entered the website through clicking on the text ads were. The AdWords campaigns for both articles ran between 16.3 and 21.3 (Figure 24.). Based on this data, both articles performed relatively similarly, Article 2 gained higher number of users, sessions and page views compared to Article 1, whereas Article 1 managed to gather higher percentage of returning users (5%) illustrated as the sessions per user figure (1.07 vs. 1.04). The number of pages visitors visited per session is the same for both ad campaigns as well as the average session duration (12-13 seconds), whilst average time on page is longer for Article 2 (00:02:33 vs. 00:02:14). The biggest difference is in bounce rates, where Article 2 performed better with a lower bounce rate of 92,5% compared to 95,7%. All in all, these numbers present the average performance of both campaigns, but since there was a high number of variance between the different keywords (other performing well compared to other with no

performance) inside the campaigns, these results don't give a holistic picture of the performance nor the engagement of the visitors.

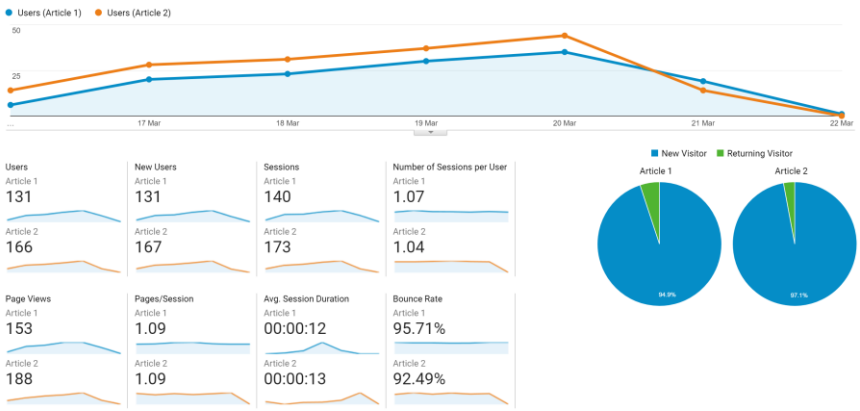

Figure 24. Audience information from AdWords campaign for Articles 1 and 2

As mentioned above, keywords and text ad performance varied between and within articles, and to gain a holistic image of engagement of online visitors it is needed to dig deeper into the analytic data from the AdWords campaigns. For Article 1, the general engagement measures suggest that users have spent on average relatively long time on page (3 minutes and 57 seconds) but have not been tempted to continue their user flow to other websites from the landing page (Article 1) (Table 22.). Long average time on page but high bounce rate (95,7%) indicates that the content provided has been engaging but lacks in providing interesting next step options to continue the user flow. This is also illustrated in the pages per session number (1.09), proposing that the user has not been engaged fully to the website to be intrigued to investigate other content available.

Table 22. Audience and engagement metrics from Google AdWords campaign

Page path level 4	Page Views	Unique Page Views	Avg. Time on Page	Bounce Rate	% Exit
Article 1	145 % of Total: 0.10% (142,475)	141 % of Total: 0.13% (111,017)	00:03:57 Avg for View: 00:01:36 (146.02%)	95.71% Avg for View: 53.71% (78.20%)	95.17% Avg for View: 34.97% (172.16%)
Article 2	187 % of Total: 0.13% (142,475)	178 % of Total: 0.16% (111,017)	00:02:33 Avg for View: 00:01:36 (58.38%)	92.49% Avg for View: 53.71% (72.19%)	91.98% Avg for View: 34.97% (163.03%)

For Article 2, the engagement metrics tell the same story as for Article 1 (Table 22.). Average time on page is slightly shorter, as is the estimated reading time (00:02:33), but still indicating a long visiting time on the website. The bounce rate (92,5%) is slightly smaller compared to Article 1, but still relatively high when comparing to for example organic traffic bounce rates from the same article or industry averages. The combination of these metrics

indicates engaging content due to a long stay on page, but not enough interesting options for continuing the user flow and engaging the user through that on a deeper level. The pages per session for Article 2 is similarly 1.09, suggesting as well that engagement to the website does not reach to investigating other content available, or possibly the content provided has answered the reason for the Google search and there is no further need to browse inside the case organisations website.

The lowest bounce rates for Article 1 keywords are on *cancer research* and *leukaemia*, which both still have almost 100% bounce rate (Table 23.). These keywords also have the highest pages per session and average session duration number, indicating that users from this keyword were the most engaged to the content. The other keywords had a 100% bounce rate, next to zero session duration and only 1 page per session, indicating that engagement was not created through majority of these text ads. *Cancer research* is the only keyword with a moderately low bounce rate (85%), over one minute long average session duration (1 minute 27 seconds) and 1.5 pages per session. *Cancer research* triggered a general text ad (Appendix 8), which matched the keyword well, but does not support the assumption prior to the research that specific text ad would increase user engagement.

Table 21. Text ad performance for Article 1 on separate keywords

Keyword	Clicks	CTR%	Users	Sessions	Bounce Rate	Pages/Session	Avg. session duration
Article 1	**162**	**4,37%**	**131**	**140**	**95,70 %**	**1.09**	**00:00:12**
blood cancer	6	5,77 %	3	4	100 %	1.0	00:00:00
blood cancers	3	3,41 %	1	1	100 %	1.0	00:00:00
cancer cure research	1	2,71 %	1	1	100 %	1.0	00:00:00
cancer research	19	2,48 %	11	13	84.6%	1.46	00:01:27
cancer treatment research	1	3,70 %	1	1	100 %	1.0	00:00:00
cancerous tissue	1	2,56 %	1	1	100 %	1.0	00:00:00
genetic mutations	4	4,60 %	2	2	100 %	1.0	00:00:00
genetics of cancer	21	7,98 %	19	19	100 %	1.0	00:00:00
leukaemia	104	5,92 %	92	98	95,90 %	1.07	00:00:06

Article 2 performed slightly better compared to Article 1 in terms of engagement measures, managing to have less than 100% bounce rate on several keywords; *cancer prevention, gastro intestinal, mouth cancer, oral health, pancreatic cancer* and *periodontitis* (Table 24.). The keywords *mouth cancer, oral health* and *periodontitis* gained average session duration longer than 20 seconds, indicating engagement to the content. Average session duration is calculated as an average length of all the sessions, and the length of the sessions is calculated utilizing engagement hits, which are missing in the presented data and therefore the sessions

with 0 seconds are common and drag the average down. Similarly, the pages per session metric was over 1 for the previously mentioned keywords (*gastro intestinal*, *mouth cancer*, *oral health* and *periodontitis*). The best performing keyword for Article 2 was *mouth cancer*, with lowest bounce rate (72,7%), longest average session time (1 minute on 49 seconds) and highest pages per session metric. *Mouth cancer* triggered a specific text ad designed for the oral cancer-keyword group (See Appendix 9.) and gained relatively high CTR%. For the other well performing keywords in Article 2, *oral health* and *periodontitis* triggered their own specific text ads while *gastro intestinal* which triggered a general text ad. This information could suggest that for Article 2, text ads which were designed specifically for keywords performed better in sense of engagement as well as keywords with specific text ads performed in general better when comparing CTR%.

Table 22. Text ad performance for Article 2 on separate keywords

Keyword	Clicks	CTR%	Users	Sessions	Bounce Rate	Pages/Session	Avg. session duration
Article 2	**205**	**6,75 %**	**166**	**173**	**92,50 %**	**1.09**	**00:00:13**
cancer prevention	67	10,62 %	51	53	94,20 %	1.06	00:00:02
cancer treatment research	2	3,13 %	2	3	100 %	1.00	00:00:00
cancer treatment study	1	3,45 %	1	1	100 %	1.00	00:00:00
gastro intestinal	7	4,70 %	4	4	75 %	1.25	00:00:11
healthy gums	10	5,46 %	10	10	100 %	1.00	00:00:00
mouth cancer	12	8,70 %	11	11	72,70 %	1.45	00:01:49
onset of pancreatic cancer	1	16,67 %	1	1	100 %	1.00	00:00:00
oral cancer	11	5,76 %	8	8	100 %	1.00	00:00:00
oral cancer prevention	2	13,33 %	2	2	100 %	1.00	00:00:00
oral health	9	2,80 %	8	8	75 %	1.25	00:00:22
pancreatic cancer	75	4,35 %	64	68	95,60 %	1.04	00:00:03
periodontitis	8	1,97 %	6	6	83,30 %	1.17	00:00:31

Even though multiple keywords managed to generate bounce rates less than 100%, longer average session duration and bigger pages per session metric for Article 2, it cannot be stated that these numbers indicate engagement to the content on a high level. Bounce rates for Google AdWords campaigns tend to be high, and when comparing to previous AdWords campaigns of the case organisation (Appendix 1) it can be stated that the bounce rates per keywords in this study were lower, but when comparing the average bounce rate of the campaign (Table 22.) the numbers were similar, whilst the average session durations were a lot lower.

7 DISCUSSION AND CONCLUSIONS

The goal of this study was to identify effective search engine optimisation and advertising tactics to increase visibility and awareness of the case organisation in search engine results. In addition, the aim was to measure how these actions would affect the website traffic and the visitor quality and engagement. The following chapter will introduce the main findings of the research and present the conclusions which can be drawn based on the available data. The key findings will be discussed in relation to the working hypotheses and research questions. The research questions will be answered based on the results from the empirical study and theoretical implications will be discussed. Managerial implications will be illustrated for University of Helsinki for them to implement search engine marketing actions into day-to-day activities. Lastly, limitations and further research ideas will be presented.

7.1 Key findings

This thesis relies on multiple different academic articles, varying from online marketing and search engine marketing to behavioural studies in online setting, and a vast number of references were used to gain an image as holistic as possible of the studied phenomena. The theoretical base was used to build the working hypotheses, which were then tested in the empirical section of the thesis. Currently, search engine marketing, and more so search engine optimisation, is a relatively new focus point in academic literature, resulting in a limited number of concepts which have not yet been established fully in academic literature and academic research. Therefore, further research on both search engine optimisation and advertising is needed in the future, especially in relation to online engagement of the website visitor.

Following chapters will highlight the main findings in relation to each sub-research question and compare the results from the empirical study to the theoretical concepts established in the theoretical part of the thesis. Through answering the sub-research questions, a holistic image of the studied phenomena will be built to compose an answer for the main research question.

7.1.1 Increasing visibility through search engine optimisation

How can search engine optimisation techniques be used to increase visibility in search engines?

Search engine's organic results are a sufficient and free of cost channel (Kennedy & Kennedy 2008; Kritzinger & Weideman 2013) to gain visibility for marketed content and websites if the ranking of the link is within the first pages (Luh et al. 2015; Zhang & Cabage 2017). Next to zero visibility is gained after the fourth ranking page (Clay 2006a) and majority of the clicks are gathered by the top five results on the first results page (Lorigo et al. 2006; Spink et al. 2006). The majority of website traffic is still generated through organic rankings, highlighting the importance of search engine optimised content and websites. Therefore, to increase visibility and furthermore traffic to the website, the goal of content creation and online presence should be to gain ranking within the first result pages (Lorigo et al. 2006; Killoran 2013; Lukito et al. 2015). The case organisation aims to become scientific content owner abroad, and to gain that position the visibility in search engine results on chosen topics is crucial. As presented in the theoretical section of the research, on page optimisation (Luh et al. 2015; Zilincan 2015; Shenoy & Prabhu 2016) and White Hat tactics (Enge et al. 2015; Scott 2015; Shenoy & Prabhu 2016), such as keyword implementation (Luh et al. 2015; Zhang & Cabage 2017) and metatext design (Gudivada et al. 2015; Lukito et al. 2015; Agarwal & Verma 2016), are in control of the content creator and the website owners. Based on the previous literature and academic research, working hypothesis 1 suggested that with correct keyword implementation to websites heading, images, domain and content in combination with designing the meta description, the ranking in search engine results page will raise on the related keywords and the traffic will increase.

The ranking in the search engine results page is in relation to the relevance of the website compared to the search query used by the online searcher (Kennedy & Kennedy 2008; Baye et al. 2016). The more relevant the content provided by a website judged by algorithms is, the higher will the ranking in the results be. Relevancy to the search query is calculated based on the appearance and frequency of the keywords in the content, quality and uniqueness of the content, meta description of the website and previous click-through-rates (O'Neill & Curran 2011; Pan 2015). The most commonly agreed search engine optimisation tactics in academic literature are correct keyword implementation, providing helpful and unique content with primary keywords, unique domain and designing of meta description visible in

search engine results (O'Neill & Curran 2011; Luh et al. 2015; Agarwal & Verma 2016; Zhang & Cabage 2017). Based on the previous literature, keyword implementation, domain modification and meta description design were chosen as tested search engine optimisation tactics, due to the already unique and helpful content (articles) provided by the case organisation and previously technically optimised website. The primary keywords from each article were identified and implemented into the website's heading, images, subtitles, domain and title (8-12 words), and the beginning of the article (20-30 words) was modified with implementation of primary keywords, providing information what the content is about. The primary keywords were chosen based on the assumption of what would the target audience with previous knowledge of the article topic use as search query, to secure high rankings on those longtail keywords. Additionally, the met description was designed for both articles to give a holistic image in the search engine results what the content of the website is about.

Chosen keywords appeared already in the content naturally, but not in an optimised manner. Therefore, they were relocated into the articles headline, subtitles, image description, domain and introduction chapter to the article, and based on that was the meta description designed (Appendices 2 and 3). The chosen keywords were the base for the chosen keywords phrases. The list of phrases was created to contain competitive and more longtail keywords, and the ranking of these keyword phrases was tested during the testing period. These modifications were assumed to change the ranking of the chosen articles in organic listings in Google SERP, and the ranking was checked prior and after the changes. The assumption was that due to the matching of keywords implemented to the website and the chosen search queries, the ranking of the website would rise noticeably.

This was the case for Article 1, which rankings raised noticeably after the implementation of relevant keywords. For four keywords, the ranking raised within the first result page and two of them, which did not maintain the first position previously, gained first rank. One keyword managed to raise ranking from second page to first and one from third page to second. All together from 13 keywords, 7 ranked on the first results page. On average the ranking raised with 4,66 slots, and on one keyword, the ranking was raised from not being visible to the third results page. 4 keywords remained not visible within the first 4 results pages, which is due to their longtail characteristic and their missing from the heading,

domain, image description or the introduction text in addition to being very competitive. After the second week, two of the keywords maintained their ranking, and one of the keywords ranked 1 slot higher compared to week before. Rest of the keywords, suffered a ranking loss of 3 to 9 slots, but three of them were still able to maintain their position at the first results page. It can be concluded from this data that ranking can be increased with keyword implementation for couple of the main keywords, as suggested by literature (Zhang & Cabage 2017), but there is a limit of how much keywords can be included in the headings, image description and introduction text naturally, without leaning towards Black Hat technique keyword stuffing (Gudivada et al. 2015; Shenoy & Prabhu 2016). Therefore, the most important 3-5 keywords should be chosen, and the implementation tactics should be concentrated on them instead of trying to spread the success thin on many key phrases. Week 2 indicates, as the literature suggests (Grappone & Couzing 2011, 53), that search engine optimisation is an ongoing process, where chosen content must be updated regularly for the ranking to stand the test against time. It should be taken into consideration that other actors will also be performing keywords implementation and other SEO actions, which will push their content higher in rankings and push down the competitors. New content will also appear regularly to compete for the rankings, which is why search engine optimisation is not something that can be performed only once.

For Article 2, the results were entirely opposite from the expected results. Due to a bug on the case organisations website, the image description was copied to the Finnish version of the article, resulting in tremendous ranking increase for the Finnish version. On six of the chosen keyword phrases, the Finnish article ranked within the first page, and for two key phrases, ranking was on the second page, compared to not being visible in the results previously (search was performed in English). Even though this change was not what was expected from the testing, it shows how much keyword implementation in image description (which was located on the beginning of the article) affects the ranking in SERP, even with wrong content language. As for the English version of Article 2, in week 1 it disappeared on all but 2 keywords, which were ranking on page 1 prior to keyword implementation. The reason behind why the Article 2 vanished from ranking in the first 4 pages remains unclear, but it could be due to incorrect link redirects because of domain changes or penalization from Google due to detected keyword stuffing. Either or, it shows how important it is to carefully implement only the main keywords to the content naturally, and if domains are

changed, the redirecting needs work properly. Keyword implementations were done in the same manner to both articles, which is why the results from Article 2 were surprising. After week 2, the Finnish version had disappeared (due to corrected image description) from the first 4 pages on all but one key phrase (which appeared in the Finnish version of the article naturally), and the English version had gained ranking on five keywords, which from four were ranking on the first page. Due to the special results from Article 2, the ranking was checked also after 3 weeks (Appendix 15). Four of the previous weeks keywords either kept their ranking or lost 1 slot, but surprisingly for two key phrases they ranked third and first after missing a ranking for 2 weeks and being previously ranked 24th and 3rd. These results suggest that keyword implementation gives good results in the long run as well as immediately and can raise ranking even 3 weeks after keyword implementation. The ranking also holds for the main keywords due to their high relevancy when compared to the search term. The appearance of the Finnish version of the article shows how effective keyword implementation on the right locations of the website can be in terms of increasing the ranking.

When considering results from both articles, it can be stated that with correct keyword implementation to the heading, subtitles, image description and domain, the ranking can be raised for a limited number of most relevant keywords, which is supported by previous academic research (O'Neill & Curran 2011; Luh et al. 2015; Agarwal & Verma 2016; Zhang & Cabage 2017). Short term ranking increase can be performed through keyword implementation on less relevant keywords, but their ranking will decrease after time compared to the most relevant keywords, which will hold their ranking better due to their higher relevancy when considering the article and search term. Correctly done keyword implementation can be a powerful search engine tactic in increasing visibility in search engine result pages. Increase in visibility should lead to increase in traffic to the website, as suggested by working hypothesis 2 and literature (Lorigo et al. 2006; Killoran 2013; Lukito et al. 2015), and the traffic to the articles from organic search during the testing period was afterwards compared to traffic during the reference period. For Article 1 during testing period, page views increased with 200%, and entrances to the website through organic search to this article increased with 100%. For Article 2, page views increased with 350%, and additionally, entrances from organic search with 233%. New sessions generated by Article 1 were 17% higher and by Article 2, 20% higher, indicating that visibility in search engines

resulted to new sessions. Even though page views for Article 2 page increased more in percentages, the actual page views gathered by Article 1 were bigger, which result from the missing rankings for Article 2 in week 1 of testing. These results indicate that an increase in visibility in search engines would lead to an increase in traffic on the specific content, supporting the literature (Jansen and Spink 2006; Lorigo et al. 2006; Killoran 2013; Lee 2013; Ghose et al. 2014; Lukito et al. 2015). Due to lacking information in Google Analytics, it cannot be studied on which keywords the audience searched for the articles on Google and which keywords lead to visiting the website, which eats credibility from the result, since it is unclear if the keyword implementation and higher ranking on the chosen key phrases was the source of increased traffic to the articles. But since the increase in traffic to the articles was quite significant, it can be stated that the overall visibility in search engine results lead to an increase in traffic. There was also an increase in organic traffic during the testing period on the whole website, but it cannot be stated based on the data available that it was solely due to the keyword implementations on two articles.

7.1.2 Increasing awareness through search engine advertising

How can search engine advertising be used to gain awareness on specific topics among target group?

Search engine advertising is a reliable and relatively inexpensive channel for online marketing when results are needed fast and the advertising needs to be targeted on a specific or a mass market (Kobylanski 2012; Qiao et al. 2017; Wang et al. 2018). Through keyword advertising, the potential consumers can be reached when they are looking for information and when they are open for marketing messages (Sääksjärvi & Pol 2007; Yang & Ghose 2010; Zenetti et al. 2014). Gaining awareness on desired content topics through paid results, resulting in increase of traffic to the website (Haans et al. 2013), is an aim of the case organisation. Previous literature has focused on researching which text ad designs work the best in generating high click-through-rates, and they conclude that while users vary from high- and low-involvement searchers the text ads should respond to different phases on search behaviours (Moe 2003; Jansen & Schuster 2011; Jerath et al. 2014; Haans et al. 2013). Low-involvement searchers use general keywords and therefore respond better to generic and abstract text ads, whereas high-involvement searchers use more longtail keywords and spend more time reading the text ads, requiring specific information to generate click-

through (Jerath et al. 2014). Working hypothesis 2 suggests that with search engine advertising campaigns, the targeted audience can be reached effectively and traffic to advertised content will increase.

Based on the literature, the ad campaigns were designed for both articles separately. The articles were the same as in search engine optimisation study, due to the search engine optimisation's positive effect on quality score. Keywords for both campaigns were chosen by using the Google AdWords Keyword Tool, to ensure sufficient search volumes during the testing period. Most of the longtail keywords relevant to the articles didn't gather search volumes, which is why more competitive and generic keywords were chosen (15-20). From the chosen keywords, 5 main keywords were separately connected with a specific text ad, whereas the rest of the generic keywords were connected to an abstract text ad. The text ads were designed based on the recommendations from literature, excluding the commercial ad designs. The tone of the text ad was kept informative, related keywords, searched keywords and specific information of the article content was presented in the text body to generate relevance and interest.

The AdWords campaigns managed to generate traffic on the target locations and on target language, whilst it is not possible to state if searches made in target locations have been made by the target audience (cancer scientist in other universities). The keywords bid on varied from more general key phrases about the topics to extremely specific key phrases, which could be assumed be used by online searchers with previous knowledge of the topic. The list of keywords used for the text ads to gain impressions/clicks varied from specific searches to general searches. This undermines the effect of the search engine advertising as a channel to reach very specific audience (cancer scientist in other universities), due to the inability to identify the audience more specifically. Both AdWords campaigns gathered impressions and clicks, but when compared against each other, they performed differently.

Article 1 gained 3251 impressions and 162 clicks, and the average CTR% was 4,37% compared to Article 2 which had 3887 impressions, 205 clicks and an average CTR% of 6,75%. It can be stated that through keyword advertising it is possible to generate traffic to the website, and when compared to the traffic generated by search engine optimisation, it can be stated that the text ad campaigns generated noticeably more traffic to the website,

600% more for Article 1 and 1 139% more for Article 2. For Article 1, there was multiple keywords which gained 0 impressions, indicating that they were too longtail to gather searches during a short run time, compared to Article 2 where impressions were divided more equally. This indicates that for short running campaigns, bidding on competitive general keywords would be beneficial if the goal is to gain an increase in awareness through a high impression number. For all but one of the text ads, the CTR% varied between 1,97% and 10,98%, and the ad groups that generated highest impressions were competitive general keywords, including Article 1 *general keywords* ad group and 2 ad groups with a specific text ad, but the ad groups which generated highest number of clicks were all ones which had a specific text ad design. To evaluate the performance of the text ads, the best figure to judge it by is CTR%, when the goal is to determine which type of ad generates most interest among the target group. The best 4 CTR% of all the ad groups was generated by specific text ads, which strongly indicates that a specific text ad with concrete information related to the keyword will create the needed interest to gain a click if the target group is highly-involved as suggested by previous literature (Jerath et al. 2014). A general text ad for multiple number of keywords would perform better if the goal was to create awareness of the brand, because the ad would have high impressions due to multiple keywords triggering the text ad.

The performance of keywords inside each ad campaign varied additionally. For Article 1, there was a lot of variance between the impressions and clicks on keywords, since some of the keywords were too longtail to gain impressions to begin with. For Article 1, three out of four keywords with the best CTR% had a specific text ad, but two specific text ads didn't gain any impressions. This suggests that to get the most out of AdWords campaigns, specific text ads should be created for the main keywords, with higher search volume, leading to higher CTR%. In Article 1, some of the more generic keywords gained a lot of impressions, but the general text ad they were connected to was not informative enough to generate clicks. For Article 2, the variance was smaller between keywords, but some patterns were visible when judging impressions and click-rates. As in Article 1, in Article 2, it was visible that CTR% was higher with keywords combined with specific text ads, resulting also in a lower cost per click, which can raise substantially higher for a general text ad for multiple keywords. For Article 2, controversially from Article 1, keywords with more longtail characteristics and special text ads generated higher CTR%, suggesting that when the online searcher is using longtail keywords they are highly-involved and spend more time reading

before clicking, supporting the academic research by Jerath et al. (2014). When combining the results from both articles, keywords with specific text ads performed better when focusing on click-through-rates. This would support the previous literature that when the online user is highly-involved will specific text ads generate better click-through-rates (Jansen & Spink 2009; Jerath et al. 2014). When advertising scientific content, which is very rich in information, specific text ads would seem to respond better with the audience, compared to general text ad, which only gives abstract information of the content offered. To answer the research question, search engine advertising can be utilized to create awareness on chosen topics on target location and language, but specific target audience can only be reached by assuming what kind of keywords they would use to search the content provided.

7.1.3 Generating engagement through content marketing and search engine marketing

How can search engine marketing alongside content marketing be used to increase engagement?

Increase in traffic is the first metric to be measured in search engine marketing, but the real test when measuring success, is how engaged the traffic generated is. Quality traffic, which is engaged to the content provided, and who continues their user flow or performs conversions, is valuable for the website (Filson Moses et al. 2016; Martínez-López et al. 2017). Content marketing has become the star of inbound marketing, by publishing instead of advertising (Feng & Ots 2015), and with connection to search engine marketing activities, websites can answer to the growing advertising avoidance happening online (Munoz-Bates 2016) and engage their website visitors. Online engagement, in relation to search engine marketing and content marketing, is not an established concept in academic research, even though engagement has been a widely researched topic among academics. Content marketing can be used as a tool to engage online users, due to the possibility to engage with the content provided and access the website to learn more (Opreana & Vinerean 2015; Pažėraitė & Repovienė 2016; Wang et al. 2017). Content marketing is all about providing unique and helpful content for the users (Harad 2016), which is what the case organisation is already performing prior to the research. In connection with the search engine marketing tactics mentioned above, more can be gained from the content provided by the case organisation, and it can be utilized as a starting point for search engine marketing. Based on the literature, the working hypothesis 3 suggests that by providing unique and helpful content

and marketing it through search engines, the traffic entering the website will be engaged to the content and to the website.

Online engagement is generated as a process between the online user and the website, and it is built on cumulative active experiences and resulting in a connection, which the online user feels for the website (Webster & Ahuja 2006; Calder et al. 2009; Demangeot & Broderick 2016; Martínez-López et al. 2017). Interaction engagement towards the content is built when the content provided matches the expectations of the online searcher, which might lead to behavioural engagement indicating that the user will return to the website (Demangeot & Broderick 2016). Activity engagement is generated when the user performs desired action while visiting the website (Demangeot & Broderick 2016). Suggested by literature (Lehmann et al. 2012; Lehmann et al. 2013), the engagement will be measured with the number of visitors, number of returning visitors, average session time, pages/session, bounce rates, second page and page depth data, which measure web usage, but together build a picture of the engagement of the website visitors.

The engagement of search engine optimisation and advertising actions will be first discussed separately since the results vary immensely between these two tactics. For Article 1, bounce rate during the testing period increased to 50%, indicating that half of the website visitors continued to browse or engage while visiting the article. The average time on page during the testing period for Article 1, decreased to 2 minutes and 23 seconds (compared to 6 minute reading time). Additionally exit% increased from 11% to 44%, which again might be simply due to increased number of visitors, but also indicates that the content on the website is not encouraging to continue with the user flow. When comparing reading time and average time on page, it can be stated that the content did not manage to engage the visitor fully, which can be a result of multiple factors. The article might have been too long to grasp the attention of the reader, it did not answer the question they were looking for, or the reader might have skimmed through the content faster than estimated reading time. Since Article 1 contained two videos, it was assumed that the time on page would be longer for Article 1 than for Article 2, but since the videos didn’t gather many views, it did not affect the time spent on page. For Article 2, bounce rate decreased from 67% to 60%, average time on page increased greatly (from 45 seconds to 3 minutes and 15 seconds) and exit% decreased (from 50% to 39%). When comparing estimated reading time to average time on page, it can be implicated

that the visitors read through the content and were left with time to look for other content as well. Based on these results, it can be stated that the engagement towards Article 2 increased after keyword implementation. Whereas for Article 1, these metrics indicate that engagement did not increase after keyword implementation. This might be due to the differences between the articles; Article 1 was lengthier and included a lot more content (videos, links and sub-titles) compared to Article 2. This might result in less engagement among users who aren't familiar with the content and engaged previously to the topic of the article. Article 2 was relatively short and straightforward article, without interactive designs (videos), two sub-titles and reference information at the bottom (increasing credibility amongst scientist) and these aspects might make the article more understandable and engaging among all types of users. Due to the shortness of the article, the user might also be more interested to read more content provided by the website, whilst with the long text in Article 1, the user might gain all the information they were looking for. This analysis based on the differences of the articles is highly hypothetical, since based on the data from this research these suggestions cannot be supported.

A significant indication of user engagement is that the user visits more than one page during the same session. For Article 1, the number of visitors continuing to second page through available links was 89%, which remained the same as during reference period. For Article 2, the number increased from 50% to 64%. This indicates that a majority of the users were engaged with content of both articles, and for Article 2, the number of engaged visitors increased after keyword implementation. In Article 1, 15% of visitors clicked on one of the engagement conversions, indicating generated interest and engagement towards the content. For Article 1, page depth analysis reveals that its visitors have been engaged with the content provided, since 89% of visits account to 2 or more page views and only 11% of visits accounted only for 1 page view, but during the reference period the percentages were the same. For Article 2, compared to reference period, visits that accounted to only 1 page view decreased from 50% to 33% and visits to 2 or more page views increased to 67% from 50% after keyword implementation. The information from page depth analysis suggest, that Article 1 managed to engage its visitors better to the case organisations website, but its situation didn't change after keyword implementation compared to Article 2, which performed better after keyword implementation. Landing page information gives significant results on how the increased visibility in search engines affected engagement, and for Article

1, bounce rate increased from 33% to 50% in addition to a decrease in pages/session from 2.0 to 1.5. Positively, average session duration increased from 56 seconds to 1 minute and 27 seconds. For Article 2, bounce rate decreased from 67% to 60%, pages/session increased from 1.67 to 2.10 and average session duration increased with 3 minutes.

In Google AdWords campaigns, engagement was measured through bounce rates, average time on page, number of returning users and CTR% on the keywords. Returning users indicate engagement to the content provided, and Article 1 gained a higher percentage of returning users compared to Article 2. Average time on page was 19 seconds longer for Article 2, which indicates higher engagement, especially since Article 2 was noticeably shorter. For both campaigns, the bounce rate was high, but Article 2 gathered a lower bounce rate (93%) compared to Article 1 (96%). Based on this information of engagement on the keyword campaigns, it can be stated that users spend a relatively long time on page without engaging with the content, either by clicking on links or moving to other sites. Keywords inside the campaigns performed differently, whilst others indicated no engagement for the content, some indicated average engagement. For Article 1, *cancer research* keyword which triggered the general text ad, had the lowest bounce rate (85%), session duration of 1 minute and 27 seconds, 1.5 pages per session and 2,48% CTR%. This does not support the assumption that a specific text ad would increase engagement, because of provided exact information of the content. For Article 2, multiple keywords performed better on engagement measures when comparing statistics to Article 1. The keyword *mouth cancer* which triggered a specific text ad, had the lowest bounce rate (73%), session duration of 1 minute and 49 seconds, 1.45 pages per session and generated a relatively high CTR%, supporting the assumption that with specific text ads the traffic will increase to the website and be more engaged to the content. From the best performing keywords, three out of four triggered a specific text ad, indicating that ads which were designed specifically for keywords, performed better in sense of engagement. Additionally, keywords with specific text ads performed in general better when comparing CTR%. As discussed above, how the content differences affect the engagement on the articles, the discussion can be included in keyword marketing. In this setting it might be even more visible, that the lesser content and shorter length of Article 2 acted in its favour in increasing engagement.

Based on the presented results, it can be stated that search engine optimisation tactics are more effective in gaining engaged traffic to the website compared to Google AdWords campaigns. Keyword advertising generates traffic to the website, but since the keywords used in the campaigns landed on the more general side of the scale to secure search volumes, the generated traffic was not engaging with the content according to majority of the metrics. Different results might have been presented, if the timeframe of the keyword campaign had been longer, making it possible to bid solely on longtail keywords, and therefore reaching more highly-involved online searchers. Through organic results, more highly-involved online searchers were probably reached due to longtail keywords and key phrases, resulting in higher engagement metrics. Previous literature suggests factors such as user-friendly website, trust, identification, emotional ties to the brand and providing the user with the information they came to find, as factors to enhance engagement (Lee & Kozar 2012; Yeh & Choi 2011; Franzak et al. 2014; Demangeot & Broderick 2016; Martínez-López et al. 2017). Based on the data provided, the engagement effect of these on the articles cannot be analysed.

7.2 Conclusions

The goal of this research was to be able to answer the main research question: *How can search engine marketing connected to content marketing be utilized to increase the awareness and engagement of international target group of a higher education institution?* The core assumption of the thesis was that with correct use of search engine optimisation tactics and advertising campaigns with content marketing, the visibility will increase in search engines, resulting in increased awareness and engagement of the target audience. Therefore, the main research question was divided into three sections, each targeting a different aspect of the assumption; increasing visibility in search engines with higher rankings through SEO, increasing awareness with SEA and gaining increased traffic to the website and measuring if engagement would increase when connecting SEM with content marketing. The research question was tested with the implementation of keywords and meta description to the content to gain higher rankings, through Google AdWords to increase website traffic and by measuring engagement from both traffic sources, to identify which actions affect the engagement of the website visitor.

The empirical testing gave expected results within all three sub-research questions, but the reliability and generalisability of the results should be discussed. Firstly, the search engine optimisation tactics chosen increased the ranking of the content significantly, as suggested by previous literature (Luh et al. 2015; Lukito et al. 2015; Zhang & Cabage 2017), and for the main keywords the ranking remained high after testing period, but for the less relevant keywords the ranking declined after some time. This study supported the results of Zhang and Cabage (2017), where implementation of keywords to the titles, meta description and content raised the ranking in SERP with 38-540%. Based on the unexpected results from Article 2, it can be stated that the keyword implementation, especially to image description and name, can raise the ranking enormously. The importance of keywords in images was highlighted in previous literature (O'Neill & Curran 2011), and this study supports the role of correct image descriptions in SEO. Through search engine optimisation actions, there was recorded an increase from organic results to the chosen content and increase in new sessions, which was also proposed by previous literature (Zhang & Cabage 2017). To conclude the results from search engine optimisation as a tool to increase website visibility, it can be stated that keyword implementation is a powerful tool for achieving ranking increase, but it can only be utilised for a few of the main keywords to receive long lasting results. Search engine optimisation should remain as an ongoing process, especially for less relevant keywords, due to witnessed ranking decrease during time, which was implied by previous literature (Grappone & Couzing 2011, 53). To gain optimum results with keyword implementation, the main keywords should be identified based on the importance of ranking high on them and implemented to the content in a natural manner, avoiding keyword stuffing with too many longtail keywords. Search engine optimisation will also increase the traffic to the optimized articles, but it cannot be stated from this data, if the visibility increased the total visits to the website.

Secondly, the search engine advertising campaigns succeeded in generating traffic to the website, which supports the previous academic literature (Haans et al. 2013), and it did it noticeably better compared to search engine optimisation but struggled with gaining high quality website visitors. Based on the data collected, more general keywords worked better in gaining impressions due to bigger search volumes, and when the keyword was connected to a specific text ad it would generate higher click-through-rates. The data also suggested that to avoid high acquisition costs, abstract text ads should be avoided with unspecific

keywords, and previous literature agrees that CPC can be higher on unspecific keywords and lower on more specific keywords (Rutz & Bucklin 2011; Jerath et al. 2014). According to this data, specific text ads perform better with highly-involved online searchers, since they search for more longtail keywords and spend more time analysing the content of the text ad. This is also suggested by the previous literature of high-involvement consumers (Jansen & Spink 2009; Rutz & Trusov 2011; Haans et al. 2013; Jerath et al. 2014). General keywords combined with an abstract text ad performed the weakest, indicating that for main and most relevant keywords, designing a specific text ad would be recommendable when the goal is to generate click-through. Search engine advertising can be used to target audiences based on their location and language selection, but it cannot be identified if the specific target audience was reached, other than by analysing the list of keywords which generated an impression of the text ads. Previous academic literature suggested that SEA is an effective tool to target consumers who are searching for the type of content provided by the website (Qiao et al. 2017; Wang et al. 2018), which is supported in this research. To conclude the results from search engine advertising testing, it can be stated that search engine advertising is a successful method in increasing traffic to the website among the target locations and language. To generate higher CTR%, the selection of keywords with specific text ads should be based on the relevancy and importance compared to the content, keeping in mind that during shorter campaign durations more general keywords generate higher impression rates.

Thirdly, engagement was measured on both search engine optimisation and advertising traffic data. Based on the chosen engagement measures, search engine optimisation was significantly more effective in engaging the website visitors compared to Google AdWords campaigns. Literature suggests, that engagement is prerequisite for participation (Filson Moses et al. 2016; Martínez-López et al. 2017), and it can be stated that for organic traffic both tested contents indicated relatively high engagement measures after keyword implementation, but only for Article 2 an increase in engagement was recorded. Search engine advertising campaigns struggled in generating continuing user flows on the website, but managed to gain, alongside increased traffic, long time on page measures. This states that even though the user was not engaged enough to continue browsing the website, they spent time focusing on the content offered. The problem might be, suggested by previous literature, that it is hard for content websites to engage the visitor during only one visit (Demangeot & Broderick 2016), which is why engagement should be measured over time

and focusing on returning visitors. To conclude the results from engagement measuring, it can be stated that search engine optimisation should be focused on when the traffic quality is in importance, whilst search engine advertising works well when increase in traffic is needed.

To answer the main research question, it can be stated that the combined usage of keyword implementation and AdWords campaigns will result in increase of visibility in search engines, awareness through increase in traffic and engagement on organic traffic. Although this research managed to create results which indicate towards these suggestions, the data provides only a thin layer of information on specific actions. Instead of providing solid proof of the phenomena, the study manages to give indication of the effect on the chosen aspects of the phenomena. The thesis works as a starting point for future research on the connection of search engine marketing and engagement.

7.3 Managerial implications

Managerial implications presented in this chapter are based on the results from the experiments, and in addition suggestions how to include value giving SEM actions to the day-to-day work tasks of the case organisation are given. Prior to this experiment, SEM was not in an active role in the case organisation for scientific content, excluding the previous technical optimisation and testing of SEA campaigns. This experiment managed to pinpoint exact actions for both SEO tactics and SEA campaigns to enhance visibility, awareness and engagement.

If search engine marketing will be chosen as a permanent marketing channel in the portfolio, which this research suggests, following key points should be included as an active part of marketing actions. Firstly, it should be stated that search engine optimisation, as well as advertising, are both active tactics, which cannot be expected to bring results by doing them once and then forgetting about it. Keyword implementation and meta description design should be performed alongside the publishing of the scientific content, to ensure high rankings on the chosen keywords and key phrases right from the beginning, due to the Google algorithm's preference for new content. Main keywords (3-5) should be chosen for the article and they should be relevant to the content and connected to the assumed key

phrases of the target audience. The main keyword(s) should be included in the heading of the article and in the domain of the article, which should also be relatively short and simple. Related keywords should be included into the sub-titles, and article in general should include titles, since they are visible in HTML-code, which is how the algorithm ranks the pages. Image description and the image name should additionally include the main keyword(s) of the article, since image search is part of the optimisation strategy and through image description can the rank be increased effectively. The beginning of the content should include a short descriptive introduction, including the main and relevant keywords naturally. Keyword stuffing of longtail keywords should be avoided. The meta description should additionally include concrete information about the content and contain the main keywords naturally. These actions should ensure high rankings on the main keywords. The performance of the main keywords should be followed over time and possible changes to the keyword implementation can be made, based on the visibility and traffic data. With re-implementation of keywords, the ranking of the article can be slightly changed on the relevant keywords. The general suggestion is that search engine optimisation needs to be an active process, and since the website is a large collection of different topics and sections, the focus points should be chosen carefully, and the first round of keyword implementation done with care to ensure maximal results on work done. It can also be stated that these suggestions should be generalizable over the full website, and they work as a main guideline of keyword implementation activities also for new content.

The search engine advertising campaign results suggest that to design a campaign as effective as possible, in the sense of impressions, CTR% and average CPC, the paring of main keywords and specific text ads should be done with consideration. In an optimal situation, each of the main keywords should be paired with a specific text ad, including the main keyword in the text body and specific information about the content. For specific text ads to generate relevancy, the bid keyword should be included in the title, alongside with supporting keyword to generate awareness. The text body should give concrete information and aim to generate interest leading to click. If a short campaign duration is chosen, it is more optimal to bid on more general keywords, compared to a longer timeframe, when longtail keywords would gather enough impressions. Based on this data, search engine advertising works well in generating awareness in target locations and on target language, and visibility of the case organisation in search engine results but lacks in generating

engagement. The performance of campaigns should be studied during the timeframe, to recognise if the chosen keywords generate impressions and if keywords generate number of impressions but fail to gain click-through. In these situations, the text ad should be modified or a specific text ad should be connected to a keyword, which is generating several impressions but no click-throughs.

Lastly, the engagement results suggest that organic traffic generates more engagement towards the websites compared to paid traffic. Visitors from organic results continued their user flow, whereas visitors from paid results spent a good amount of time on the page but did not engage with the content. Engagement measures can be explained with the assumption that visitors from paid results might have been goal-directed and looking for information to one question, compared to visitors from organic traffic who might have been more explore-oriented and therefore continuing to second pages. This indicates that these different channels should be used for different purposes and to attract different kind of audience to the websites. To generate engagement, the content should respond to the expectations online searchers have from reading meta description or text ads and naturally have further links or engagement points to encourage the website visitor to perform conversions.

7.4 Limitations and future research

The main concepts of this thesis were new in nature for academic research and therefore lacking in established definitions and characteristics. They were connected to more established marketing concepts such as *online marketing*, *inbound marketing* and *content marketing* to paint a holistic theoretical base for the research. Search engine marketing has gained wide popularity especially among the practitioners, and lately also in academia, whilst it is still focusing on limited concepts and metrics. Online engagement in a search engine marketing setting, based on the literature review, is still an unexplored concept, and therefore the definition was generated based on other engagement definitions, such as engagement building, brand engagement and engagement between users. This chapter identifies the limitations of the research, as well as discusses the reliability and validity of the results, and finishes by providing future research suggestions.

The newness and lacking agreed establishment of the concepts affected negatively the discussion between multiple authors and prevented the theoretical discussion from gaining the hoped depth and variance. Search engine marketing in connection with content marketing, was a wider theoretical framework than originally expected, which resulted in a widespread theoretical base aiming to grasp the phenomena from multiple angles at the same time. The wide focus of this thesis resulted in a rather lengthy discussion of the concepts and their connections, and additionally lead to an empirical testing, which managed to barely test one viewpoint from each main building part of the research question. Had the theoretical framework been more focused, for example only search engine optimisation or advertising, the empirical testing could have been more focused and provided with more reliable data and results. During previous chapters, the state of the empirical experiment has been elaborated in detail, and even though assumed changes were recorded through implemented actions, it cannot be stated that the results would be generalizable or obtain high validity and reliability. The implemented actions were chosen based on the previous literature as the most effective tactics to generate assumed results, but the implementation of the tactics, on both search engine optimisation and advertising experiments, could have been more analytical. Instead of performing the same changes on both chosen contents, different actions could have been tested separately to indicate the effectiveness of different actions compared against each other. Now the results gained, were from the same actions performed on two different contents, which makes it hard to compare the effectivity or draw reliable conclusions of the results. Testing search engine optimisation does not happen in a stabile laboratorial environment, but rather in an environment where multiple factors are changing constantly, including the ranking algorithms, SEO actions of competing websites and publishing of new content.

Even though the content validity of the measurements is good, and it managed to capture the different aspects of the concepts studied, the construct validity is weak, since some conclusions cannot be drawn from the gained data. The gathered data is homogeneous by its nature in each experiment category, since measurements represent one construct; visibility, awareness and engagement. The convergence of the instruments is hard to evaluate, due to newness of the experiment. For SEO the convergence of the instrument (ranking change) is similar compared to other researches, but the implemented actions differ, and for engagement no previous agreed engagement measure was found. The results gained matched

the theoretical propositions generating theory evidence, but it remained unclear if the measured construct matched the theoretical evidence proposed. Therefore, there are some questions of the validity of the research, as well as the reliability of the results. The data available represents results of an experiment in one timeframe, and it is doubted whether it is repeatable to other time periods or generalizable to other websites. Results from the experiment can be stated and even compared with the previous timeframe and each other, but suggestions and conclusions made, based on the comparison and results, lack in reliability. It can be discussed if all the measures measure one construct, or if the results could be gained through repeated testing.

The actual empirical testing was made with the best knowledge to represent the theoretical base, but due to the wide range of concepts and measures, the experiment managed to barely scratch the surface of the phenomena. The evaluating of which change had been due to implicated actions and which occurred naturally, could have been given more thought before designing the study. Ranking changes after keyword implementation should have been recorded immediately after implementation, and not for the first time a week after. Additionally, the belief of ability to target very specific target group through search engine advertising was based on a soft assumption of being able to indicate which keywords and phrases target audience would use in search engines. As mentioned above, different actions could have been implemented on the content, to be able to better identify which tactics had effect on the results. Since this was not the case, it cannot be extracted from the current data, what was the effect of different actions, only their combined effect. Lastly the testing period for the experiment could have been longer than 2 weeks to gain more valid results on the chosen measures.

This study has shown that future research in this area of online marketing is direly needed, and this thesis acts barely as a starting point for future research, offering insight on possible experimenting of visibility, awareness and engagement, but lacking in presenting results with reliability. As the world moves online, and as the information online continues growing, the role of search engines, organic and paid results, substantially increases. This indicates the need for future research on how to perform search engine marketing in an effective way, which engages the online users to the websites and content provided.

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APPENDICES

APPENDIX 1. Results from previous Google AdWords campaign

Valitaan testattavaksi tutkimusjutut, jotka toimineet parhaiten somemainoksissa

Muista kohderyhmä: Millä avainsanoilla **TUTKIJAT tai OPISKELIJAT** hakisivat niistä tietoa? Pitää olla TIETEENALA-näkökulmasta, koska en halua tavoittaa suurta yleisöä vaan muiden yliopistojen väkeä.

Testissä:
brain drain (lymphatic vessels) https://www.helsinki.fi/en/news/studying-and-counteracting-the-brain-drain
neutronitähdet (densest matter) https://www.helsinki.fi/en/news/aleksi-vuorinen-looks-into-the-heart-of-neutron-stars
päiväkoti (varhaiskasvatus) https://www.helsinki.fi/en/news/what-does-kindergarten-teach-our-children
breast cancer (killing cancer) - living tissue cancer research https://www.helsinki.fi/en/news/killing-cancer
Fetus DNA https://www.helsinki.fi/en/news/genome-wide-association-study-shows-that-babies-genetic-makeup-affects-mothers-risk-of-pre-eclampsia
targeted drug delivery https://www.helsinki.fi/en/news/targeted-drug-therapies-for-bacterial-infections / ei välttämättä mene läpi lääkelainsäädännön takia

Potentiaalisia:
kalaevoluutio (fastest evolution)
human DNA
licorice - onko liian yleistajuinen? (what not to eat while pregnant ei oo hyvä näkökulma)
(- burnout juttu liian yleistajuinen)
(- muovailuvahajuttu - liian vaikea googlata, ei vastaa tarpeeseen vaan on enemmänkin kuriositeetti)

(- ikenet ja raskaus - onks periodontal pathogen liian vaikea avainsana

Tulokset:

Adwords

Tiedemainokset-kampanja 21.6.-5.7.2017

6 mainosta

295,19 € käytetty

26 837 näyttöä

1837 klikkiä

CTR 6,85 %

CPC 0,16 €

	Brain drain	**Breast cancer**	**Fetus DNA**	**Neutron stars**	**Päiväkoti**	**Targeted drug therapies**
Käytetty	172,55 €	33,18 €	4,08 €	29,28 €	53,95 €	2,15 €
Näyttöä	14 913	4 195	627	1 878	4 860	364
Klikkiä	1 123	264	30	142	263	15
CTR	7,53 %	6,29 %	4,78 %	7,56 %	5,41 %	4,12 %
CPC	0,15 €	0,13 €	0,14 €	0,21 €	0,21 €	0,14 €

Kaksi mainoksista oli kalliimpia (0,21 €), neljä taas oli huomattavan edullisia (0,13-0,15 €). Kaikki olivat todella edullisia verrattuna somekanaviin.

CTR 6,85 % on hurjasti parempi kuin somekanavissa (FB 1,0 %, Twitter 0,1 %, LinkedIn 0,8 %).

Haittapuoli: kertaluontoista toimintaa, ei mahdollisuutta kerryttää yhteisöä kuten somekanavissa.

Lääkkeisiin liittyvät avainsanat ovat säänneltyjä, joten niitä ei voi käyttää mainoksissa.

Jos CTR alhainen, avainsana ja mainosteksti eivät ehkä matchaa tarpeeksi hyvin.

Klikkaajat ovat käyttäneet 1039 eri hakusanaa (search term).

50 klikatuimmassa (kaikki merkittävät) ei yhtään kummallista hakusanaa

brain drain –termin sisältäviä hakuja oli yllättävän paljon (11 eri hakusanaa, yht. 58 klikkiä)

Demografia:

klikkaajista 826 oli miehiä, 756 naisia

enemmän naisia: päiväkoti

enemmän miehiä: neutron stars, targeted drug therapy, breast cancer, brain drain

tasaista: fetus DNA

ikäryhmissä nuorimmat olivat parhaiten edustettuina!

18-24-vuotiaat 443 klikkiä

25-34-vuotiaat 330 klikkiä

35-44-vuotiaat 233 klikkiä

45-54-vuotiaat 100 klikkiä

55-64-vuotiaat 31 klikkiä

65+-vuotiaat 61 klikkiä

eniten nuoria (18-24) kiinnostava aiheet suhteellisesti olivat *targeted drug therapy* ja *breast cancer*

sama trendi oli kaikissa

Brain drain

Klikatuimmat avainsanat:

brain diseases 716 klikkiä / 9566 näyttöä / 7,48 % / 0.15 €

brain drainage 206 / 2718 / 7,58 % / 0.16 €

brain research 76 / 771 / 9,86 % / 0.14 €

pressure in the brain 59 / 847 / 6,97 % / 0.16 €

brain vessels 50 / 808 / 6,19 % / 0.17 €

Avg. position 1.5. Quality score 3-5/10.

Klikkejä 1123.

780 sivulatausta (hävikki 343 eli 31 %). Aika 01:51, bounce 97.26 %.

Breast cancer

Klikatuimmat avainsanat:

breast cancer research 126 / 2260 / 5,58 % / 0.12 €

cancer research 105 / 1535 / 6,84 % / 0.13 €

cancer tissue 33 / 398 / 8,29 % / 0.13 €

Avg. position 2.3. Quality score 7/10.

Klikkejä 264.

188 sivulatausta (hävikki 76 eli 29 %). Aika 06:48, bounce 96,24 %.

Neutron stars

Klikatuimmat avainsanat:

phase of matter 92 / 974 / 9,45 % / 0.24 € (quality score 1/10)

neutron star 16 / 499 / 3,21 % / 0.13 € (7/10)

neutron stars 13 / 179 / 7,26 % / 0.12 € (7/10)

Avg. position 1.1.

142 klikkiä.

89 sivulatausta (hävikki 53 eli 37 %). Aika 02:40, bounce 94,05 %.

Fetus DNA

Klikatuimmat avainsanat:

pre-eclampsia 14 / 331 / 4,23 % / 0.14 € (5/10)

DNA research 13 / 147 / 8.84 % / 0.14 € (3/10)

Avg. position 1.9.

Oli vaikea löytää toimivia avainsanoja.

30 klikkiä.

24 sivulatausta (hävikki 6 eli 20 %). Aika 00:46, bounce 90,91 %.

Päiväkoti

Klikatuimmat avainsanat:

early childhood education and care 150 / 3031 / 4,95 % / 0.22 €

early childhood education 68 / 1060 / 6,42 % / 0.18 € (5/10)

kindergarten research 17 / 378 / 4,50 % / 0.14 € (6/10)

early childhood education research 14 / 172 / 8,14 % / 0.14 € (5/10)

early education research 14 / 199 / 7,04 % / 0.29 €

Avg. position 2.1.

263 klikkiä.

227 sivulatausta (hävikki 36 eli 14 %). Aika 06:09, bounce 95,43 %.

Targeted drug therapies

Klikatuimmat avainsanat:

molecular medicine 7 / 258 / 2,71 % / 0.14 € (5/10)

bacterial genes 4 / 50 / 8 % / 0.13 €

bacterial genomics 3 / 40 / 7,50 % / 0.15 €

Avg. position 2.1.

15 klikkiä.

16 sivulatausta (1 ylimääräinen). Aika 00:21, bounce 87,50 %.

Google Analytics

Kampanjat-sivulla näkyy vain 31 sessiota.

Liikenteen laatu per mainos:

	Brain drain	**Breast cancer**	**Fetus DNA**	**Neutron stars**	**Päiväkoti**	**Targeted drug therapies**
Sivulatauksia	780	188	24	89	227	16
Hävikki, %	31 %	29 %	20 %	37 %	14 %	0 %
Aika	01:51	06:48	00:46	02:40	06:09	00:21
Bounce	97,26 %	96,24 %	90,91 %	94,05 %	95,43 %	87,50 %

APPENDIX 2. Illustration of changes made to article 1 and meta text.

- Keywords:
  - Personalised leukaemia treatment
  - Adoption of new drugs
  - Effective cancer treatment
  - Genetics of cancer
  - University of Helsinki cancer research
  - Personalised leukaemia treatment in cancer treatment
  - Leukaemia and cancer
  - Genetic mutations in cancer tumours
  - Genetic variations increasing risk of cancer
  - Fifth letter cancer susceptibility
  - Fifth letter susceptibility
  - Personalised drug treatment
  - Adoption of new cancer drugs
  - Effective cancer treatment studies
  - Effective personalised cancer treatment
  - Genetic changes in cancerous tumours
  - Genetic mutations in cancer tumours research
  - Mutations in cancerous tissue

PHOTO: 123RF

NEWS / NEWS AND PRESS RELEASES /

Personalised leukaemia treatment and faster adoption of new drugs: four studies leading towards more effective cancer treatment

5.1.2018 | HEALTH | LIFE SCIENCE

NEWS

AUTHOR: ELISA LAUTALA

909

Cancer research at the University of Helsinki

Cancer is one of the research focus areas on University of Helsinki's Meilahti Campus.

Our understanding of the genetics of cancer is constantly increasing. At the same time, we are accumulating more information, which will allow for the development of more effective treatments. These four breakthroughs were achieved by the University of Helsinki's cancer researchers during the past year.

To comprehend the biology of cancer, we must have an extensive understanding of the human genome and the genetic variations that increase susceptibility to cancer as well as the genetic mutations found in cancer tumours.

Title: main keywords

Personalised leukaemia treatment
Effective cancer treatment
Fifth letter in cancer susceptibility
Adoption of new cancer drugs

Personalised leukaemia treatment and faster adoption of new drugs: four breakthroughs leading towards more effective cancer treatment.

Introduction chapter includes naturally sub keywords

Genetics of cancer
Effective cancer treatments
Helsinki university cancer research
Fifth letter in cancer susceptibility
Adoption of new cancer drugs
Personalised cancer treatment

Our understanding of the genetics of cancer is constantly increasing. At the same time, we are accumulating more information of the genetic variations which increase cancer susceptibility, allowing the development of more effective cancer treatments. These four breakthrough studies about the "fifth letter" in the human genome, adoption of new cancer drugs, personalised cancer treatment and blood cancers were achieved by the University of Helsinki's cancer researchers during the past year.

Name of the photo: genetics-of-cancer-enables-personalised-cancer-treatment.jpg
Photo alt: DNA-analysis enables personalised cancer treatment
Photo caption: By understanding the genetics of cancer are personalised and more effective cancer treatments possible.

PHOTO: 123RF

NEWS / NEWS AND PRESS RELEASES /

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To comprehend the biology of cancer, we must have an extensive understanding of the human genome and the genetic variations that increase susceptibility to cancer as well as the genetic mutations found in cancer tumours.

At the Faculty of Medicine, there are two Academy of Finland's Centres of Excellence concentrating on cancer research: Centre of Excellence in Tumour Genetics Research (2018–2025) led by **Lauri Aaltonen** and Centre of Excellence in Translational Cancer Biology (2014–2019) led by **Kari Alitalo**.

The Centre of Excellence in Tumour Genetics Research, which launched at the Faculty of Medicine at the beginning of 2018, focuses on the mutations that occur in cancerous tissue. Led by Professor **Lauri Aaltonen**, the research continues the work of the Finnish Centre of Excellence in Cancer Genetics Research, which closed at the end of 2017.

"Once we understand the detailed significance of the structure of the genome, we will also be able to better decipher the genetic changes we see in cancerous tumours," says Aaltonen.

Sub title: 1. DNA's fifth letter reveals information about cancer susceptibility

1. The "fifth letter" reveals information about cancer susceptibility

Aaltonen considers the greatest recent achievement of the Centre of Excellence to be the study conducted by Professor **Jussi Taipale**'s group and published in *Science* in 2017, discussing DNA's "fifth letter", which shapes the way the genetic code is read.

Engagement measures:

Click the profile of scientist

Click the article link

The order of the letters in the human genome – A, C, G and T – has been known since 2000. In addition to these four letters, the Cs in combinations of C and G can be transformed in the cell into a "fifth letter" of the genome.

Understanding the order of the DNA base pairs, or letters, is necessary for applying genome data in medicine. Cancer research will in the future be able to provide more information on which individuals are more susceptible to tumours on account of their genetics. This would be valuable information for cancer prevention.

"A better understanding of the biology of cancer will also open new opportunities for developing cancer treatments. That is another area where major strides are constantly being taken and applied to clinical work," says Aaltonen.

Sub title: 2. kept the same

2. New opportunities for treating leukaemias

Blood cancers provide a good model for studying more effective, personalised cancer treatments. This is because, unlike with solid tumours, it is relatively easy to extract samples directly from the patient's blood or bone marrow.

"The goal of our research is to study leukaemia patients as closely as possible to recognise the individual characteristics which will allow us to further develop personalised treatments," says **Kimmo Porkka**, professor of clinical haematology.

Engagement measure

The challenge is that leukaemia causes between two and six mutations on average, but when the potential combinations of these mutations are considered, the result is thousands of different varieties of cancer.

"In practice, each patient has a slightly different form of the disease," says Porkka.

Some leukaemia patients respond well to traditional chemotherapy, but more than half see no benefit from it. However, all leukaemia patients are currently treated in the same way, as there is no existing data on who will respond to the treatment and who will not.

Existing sub title

> Each patient has a slightly different form of leukaemia, but the treatment is the same.

Studies are underway to map the genome of the patients' leukaemia cells and germline cells and to conduct drug susceptibility testing on their cancer cells.

"We test up to 500 different medications on the cells of an individual patient, which lets us determine already at the test tube stage which drugs will be helpful."

Combining this information with the molecular mapping of the genomes of both the patient and the cancer cell may reveal biomarkers, or the characteristics in the genome which will enable medical professionals to choose a personalised treatment for each patient's cancer.

"In 2017, we discovered several biomarkers which help us predict what kinds of treatments we should use," Porkka explains.

Engagement measure watching the video

One significant discovery relates to BCL2 antagonists, proteins which can induce programmed cell death in the cancer cells of a patient group with a specific set of genetic characteristics. Another has to do with the cortisone medication used in autoimmune diseases, which seems to be highly effective in treating a certain type of acute leukaemia.

To support the research in blood cancers, the University last year established the professorship in translational haematology, which is held by **Satu Mustjoki**.

According to Mustjoki, the biggest achievement of her research group during the last year was the discovery of the genetic mutations found to underlie LGL and T cell leukaemias, increasing the understanding of the generation mechanisms of these diseases. New potential treatments have also been uncovered for these cancers, which are difficult to treat.

During the new year, Mustjoki's group intends to learn to understand the immunological characteristics of various cancers.

"We want to find out why the immune system cannot destroy the cancer cells, and how we could make it more effective."

Sub title: 3. Personalised cancer drug treatment on the horizon

3. Personalised drug treatment on the horizon

At the moment, the use of genetic information in selecting cancer treatments is still in the research stage, with only a few biomarkers being actively used.

"Fully personalised treatment is still a thing of the future, but not too distant a future," says Professor Porkka.

This is also the goal of 2017 Helsinki Challenge-winner iCombine, a team seeking to develop an AI solution combining nearly a decade of genetic and drug susceptibility data and providing personalised medication suggestions for cancer patients based on genetic information.

In addition to combining huge amounts of information, another hurdle on the way from the laboratory to the clinic is that even new uses for existing, tested medications require an approval process of couple of years.

However, that is a brief amount of time compared to the average development process of new drugs, which can be 15 years.

Sub title: 4. Clinical testing of cancer drugs to be adopted faster

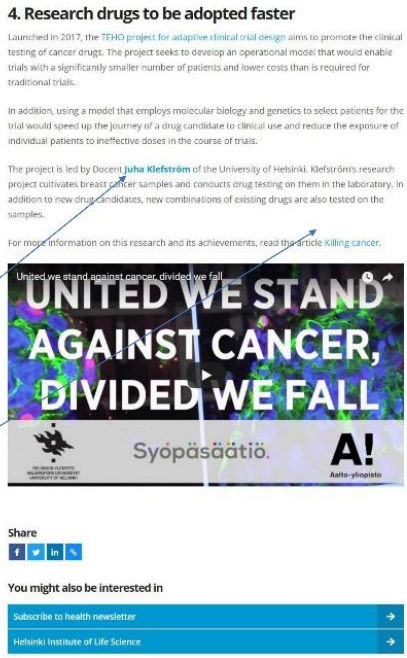
Engagement measures:

Watch the video

Click the profile of scientist

Share

Proceed to next page



4. Research drugs to be adopted faster

Launched in 2017, the TEHO project for adaptive clinical trial design aims to promote the clinical testing of cancer drugs. The project seeks to develop an operational model that would enable trials with a significantly smaller number of patients and lower costs than is required for traditional trials.

In addition, using a model that employs molecular biology and genetics to select patients for the trial would speed up the journey of a drug candidate to clinical use and reduce the exposure of individual patients to ineffective doses in the course of trials.

The project is led by Docent **Juha Klefström** of the University of Helsinki. Klefström's research project cultivates breast cancer samples and conducts drug testing on them in the laboratory. In addition to new drug candidates, new combinations of existing drugs are also tested on the samples.

For more information on this research and its achievements, read the article Killing cancer.

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Other changes

- url: https://www.helsinki.fi/en/news/health/personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-four-studies-leading-towards-more-effective-cancer-treatment
  - /personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-leading-to-effective-cancer-treatment
- Cancer research tag creation

Meta text

- Understanding of the genetics of cancer and its variations increasing cancer susceptibility is growing, leading to development of more effective cancer treatments. 4 studies about fifth letter in cancer susceptibility, adoption of new drugs, personalised cancer treatment and blood cancers were achieved by the University of Helsinki's cancer researchers

APPENDIX 3. Illustration of changes made to article 2 and meta text.

- keywords:
  - Cancer prevention
  - Oral health in cancer prevention
  - Oral health cancer
  - Onset of pancreatic cancer
  - Periodontitis role in cancer
  - Oral cancer
  - Link of periodontitis and cancer mortality
  - Periodontitis' role in oral cancer
  - Oral cancer prevention
  - Treponema denticola effect on cancer
  - Td-CTLP proteinase in pancreatic cancer
  - Helsinki university cancer research

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NEWS / NEWS AND PRESS RELEASES /

Oral health may have an important role in cancer prevention

12.1.2018 | HEALTH

PRESS RELEASE

AUTHOR: PÄIVI LEHTINEN

471

The bacteria that cause periodontitis, a disease affecting the tissues surrounding the teeth, seems to play a part also in the onset of pancreatic cancer.

Researchers at the University of Helsinki, the Helsinki University Hospital and the Karolinska Institutet have investigated the role of bacteria causing periodontitis, an inflammation of the tissues surrounding the teeth, in the development of oral cancers and certain other cancers, as well as the link between periodontitis and cancer mortality on the population level.

The study, published in the *British Journal of Cancer*, has for the first time proven the existence of a mechanism on the molecular level through which the bacteria associated with periodontitis,

The title should include the main keyword: oral health in cancer prevention
Is already optimized as it is.

Introduction chapter should contain naturally few of the main keywords: periodontitis' role in cancer, oral cancer, pancreatic cancer, cancer prevention →

The bacteria that causes periodontitis seems to have a role in the onset of oral cancers and other cancers such as pancreatic cancer. Oral health and early diagnosis of periodontitis plays a role in cancer prevention.

Name of the photo:
oral_health_important_for_cancer_prevention.jpg
photo title when mouseover: oral health plays an important role in cancer prevention
Image text: Good oral health might prevent oral cancers as well as pancreatic cancer.

PHOTO: 123RF

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The study, published in the *British Journal of Cancer*, has for the first time proven the existence of a mechanism on the molecular level through which the bacteria associated with periodontitis,

Sub titles:

Treponema Denticola might have an effect on onset of cancer. Before this chapter

Virulence factors such as Td-CTLP proteinase can spread from mouth.

Treponema denticola (Td), may also have an effect on the onset of cancer. Researchers found that the primary virulence factor of the Td bacteria, the Td-CTLP proteinase (an enzyme), occurs also in malignant tumours of the gastrointestinal tract, for example, in pancreatic cancer. According to another study finding, the CTLP enzyme has the ability to activate the enzymes that cancer cells use to invade healthy tissue (pro-MMP-8 and -9). At the same time, CTLP also diminished the effectiveness of the immune system by, for example, inactivating molecules known as enzyme inhibitors.

In another study, published in the *International Journal of Cancer*, it was proven that on the population level, periodontitis is clearly linked with cancer mortality. An especially strong link to mortality caused by pancreatic cancer was found. Some 70,000 Finns took part in this 10-year follow-up study.

"These studies have demonstrated for the first time that the virulence factors of the central pathogenic bacteria underlying gum disease are able to spread from the mouth to other parts of the body, most likely in conjunction with the bacteria, and take part in central mechanisms of tissue destruction related to cancer," says **Timo Sorsa**, a professor at the University of Helsinki.

Researchers have come to the conclusion that a low grade systemic inflammation related to periodontitis facilitates the spreading of oral bacteria and their virulence factors to other parts of the body. They point out that the prevention and early diagnosis of periodontitis are very important not only for patients' oral health, but their overall wellbeing.

"In the long run, this is extremely cost-effective for society," notes Sorsa.

The studies were conducted by research groups led by Professor **Timo Sorsa** (University of Helsinki and Karolinska Institutet), Professor **Caj Haglund** (University of Helsinki and the Hospital District of Helsinki and Uusimaa HUS), Docent **Jari Haukka** (University of Helsinki) and Docent **Jaana Hagström** (HUS).

Engagement measures:

Doi: article click

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Further studies are already ongoing at both the University of Helsinki and the Karolinska Institutet.

Further information:

Professor, Chief Dental Officer Timo Sorsa, University of Helsinki and Karolinska Institutet
Tel. +358 50 737 4240
Email: timo.sorsa@helsinki.fi

References:

Mikko T Nieminen, Dyah Listyarifah, Jaana Hagström, Caj Haglund, Daniel Grenier, Dan Nordström, Veli-Jukka Uitto, Marcela Hernandez, Tülay Yucel-Lindberg, Taina Tervahartiala, Mari Ainola & Timo Sorsa. Treponema denticola chymotrypsin-like proteinase may contribute to orodigestive carcinogenesis through immunomodulation. British Journal of Cancer, Nov 2017 doi:10.1038/bjc.2017.409

Pia Heikkiä, Anna But, Timo Sorsa & Jari Haukka. Periodontitis and Cancer Mortality: Register-based Cohort Study of 68 273 Adults in 10-year Follow-up. Int J Cancer, Jan 2018, doi: 10.1002/ijc.31254

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Other changes:

- url: https://www.helsinki.fi/en/news/health/oral-health-may-have-an-important-role-in-cancer-prevention
  - Oral-health-and-periondontitis-role-in-cancer-prevention
- Add sub titles
- Cancer research tag creation

Meta text

- The bacteria that causes periodontitis seems to have a role in the onset of oral cancers and other cancers such as pancreatic cancer. Oral health and early diagnosis of periodontitis might play a role in oral and also other types of cancer prevention.

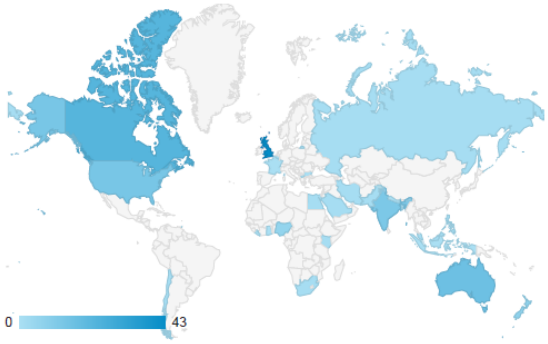
APPENDIX 4. Search Keyword Report for Article 1

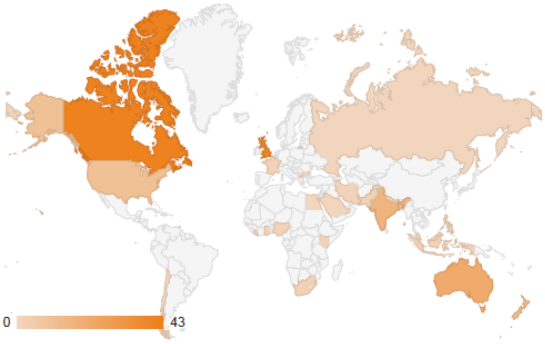
1	Search keyword report Article 1		March 16, 2018 - March 21, 2018								
2	Keyword	Campaign	Ad group	Max. CPC	Clicks	Impr.	CTR	Avg. CP	Cost	Avg. po	Quality S
3	leukaemia	Article 1	leukaemia	auto: €0.28	104	1 758	5,92 %	€0,29	€29,68	2	7
4	leukaemia treatm	Article 1	leukaemia	auto: €0.28	0	0	0,00 %	€0,00	€0,00	--	
5	genetics of cancer	Article 1	Genetics of cancer	auto: €0.28	21	263	7,98 %	€0,38	€8,07	3	6
6	DNA base pairs	Article 1	DNA base pairs	auto: €0.28	1	36	2,78 %	€0,22	€0,22	3	
7	personalized canc	Article 1	Personalized cancer tr	auto: €0.28	0	0	0,00 %	€0,00	€0,00	--	
8	personalized canc	Article 1	Personalized cancer tr	auto: €0.28	0	2	0,00 %	€0,00	€0,00	3	
9	personalised canc	Article 1	Personalized cancer tr	auto: €0.28	0	2	0,00 %	€0,00	€0,00	2	4
10	blood cancer	Article 1	Blood cancers	auto: €0.28	6	104	5,77 %	€0,19	€1,14	2	6
11	blood cancers	Article 1	Blood cancers	auto: €0.28	3	88	3,41 %	€0,35	€1,04	2	4
12	human genome	Article 1	General	auto: €0.28	1	15	6,67 %	€0,84	€0,84	2	
13	cancer research	Article 1	General	auto: €0.28	19	766	2,48 %	€0,42	€7,95	3	5
14	genetic mutations	Article 1	General	auto: €0.28	4	87	4,60 %	€0,61	€2,43	2	
15	cancer treatment	Article 1	General	auto: €0.28	1	27	3,70 %	€1,28	€1,28	3	
16	"cure for cancer re	Article 1	General	auto: €0.28	0	0	0,00 %	€0,00	€0,00	--	
17	cancer treatment	Article 1	General	auto: €0.28	0	18	0,00 %	€0,00	€0,00	2	
18	cancer cure resear	Article 1	General	auto: €0.28	1	46	2,17 %	€1,47	€1,47	3	
19	cancerous tissue	Article 1	General	auto: €0.28	1	39	2,56 %	€0,30	€0,30	2	
20	cancer genetics re	Article 1	General	auto: €0.28	0	0	0,00 %	€0,00	€0,00	--	
21	effective cancer tr	Article 1	General	auto: €0.28	0	0	0,00 %	€0,00	€0,00	--	
22	leukaemia treatm	Article 1	General	auto: €0.28	0	0	0,00 %	€0,00	€0,00	--	
23					**162**	**3 251**	**4,37 %**				

APPENDIX 5. Search Keyword Report for Article 2

1	Search keyword repo	March 1, 2018 - March 21, 2018									
2	Keyword	Campaign	Ad group	Max. CPC	Clicks	Impr.	CTR	Avg. CI	Cost	Avg. pc	Quality S
3	oral health	Oral health cancer prevention	Oral health	auto: €0.21	9	321	2,80 %	€0,28	€2,51	3	8
4	healthy gums	Oral health cancer prevention	Oral health	auto: €0.21	10	183	5,46 %	€0,25	€2,48	3	
5	periodontitis	Oral health cancer prevention	Periodontitis	auto: €0.21	8	407	1,97 %	€0,21	€1,70	3	7
6	cancer prevention	Oral health cancer prevention	Cancer prevention	auto: €0.21	67	631	10,62 %	€0,23	€15,69	2	7
7	oral cancer preventio	Oral health cancer prevention	Cancer prevention	auto: €0.21	2	15	13,33 %	€0,21	€0,41	2	
8	oral cancer	Oral health cancer prevention	Oral cancer	auto: €0.21	11	191	5,76 %	€0,20	€2,16	2	5
9	oral cancer preventio	Oral health cancer prevention	Oral cancer	auto: €0.21	0	3	0,00 %	€0,00	€0,00	3	
10	mouth cancer	Oral health cancer prevention	Oral cancer	auto: €0.21	12	138	8,70 %	€0,29	€3,45	2	3
11	onset of pancreatic c	Oral health cancer prevention	Pancreatic cancer	auto: €0.21	1	6	16,67 %	€0,27	€0,27	3	
12	pancreatic cancer	Oral health cancer prevention	Pancreatic cancer	auto: €0.21	75	1 726	4,35 %	€0,28	€21,33	3	7
13	pancreatic enzymes	Oral health cancer prevention	Pancreatic cancer	auto: €0.21	0	14	0,00 %	€0,00	€0,00	3	3
14	gastro intestinal	Oral health cancer prevention	General	auto: €0.21	7	149	4,70 %	€0,38	€2,66	3	1
15	virulence factors	Oral health cancer prevention	General	auto: €0.21	0	6	0,00 %	€0,00	€0,00	2	
16	international journal	Oral health cancer prevention	General	auto: €0.21	0	4	0,00 %	€0,00	€0,00	3	
17	cancer treatment stu	Oral health cancer prevention	General	auto: €0.21	1	29	3,45 %	€0,16	€0,16	3	
18	cancer treatment res	Oral health cancer prevention	General	auto: €0.21	2	64	3,13 %	€0,57	€1,13	3	
19	treponema denticola	Oral health cancer prevention	General	auto: €0.21	0	0	0,00 %	€0,00	€0,00	--	
20					**205**	**3 887**	**6,75 %**				

APPENDIX 6. Location data for Google AdWords campaigns





Country	Acquisition			Behaviour			Conversions		
	Users	New Users	Sessions	Bounce Rate	Pages/Session	Avg. Session Duration	Goal Conversion Rate	Goal Completions	Goal Value
Article 1	131 % of Total: 0.30% (44,172)	131 % of Total: 0.43% (30,570)	140 % of Total: 0.24% (59,126)	95.71% Avg for View: 53.54% (78.75%)	1.09 Avg for View: 2.87 (-61.87%)	00:00:12 Avg for View: 00:03:01 (-93.12%)	0.00% Avg for View: 0.00% (0.00%)	0 % of Total: 0.00% (0)	US$0.00 % of Total: 0.00% (US$0.00)
Article 2	166 % of Total: 0.38% (44,172)	167 % of Total: 0.55% (30,570)	173 % of Total: 0.29% (59,126)	92.49% Avg for View: 53.54% (72.72%)	1.09 Avg for View: 2.87 (-62.08%)	00:00:13 Avg for View: 00:03:01 (-92.68%)	0.00% Avg for View: 0.00% (0.00%)	0 % of Total: 0.00% (0)	US$0.00 % of Total: 0.00% (US$0.00)
1. United Kingdom									
Article 1	**43** (32.82%)	43 (32.82%)	45 (32.14%)	93.33%	1.13	00:00:14	0.00%	0 (0.00%)	US$0.00 (0.00%)
Article 2	**39** (23.49%)	39 (23.35%)	40 (23.12%)	97.50%	1.02	<00:00:01	0.00%	0 (0.00%)	US$0.00 (0.00%)
2. Canada									
Article 1	**22** (16.79%)	22 (16.79%)	24 (17.14%)	100.00%	1.00	00:00:00	0.00%	0 (0.00%)	US$0.00 (0.00%)
Article 2	**41** (24.70%)	41 (24.55%)	43 (24.86%)	93.02%	1.12	00:00:18	0.00%	0 (0.00%)	US$0.00 (0.00%)
3. Australia									
Article 1	**16** (12.21%)	16 (12.21%)	16 (11.43%)	93.75%	1.06	00:00:01	0.00%	0 (0.00%)	US$0.00 (0.00%)
Article 2	**21** (12.65%)	21 (12.57%)	21 (12.14%)	90.48%	1.10	00:00:25	0.00%	0 (0.00%)	US$0.00 (0.00%)
4. United States									
Article 1	**13** (9.92%)	13 (9.92%)	15 (10.71%)	100.00%	1.00	00:00:00	0.00%	0 (0.00%)	US$0.00 (0.00%)
Article 2	**10** (6.02%)	10 (5.99%)	10 (5.78%)	80.00%	1.20	00:00:20	0.00%	0 (0.00%)	US$0.00 (0.00%)
5. India									
Article 1	**12** (9.16%)	12 (9.16%)	13 (9.29%)	92.31%	1.38	00:01:22	0.00%	0 (0.00%)	US$0.00 (0.00%)
Article 2	**16** (9.64%)	16 (9.58%)	16 (9.25%)	87.50%	1.12	00:00:11	0.00%	0 (0.00%)	US$0.00 (0.00%)
6. New Zealand									
Article 1	**7** (5.34%)	7 (5.34%)	7 (5.00%)	100.00%	1.00	00:00:00	0.00%	0 (0.00%)	US$0.00 (0.00%)
Article 2	**13** (7.83%)	13 (7.78%)	13 (7.51%)	84.62%	1.15	00:00:43	0.00%	0 (0.00%)	US$0.00 (0.00%)

APPENDIX 7. Detailed information of Keyword performance on text ad campaigns.

Keyword	Acquisition			Behaviour		
	Users	New Users	Sessions	Bounce Rate	Pages/Session	Avg. Session Duration
	4,425 % of Total: 10.02% (44,176)	3,925 % of Total: 12.85% (30,536)	5,040 % of Total: 8.52% (59,127)	65.54% Avg for View: 53.55% (22.39%)	2.20 Avg for View: 2.87 (-23.28%)	00:01:29 Avg for View: 00:03:01 (-50.75%)
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
leukaemia	92 (2.08%)	92 (2.34%)	98 (1.94%)	95.92%	1.07	00:00:06
pancreatic cancer	64 (1.45%)	65 (1.66%)	68 (1.35%)	95.59%	1.04	00:00:03
cancer prevention	51 (1.15%)	51 (1.30%)	52 (1.03%)	94.23%	1.06	00:00:02
genetics of cancer	19 (0.43%)	19 (0.48%)	19 (0.38%)	100.00%	1.00	00:00:00
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
cancer research	11 (0.25%)	11 (0.28%)	13 (0.26%)	84.62%	1.46	00:01:27
mouth cancer	11 (0.25%)	10 (0.25%)	11 (0.22%)	72.73%	1.45	00:01:49
healthy gums	10 (0.23%)	10 (0.25%)	10 (0.20%)	100.00%	1.00	00:00:00
oral cancer	8 (0.18%)	8 (0.20%)	8 (0.16%)	100.00%	1.00	00:00:00
oral health	8 (0.18%)	8 (0.20%)	8 (0.16%)	75.00%	1.25	00:00:22
periodontitis	6 (0.14%)	6 (0.15%)	6 (0.12%)	83.33%	1.17	00:01:31
gastro intestinal	4 (0.09%)	4 (0.10%)	4 (0.08%)	75.00%	1.25	00:00:11
blood cancer	3 (0.07%)	3 (0.08%)	4 (0.08%)	100.00%	1.00	00:00:00
cancer treatment research	3 (0.07%)	3 (0.08%)	3 (0.06%)	100.00%	1.00	00:00:00
genetic mutations	2 (0.05%)	2 (0.05%)	2 (0.04%)	100.00%	1.00	00:00:00
oral cancer prevention	2 (0.05%)	1 (0.03%)	2 (0.04%)	100.00%	1.00	00:00:00
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
blood cancers	1 (0.02%)	1 (0.03%)	1 (0.02%)	100.00%	1.00	00:00:00
cancer cure research	1 (0.02%)	1 (0.03%)	1 (0.02%)	100.00%	1.00	00:00:00
cancer treatment study	1 (0.02%)	1 (0.03%)	1 (0.02%)	100.00%	1.00	00:00:00
cancerous tissue	1 (0.02%)	1 (0.03%)	1 (0.02%)	100.00%	1.00	00:00:00
onset of pancreatic cancer	1 (0.02%)	1 (0.03%)	1 (0.02%)	100.00%	1.00	00:00:00

APPENDIX 8. Text Ad design for Article 1

Main text ad for all of the rest keywords

Personalized cancer care study – Leads to effective cancer care
www.Helsinki.fi/en/news/health...

Four recent breakthroughs by University of Helsinki's cancer research team.

Personalized cancer treatment

Personalised cancer care study – Helsinki University research
www.helsinki.fi/en/news/health...

Four studies by Helsinki University of effective personalised cancer treatment

Blood cancers

Blood cancers – Personalised cancer care study
www.helsinki.fi/en/news/health...

Blood cancers enable the studying of effective, personalised cancer treatments

Genetics of cancer

Genetics of cancer – Cancer genetics research
www.helsinki.fi/en/news/health...

Understanding the genetics of cancer leads to development of effective treatments

Leukaemia

Leukaemia treatment - Blood cancer research
www.helsinki.fi/en/news/health...

Leukaemia provides a model for studying effective, personalised cancer treatment

DNA base pairs

DNA fifth letter – Cancer susceptibility
www.helsinki.fi/en/news/health...

The DNA's "fifth letter" reveals information about cancer susceptibility

APPENDIX 9. Text Ad design for Article 2.

Main text ad for keywords
The importance of oral health – Research on cancer prevention
www.helsinki.fi/en/news/health....

Helsinki University's research found a connection between oral health and cancer

Oral health

Oral health preventing cancer – Periodontitis eddecting cancer
www.helsinki.fi/en/news/health....

Oral health and early fiagnosis of periodontitis plays role in cancer prevention

Pancreatic cancer

Pancreatic cancer – Oral health as prevention
www.helsinki.fi/en/news/health....

Oral health may have an important role in cancer prevention

Oral cancer

Oral health factoring cancer – Oral cancer and Periodontitis
www.helsinki.fi/en/news/health....

Bacteria in periodontitis has role in the development of oral and other cancers

Periodontitis

Periodontitis behind cancer – Oral health as prevention
www.helsinki.fi/en/news/health....

Bacteria causing periodontitis seems to connect to onset of pancreatic cancer

Cancer prevention

Cancer prevention research – The importance of oral health
www.helsinki.fi/en/news/health....

Oral health may have a big role in prevention of oral and other cancers

APPENDIX 10. Page views, avg. time on site and bounce rate reference period

	Page path level 4	Page Views	Page Views (compared to site average)
	organic google	49 % of Total: 0.02% (298,910)	49 % of Total: 0.02% (298,910)
1.	/personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-four-studies-leading-towards-more-effective-cancer-treatment	9	157.14%
2.	/valo-therapeutics-receives-4.6-million-funding-to-accelerate-development-of-a-novel-oncolytic-virus-based-cancer-immunotherapy	6	71.43%
3.	/hormonal-contraceptives-and-hair-dyes-increase-breast-cancer-risk	5	42.86%
4.	/valo-therapeutics-develops-a-novel-virus-based-cancer-immunotherapy	5	42.86%
5.	/adaptive-clinical-trials-a-new-concept-to-improve-and-accelerate-the-clinical-testing-of-cancer-drugs-in-finland	4	14.29%
6.	/oral-health-may-have-an-important-role-in-cancer-prevention	4	14.29%

	Page path level 4	Page Views	Avg. Time on Page (compared to site average)
	organic google	49 % of Total: 0.02% (298,910)	00:03:51 Avg for View: 00:01:35 (143.22%)
1.	/personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-four-studies-leading-towards-more-effective-cancer-treatment	9	-27.94%
2.	/valo-therapeutics-receives-4.6-million-funding-to-accelerate-development-of-a-novel-oncolytic-virus-based-cancer-immunotherapy	6	206.09%
3.	/hormonal-contraceptives-and-hair-dyes-increase-breast-cancer-risk	5	-78.22%
4.	/valo-therapeutics-develops-a-novel-virus-based-cancer-immunotherapy	5	-74.53%
5.	/adaptive-clinical-trials-a-new-concept-to-improve-and-accelerate-the-clinical-testing-of-cancer-drugs-in-finland	4	-100.00%
6.	/oral-health-may-have-an-important-role-in-cancer-prevention	4	-81.72%

	Page path level 4	Page Views	Bounce Rate (compared to site average)
	organic google	49 % of Total: 0.02% (298,910)	76.47% Avg for View: 54.42% (40.51%)
1.	/personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-four-studies-leading-towards-more-effective-cancer-treatment	9	-57.69%
2.	/valo-therapeutics-receives-4.6-million-funding-to-accelerate-development-of-a-novel-oncolytic-virus-based-cancer-immunotherapy	6	-4.81%
3.	/hormonal-contraceptives-and-hair-dyes-increase-breast-cancer-risk	5	-4.81%
4.	/valo-therapeutics-develops-a-novel-virus-based-cancer-immunotherapy	5	1.54%
5.	/adaptive-clinical-trials-a-new-concept-to-improve-and-accelerate-the-clinical-testing-of-cancer-drugs-in-finland	4	26.92%
6.	/oral-health-may-have-an-important-role-in-cancer-prevention	4	-15.38%

APPENDIX 11. Landing page, second page and page depth analysis of Article 1

	Page	Landing Page	Page Views	Unique Page Views	Avg. Time on Page	Entrances	Bounce Rate	% Exit
	organic google		27 % of Total: 0.01% (305,899)	20 % of Total: 0.01% (238,910)	00:02:32 Avg for View: 00:01:38 (55.35%)	6 % of Total: 0.01% (109,317)	50.00% Avg for View: 54.67% (-8.54%)	44.44% Avg for View: 35.74% (24.37%)
1.	/en/news/health/personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-leading-to-effective-cancer-treatment	/en/news/health/personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-leading-to-effective-cancer-treatment	7 (25.93%)	5 (25.00%)	00:00:24	5 (83.33%)	60.00%	71.43%
2.	/en/news/health/personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-leading-to-effective-cancer-treatment	/en/helsinki-institute-of-life-science	5 (18.52%)	5 (25.00%)	00:01:18	0 (0.00%)	0.00%	40.00%
3.	/en/news/health/personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-leading-to-effective-cancer-treatment	/en/news/health	4 (14.81%)	1 (5.00%)	00:00:54	0 (0.00%)	0.00%	25.00%
4.	/en/news/health/personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-four-studies-leading-towards-more-effective-cancer-treatment	/en/news/health/oral-health-may-have-an-important-role-in-cancer-prevention	3 (11.11%)	1 (5.00%)	00:03:22	0 (0.00%)	0.00%	33.33%
5.	/en/news/health/personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-four-studies-leading-towards-more-effective-cancer-treatment	/en/news/health/personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-four-studies-leading-towards-more-effective-cancer-treatment	1 (3.70%)	1 (5.00%)	00:07:54	1 (16.67%)	0.00%	0.00%
6.	/en/news/health/personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-leading-to-effective-cancer-treatment	/en/faculty-of-medicine/research/for-researchers	1 (3.70%)	1 (5.00%)	00:14:30	0 (0.00%)	0.00%	0.00%
7.	/en/news/health/personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-leading-to-effective-cancer-treatment	/en/faculty-of-medicine/research/for-researchers/research-faculty	1 (3.70%)	1 (5.00%)	00:00:51	0 (0.00%)	0.00%	0.00%
8.	/en/news/health/personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-leading-to-effective-cancer-treatment	/en/masters-programme-in-microbiology-and-microbial-biotechnology-master-of-science-2-years/1.2.246.562.17.76898149778	1 (3.70%)	1 (5.00%)	00:00:00	0 (0.00%)	0.00%	100.00%
9.	/en/news/health/personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-leading-to-effective-cancer-treatment	/en/news/health/personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-four-studies-leading-towards-more-effective-cancer-treatment	1 (3.70%)	1 (5.00%)	00:00:00	0 (0.00%)	0.00%	100.00%
10.	/en/news/health/personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-leading-to-effective-cancer-treatment	/en/news/health/unknown-disorders-suffered-by-thousands-who-will-defeat-mito	1 (3.70%)	1 (5.00%)	00:00:00	0 (0.00%)	0.00%	100.00%

	Page	Second Page	Page Views	Unique Page Views	Avg. Time on Page	Entrances	Bounce Rate	% Exit
	organic google		27 % of Total: 0.01% (305,899)	20 % of Total: 0.01% (238,910)	00:02:32 Avg for View: 00:01:38 (55.35%)	6 % of Total: 0.01% (109,317)	50.00% Avg for View: 54.67% (-8.54%)	44.44% Avg for View: 35.74% (24.37%)
1.	/en/news/health/personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-leading-to-effective-cancer-treatment	/en/news/health/personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-leading-to-effective-cancer-treatment	9 (33.33%)	7 (35.00%)	00:04:19	2 (33.33%)	0.00%	55.56%
2.	/en/news/health/personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-leading-to-effective-cancer-treatment	/en/news/health/unknown-disorders-suffered-by-thousands-who-will-defeat-mito	4 (14.81%)	1 (5.00%)	00:00:54	0 (0.00%)	0.00%	25.00%
3.	/en/news/health/personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-four-studies-leading-towards-more-effective-cancer-treatment	/en/news/health/oral-health-may-have-an-important-role-in-cancer-prevention	3 (11.11%)	1 (5.00%)	00:03:22	0 (0.00%)	0.00%	33.33%
4.	/en/news/health/personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-leading-to-effective-cancer-treatment	(not set)	3 (11.11%)	3 (15.00%)	00:00:00	3 (50.00%)	100.00%	100.00%
5.	/en/news/health/personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-leading-to-effective-cancer-treatment	/en/helsinki-institute-of-life-science/news	3 (11.11%)	3 (15.00%)	00:00:59	0 (0.00%)	0.00%	33.33%
6.	/en/news/health/personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-four-studies-leading-towards-more-effective-cancer-treatment	/en/news/health/personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-leading-to-effective-cancer-treatment	1 (3.70%)	1 (5.00%)	00:07:54	1 (16.67%)	0.00%	0.00%
7.	/en/news/health/personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-leading-to-effective-cancer-treatment	/en/faculty-of-medicine	1 (3.70%)	1 (5.00%)	00:00:21	0 (0.00%)	0.00%	0.00%
8.	/en/news/health/personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-leading-to-effective-cancer-treatment	/en/faculty-of-medicine/faculty	1 (3.70%)	1 (5.00%)	00:00:51	0 (0.00%)	0.00%	0.00%
9.	/en/news/health/personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-leading-to-effective-cancer-treatment	/en/news	1 (3.70%)	1 (5.00%)	00:00:18	0 (0.00%)	0.00%	0.00%
10.	/en/news/health/personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-leading-to-effective-cancer-treatment	/en/news/data-science/new-ai-method-keeps-data-private	1 (3.70%)	1 (5.00%)	00:00:00	0 (0.00%)	0.00%	100.00%

	Page	Page Depth	Page Views	Unique Page Views	Avg. Time on Page	Entrances	Bounce Rate	% Exit
	organic google		27 % of Total: 0.01% (305,899)	20 % of Total: 0.01% (238,910)	00:02:32 Avg for View: 00:01:38 (55.35%)	6 % of Total: 0.01% (109,317)	50.00% Avg for View: 54.67% (-8.54%)	44.44% Avg for View: 35.74% (24.37%)
1.	/en/news/health/personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-leading-to-effective-cancer-treatment	2	7 (25.93%)	5 (25.00%)	00:00:24	2 (33.33%)	0.00%	71.43%
2.	/en/news/health/personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-leading-to-effective-cancer-treatment	12	5 (18.52%)	2 (10.00%)	00:00:46	0 (0.00%)	0.00%	20.00%
3.	/en/news/health/personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-four-studies-leading-towards-more-effective-cancer-treatment	9	3 (11.11%)	1 (5.00%)	00:03:22	0 (0.00%)	0.00%	33.33%
4.	/en/news/health/personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-leading-to-effective-cancer-treatment	1	3 (11.11%)	3 (15.00%)	00:00:00	3 (50.00%)	100.00%	100.00%
5.	/en/news/health/personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-leading-to-effective-cancer-treatment	5	2 (7.41%)	2 (10.00%)	00:01:22	0 (0.00%)	0.00%	50.00%
6.	/en/news/health/personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-four-studies-leading-towards-more-effective-cancer-treatment	2	1 (3.70%)	1 (5.00%)	00:07:54	1 (16.67%)	0.00%	0.00%
7.	/en/news/health/personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-leading-to-effective-cancer-treatment	3	1 (3.70%)	1 (5.00%)	00:00:00	0 (0.00%)	0.00%	100.00%
8.	/en/news/health/personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-leading-to-effective-cancer-treatment	4	1 (3.70%)	1 (5.00%)	00:14:30	0 (0.00%)	0.00%	0.00%
9.	/en/news/health/personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-leading-to-effective-cancer-treatment	6	1 (3.70%)	1 (5.00%)	00:00:51	0 (0.00%)	0.00%	0.00%
10.	/en/news/health/personalised-leukaemia-treatment-and-faster-adoption-of-new-drugs-leading-to-effective-cancer-treatment	7	1 (3.70%)	1 (5.00%)	00:01:56	0 (0.00%)	0.00%	0.00%

APPENDIX 12. Landing page, second page and page depth analysis for Article 2

	Page	Landing Page	Page Views	Unique Page Views	Avg. Time on Page	Entrances	Bounce Rate	% Exit
	organic google		18 % of Total: 0.01% (305,899)	15 % of Total: 0.01% (238,910)	00:03:15 Avg for View: 00:01:38 (99.02%)	10 % of Total: 0.01% (109,317)	60.00% Avg for View: 54.67% (9.75%)	38.89% Avg for View: 35.74% (8.82%)
1.	/en/news/health/oral-health-and-periodontitis-role-in-cancer-prevention	/en/news/health/oral-health-and-periodontitis-role-in-cancer-prevention	10 (55.56%)	9 (60.00%)	00:04:35	9 (90.00%)	66.67%	70.00%
2.	/en/news/health/oral-health-may-have-an-important-role-in-cancer-prevention	/en/news/health/oral-health-may-have-an-important-role-in-cancer-prevention	3 (16.67%)	1 (6.67%)	00:01:29	1 (10.00%)	0.00%	0.00%
3.	/en/news/health/oral-health-and-periodontitis-role-in-cancer-prevention	/en/news/data-science/university-of-helsinki-and-nokia-bell-labs-develop-smart-5g-technology-to-monitor-air-quality	1 (5.56%)	1 (6.67%)	00:13:42	0 (0.00%)	0.00%	0.00%
4.	/en/news/health/oral-health-and-periodontitis-role-in-cancer-prevention	/en/news/health/oral-health-may-have-an-important-role-in-cancer-prevention	1 (5.56%)	1 (6.67%)	00:01:47	0 (0.00%)	0.00%	0.00%
5.	/en/news/health/oral-health-and-periodontitis-role-in-cancer-prevention	/en/news/health/unknown-disorders-suffered-by-thousands-who-will-defeat-mito	1 (5.56%)	1 (6.67%)	00:00:11	0 (0.00%)	0.00%	0.00%
6.	/en/news/health/oral-health-and-periodontitis-role-in-cancer-prevention	/en/news/life-science/antibiotics-the-end-of-the-world-or-a-revolution	1 (5.56%)	1 (6.67%)	00:00:24	0 (0.00%)	0.00%	0.00%
7.	/en/news/health/oral-health-and-periodontitis-role-in-cancer-prevention	/en/news/life-science/unique-finnish-genomics-scene-attracts-top-us-scientist-to-university-of-helsinki	1 (5.56%)	1 (6.67%)	00:01:28	0 (0.00%)	0.00%	0.00%

	Page	Second Page	Page Views	Unique Page Views	Avg. Time on Page	Entrances	Bounce Rate	% Exit
	organic google		18 % of Total: 0.01% (305,899)	15 % of Total: 0.01% (238,910)	00:03:15 Avg for View: 00:01:38 (99.02%)	10 % of Total: 0.01% (109,317)	60.00% Avg for View: 54.67% (9.75%)	38.89% Avg for View: 35.74% (8.82%)
1.	/en/news/health/oral-health-and-periodontitis-role-in-cancer-prevention	(not set)	6 (33.33%)	6 (40.00%)	00:00:00	6 (60.00%)	100.00%	100.00%
2.	/en/news/health/oral-health-may-have-an-important-role-in-cancer-prevention	/en/news/health/oral-health-may-have-an-important-role-in-cancer-prevention	3 (16.67%)	1 (6.67%)	00:01:29	1 (10.00%)	0.00%	0.00%
3.	/en/news/health/oral-health-and-periodontitis-role-in-cancer-prevention	/en/news/data-science/new-ai-method-keeps-data-private	2 (11.11%)	2 (13.33%)	00:00:06	1 (10.00%)	0.00%	0.00%
4.	/en/news/health/oral-health-and-periodontitis-role-in-cancer-prevention	/en/news/health/oral-health-and-periodontitis-role-in-cancer-prevention	2 (11.11%)	1 (6.67%)	00:10:49	1 (10.00%)	0.00%	50.00%
5.	/en/news/health/oral-health-and-periodontitis-role-in-cancer-prevention	/en/news	1 (5.56%)	1 (6.67%)	00:00:24	0 (0.00%)	0.00%	0.00%
6.	/en/news/health/oral-health-and-periodontitis-role-in-cancer-prevention	/en/news/data-science/university-of-helsinki-and-nokia-bell-labs-develop-smart-5g-technology-to-monitor-air-quality	1 (5.56%)	1 (6.67%)	00:13:42	0 (0.00%)	0.00%	0.00%
7.	/en/news/health/oral-health-and-periodontitis-role-in-cancer-prevention	/en/news/health/oral-health-may-have-an-important-role-in-cancer-prevention	1 (5.56%)	1 (6.67%)	00:01:47	0 (0.00%)	0.00%	0.00%
8.	/en/news/health/oral-health-and-periodontitis-role-in-cancer-prevention	/en/news/life-science/unique-finnish-genomics-scene-attracts-top-us-scientist-to-university-of-helsinki	1 (5.56%)	1 (6.67%)	00:01:28	0 (0.00%)	0.00%	0.00%
9.	/en/news/health/oral-health-and-periodontitis-role-in-cancer-prevention	/en/news/news-and-press-releases	1 (5.56%)	1 (6.67%)	00:02:56	1 (10.00%)	0.00%	0.00%

	Page	Page Depth	Page Views	Unique Page Views	Avg. Time on Page	Entrances	Bounce Rate	% Exit
	organic google		18 % of Total: 0.01% (305,899)	15 % of Total: 0.01% (238,910)	00:03:15 Avg for View: 00:01:38 (99.02%)	10 % of Total: 0.01% (109,317)	60.00% Avg for View: 54.67% (9.75%)	38.89% Avg for View: 35.74% (8.82%)
1.	/en/news/health/oral-health-and-periodontitis-role-in-cancer-prevention	1	6 (33.33%)	6 (40.00%)	00:00:00	6 (60.00%)	100.00%	100.00%
2.	/en/news/health/oral-health-and-periodontitis-role-in-cancer-prevention	2	4 (22.22%)	3 (20.00%)	00:04:35	3 (30.00%)	0.00%	25.00%
3.	/en/news/health/oral-health-may-have-an-important-role-in-cancer-prevention	9	3 (16.67%)	1 (6.67%)	00:01:29	1 (10.00%)	0.00%	0.00%
4.	/en/news/health/oral-health-and-periodontitis-role-in-cancer-prevention	5	1 (5.56%)	1 (6.67%)	00:00:11	0 (0.00%)	0.00%	0.00%
5.	/en/news/health/oral-health-and-periodontitis-role-in-cancer-prevention	9	1 (5.56%)	1 (6.67%)	00:01:47	0 (0.00%)	0.00%	0.00%
6.	/en/news/health/oral-health-and-periodontitis-role-in-cancer-prevention	18	1 (5.56%)	1 (6.67%)	00:13:42	0 (0.00%)	0.00%	0.00%
7.	/en/news/health/oral-health-and-periodontitis-role-in-cancer-prevention	22	1 (5.56%)	1 (6.67%)	00:00:24	0 (0.00%)	0.00%	0.00%
8.	/en/news/health/oral-health-and-periodontitis-role-in-cancer-prevention	32	1 (5.56%)	1 (6.67%)	00:01:28	0 (0.00%)	0.00%	0.00%

APPENDIX 13. Comparison of new and returning users

Testing period (9.3-22.3) on top and reference period (22.2-8.3) at the bottom.

User Type	Acquisition			Behaviour		
	Users	New Users	Sessions	Bounce Rate	Pages/Session	Avg. Session Duration
organic google	40,754 % of Total: 51.86% (78,582)	26,486 % of Total: 46.18% (57,358)	62,028 % of Total: 56.70% (109,395)	49.87% Avg for View: 54.67% (-8.78%)	3.10 Avg for View: 2.80 (10.69%)	00:03:29 Avg for View: 00:02:56 (18.69%)
1. New Visitor	**26,373** (59.63%)	26,486 (100.00%)	26,483 (42.70%)	53.22%	2.87	00:02:31
2. Returning Visitor	**17,858** (40.37%)	0 (0.00%)	35,545 (57.30%)	47.37%	3.26	00:04:13

User Type	Acquisition			Behaviour		
	Users	New Users	Sessions	Bounce Rate	Pages/Session	Avg. Session Duration
organic google	38,959 % of Total: 50.58% (77,029)	25,176 % of Total: 45.03% (55,907)	60,096 % of Total: 56.20% (106,933)	49.50% Avg for View: 54.42% (-9.06%)	3.12 Avg for View: 2.80 (11.52%)	00:03:21 Avg for View: 00:02:51 (18.12%)
1. New Visitor	**25,026** (58.58%)	25,176 (100.00%)	25,174 (41.89%)	52.65%	2.88	00:02:29
2. Returning Visitor	**17,693** (41.42%)	0 (0.00%)	34,922 (58.11%)	47.23%	3.29	00:03:59

APPENDIX 14. Defining key design elements for user engagement.

Modified from Gerett et al. 2016

Navigation	Graphical representation	Optimal organisation	Content utility	Clear purpose	Simplicity	Readability
salient and consistent menu/navigation bars	inclusion of images	cognitive architecture	sufficient amount of information	establishes a clear and unique brand identity	simple subject headings	easy to read
aids for navigation (visible links)	proper size and resolution of images	logical, understandable and hierarchical structure	keep visitors interested and keep them on site	addresses visitors' intended purpose and expectations for visiting the site	transparency of information (reduce search time)	well written
search feature	multimedia content	information arrangement and categorization	content quality	provides information about the organisation and/or services	website design optimized for computer screens,	grammatically correct
easy access to pages	proper colour, font, size of text	meaningful headings and titles	information relevant to the purpose of site		uncluttered layout	understandable
	use of logos and icons	use of keywords	perceived utility based on user needs		consistency in design throughout website	
	attractive visual layout				ease of using (including first-time users)	presented in readable blocks
	colour schemes				minimize redundant features	reading level appropriate
	effective use of white space				easily understandable functions	

APPENDIX 15. Ranking changes for Article 2 including results after 3 weeks

Oral health may have an important role in cancer prevention				
keyword / phrase used	ranking prior	ranking 1 week after	ranking 2 weeks after	ranking 3 weeks after
oral health in cancer prevention	1st	1st Finnish article	1st	1st
oral cancer prevention	29th	19th Finnish article	-	-
pancreatic cancer prevention	24th	19th Finnish article	34th	-
oral cancer	-	-	-	-
periodontitis role in oral cancer	14th	3rd Finnish article	-	3rd
treponema denticola effect on cancer	2nd	2nd	4th	5th
Td-CTLP proteinase	4th	4th Finnish article	4th Finnish article	4th Finnish article
Td-CTLP proteinase in pancreatic cancer	1st	1st Finnish article	1st	1st
periodontitis role in pancreatic cancer	3rd	1st Finnish article	-	1st
link between periodontitis and cancer mortality	4th	5th	2nd	3rd
periodontitis cancer mortality	5th	5th Finnish article	-	-