Search Engine Marketing

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INTRODUCTION TO SEARCH ENGINE MARKETING

E-commerce has become the new economic model of transactions in people's daily life. With the rise of online shopping, more and more consumers turn to the internet for new information, such as the latest trends and best online deals. Research shows that more than 80% of internet users use search engines to search for information. However, in this massive surplus of information, users are often only interested in the top of the search result list. Hence, it is every company's goal to be ranked at the top by some techniques like Search Engine Marketing (SEM) which promotes sales by increasing the specific keyword exposure.

Search Engine Marketing, also known as SEM, is a method in which businesses market themselves by ensuring that their products and services appear in search engine results pages (SERPs). Through the use of paid advertising and search keywords, businesses are able to appear as a result of particular queries and get found by consumers on the web.

With the increasingly competitive marketplace and wide use of the internet, it is important for businesses to establish their presence through online advertising. Search Engine Marketing allows businesses to do this in the most effective way because it incorporates search engine optimization (SEO). SEO adjusts website content so that businesses can achieve a higher ranking in SERPs and enhance pay per click (PPC) listings.

Why do companies invest in Search Engine Marketing?

- ➔ Global accessibility
- ➔ Build online traffic quickly based on the degree of competition
- ➔ Ability to capitalize on consumers that trust the first few links in search engine results *(See Appendix A for the searcher's view of SEM)*
- ➔ Increase online presence and relevance
- ➔ Accumulate new visitors to their website
- ➔ Reach the right consumers in terms of demographics, geographical location, social status, etc.
- ➔ Non-intrusive form of advertising that reaches consumers at a time when they are open to new information

  **See Appendix B for a summarized diagram of the searcher's end*

SEM Keyword Research

Before you can choose which keywords to use in your search engine marketing campaigns, you need to conduct comprehensive research as part of your keyword management strategy. First, you need to identify keywords that are relevant to your business and that prospective customers are likely to use when searching for your products and services. Simply enter a keyword that's relevant to your business or service, and see related keyword suggestion ideas that can form the basis of various search engine marketing campaigns.

SEM tools

1. SEMRush
    a. SEMRush is used to analyze the marketing analytics of competitors (through extensive keyword research, keyword rank tracking, traffic analysis, etc.) in order to help businesses out-rank their competitors and cultivate their own keyword strategy.
2. Google Trends

    a. Google Trends allows businesses to track the trends of particular keywords across regions, languages, time frames, etc. This tool helps businesses identify trending words that they can invest SEM efforts in.
3. Keywordtool.lo
    a. Keywordtool.lo taps into Google, Bing, YouTube, Amazon, Instagram, Twitter and the App Store for keyword research. It also provides variations of a base keyword for a more extensive list of possible keywords that the businesses may want to pay for.
4. Google Ads
    a. Google Ads is an online advertising platform developed by Google, where advertisers pay to display brief advertisements, service offerings, product listings, video content, and generate mobile application installs within the Google ad network to web users.

**See Appendix C for a summarized diagram of the advertiser's end*

PLANNING

A. Project Initiation and Planning

1. Deliverables and Outcomes
    a. Problem Statement

        Nowadays, technology is developing at a rapid rate. Specifically, it has caused advertising to change drastically. News has gone primarily online and the effectiveness of print media, such as posters, billboards, and flyers, is declining. Due to this shift in advertising, some business encounter various problems concerning their ability to reach their target consumers and make others aware of their products or services. With this said, it is essential for businesses to innovate their advertising and marketing efforts to keep up with the changing times and to accommodate the growing preference for digital content. With a growing number of consumers shopping for products using the internet, Search Engine Marketing has become a crucial digital marketing strategy for widening a company's reach.

    b. Project Objectives
        1. Define Search Engine Marketing and its different processes
        2. Analyze the systems and requirements involved in SEM through the use of diagrams
        3. Examine the current design of SEM processes and interfaces
        4. Evaluate the importance of SEM to modern day businesses and advertising processes

    c. Project Description

        The project focuses on Search Engine Marketing and how businesses can utilize this to improve their operations. SEM procedures, requirements, and design will be discussed. How businesses can better establish their online presence through SEM will also be examined.

    d. Expected Duration

        The duration of the project will be for the entire first semester of Academic Year 2019 to 2020.

2. Project Feasibility
    a. Economic Feasibility

        With SEM, the financial benefits outweigh the costs when compared to print advertising. The only costs incurred in SEM are dependent on the advertisement type used, as compared to print advertising which has higher costs because of printing, designing, and manpower related expenses. SEM is also able to reach a larger number of people on a much wider scale, as compared to print advertisements which are limited to physical reach.

    b. Technical Feasibility

        The development of an SEM system is feasible because of the various technological tools and applications readily available for keyword research, keyword strategy, and marketing analytics. However, some risk is involved because the group members are not so familiar with the systems development process involved in SEM.

c. Project Risk Factors

The project risk factors are concerned primarily with the development group and the user group. The development group is the familiarity with the platform, software, development method, application area, and development of similar systems. This is considered a risk factor as not all members of the group are familiar with the SEM platform and the various software it utilizes, thus extensive research had to be done. On the other hand, the user group is the familiarity with the information system development process, application area, and use of similar systems. This is also considered a risk factor as the members were not familiar with the processes involved in information systems.

3. Project Benefits
   a. Tangible Benefits

The tangible benefits of the project include cost reduction, increased reach, and increased speed of activity. With SEM, costs are reduced because instead of spending money and other resources on numerous print advertisements, the only cost incurred would be on the online advertisement type used. SEM usually follows a Pay Per Click (PPC) system, meaning a website owner only pays once his or her advertisement is clicked. Increased reach is also attained because with SEM, advertisements are available online, therefore becoming accessible to anyone with internet access. With increased reach comes increased speed of activity because more target consumers are reached with less resources, allowing for a quicker and cost-effective dissemination of information. These are tangible benefits because the cost per person reached significantly decreases.

   b. Intangible Benefits

The intangible benefits of the project include the reduction of waste and improved efficiency. There is a significant reduction in waste because advertising efforts are shifted to a digital platform, eliminating the need to print physical advertisements that eventually just end up in the trash. Improved efficiency is also achieved because as mentioned, less resources are utilized to reach a larger number of people. Efficiency is also improved because with SEM, the advertisement reaches target consumers or people actively looking for one's product or service, as compared to physical advertisements which reach just anyone.

4. Project Costs

The costs incurred in Search Engine Marketing revolve around the type of advertisement used. Advertisement types include Pay Per Sale (PPS), Pay Per Impression (PPI), or Pay Per Click (PPC). PPI is a type of fixed cost, while PPS and PPC are types of variable costs.

   a. Fixed Costs

Pay Per Impression or PPI advertising is based around a fixed or pre-determined fee for every 1,000 impressions of an advertisement, meaning for

every one thousand times your advertisement appears, you will be charged regardless of whether anyone has clicked it.

b. Variable Costs

Pay Per Sale or PPS advertising is a system wherein the website owner is paid on the basis of the number of sales that are directly generated by an advertisement. More popularly used in SEM is Pay Per Click or PPC advertising, meaning an ad is only paid for when someone clicks on it. PPC advertisements are generally based on a bidding system for keywords, and savings can be made on this type of advertisement by using keyword research and traffic analysis tools to determine how popular a search term is and how expensive it will be.

One-time costs and recurring costs may also be involved, specifically in the start-up and development of SEM systems. These costs may be incurred due to implementation or advancement of keyword research and strategy tools or marketing and traffic analysis tools.

ANALYSIS

A. Determining System Requirements

Deliverables for Requirements Determination

Interviews, surveys, and direct observations can give useful information on what keywords are most popularly used by target customers. This can significantly make search engine marketing campaigns more effective and relevant. Through these deliverables, one can also obtain other essential data such as demographics and trends to better understand the target customers and to better inform the search engine marketing strategy. Existing written documents about the business can also be utilized to ensure that all decisions related to the search engine marketing strategy (such as what keywords to use, what products to advertise, and others) are relevant to the business' mission and demands.

Analyzing Procedures

Search Engine Marketing through the different aforementioned tools for users usually follows a typical procedure. For example, ads.google.com, google's search engine marketing platform follows these simple steps for users:

1. Users select the goal of the advertisement whether it be to drive people to a website or to drive more store visits or calls.
2. Next, users select where in the world they want their ads to be seen. They can target certain areas locally or choose even to go global and target areas in different regions around the world.
3. The next step for the user would be to create the message of the ad to be seen on the search engine results
4. Following this would be to set the payment. For google, their payment schemes vary depending on a number of factors leading to the reach and effectiveness of the search engine ad. These can be budgeted for a set time depending on the desire of the user. Other tools and platforms have varying payment options to avail of more services for a given time.
5. Afterward, ads can proceed to go online and will appear on search engine results and across different platforms allowing for more effective search related and targeted advertising.

Based on these steps, the following is the initial analysis of the user procedure:

- These procedures are effective for the platform given that the users need little to no knowledge and background in the use of search engine marketing.
- It, however, does not delve too deep into the numbers and analysis of the effectiveness of the SEM from an initial user standpoint. This is sacrificed for a simpler ease of user interface.
- The procedure allows for convenient and cost-effective budget management of the available funds a user may have for SEM
- The procedure places importance and focuses on the key factors needed to specifically drive the attainment of specific user goals based on the needs of the user's business.

Formal Systems

A formal system is the official way a system works or describes a work procedure. An example of a formal system is Google's Quality Score. Quality Score is arguably the most important metric in search engine marketing. This is Google's rating of the quality and relevance of both keywords and PPC ads. As seen in *Appendix D*, this process is used to determine a company's ad rank and position by determining a company's quality score and multiplying it by a company's maximum bid. It is important to understand this process since high-quality scores can help a company achieve better ad positions at lower costs. Moreover, Google favors ads that are highly relevant to user queries. A quality score depends on multiple

factors such as click-through rate (CTR), the relevance of each keyword to its ad group, landing page quality, the relevance of one's ad text and a company's historical Google Ads account performance.

B. Structuring System Process Requirements

Processes	- Process and identify the keywords from a search query. - Identify and process the ads to be returned on the search page results based on the algorithm and keywords from the search. - Collection and calculation of the numbers generated from the search engine advertisement.
Data Stores	- **Keywords Bank:** The database of keywords and what results are returned. - **Advertisement Database:** The ads targeted at the researcher based on location, cookies, and keywords inputted into the search. - **Advertisement Numbers and Statistics:** The statistics shown to the advertiser reporting the results and reach of the search engine advertisement created.
Sources/Sinks	- **The Researcher:** He or she inputs the search query - **The Researcher:** He or she sees the ad returned on the search engine - **The Advertiser:** The person that created the ad based on the keyword searches

Figure 3.1: Elements of the Data Flow Diagram (DFD)

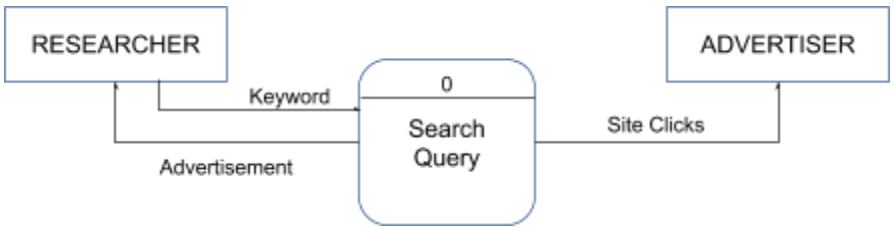


Figure 3.2: Context Diagram of Search Engine Marketing

Figures 3.1 and 3.2 illustrate an overview of an organizational system that shows the system boundaries, external entities that interact with the system, and major information flows between the entities and the system. The diagram includes researcher and advertisers as the sink and source. The data that flows through the system are the keyword, advertisement, and the number of site clicks that returns to the advertiser. Lastly, there is only one process in the diagram which is the search query, wherein the researcher inputs its desired keyword and the search engine returns the relevant advertisements to the search.

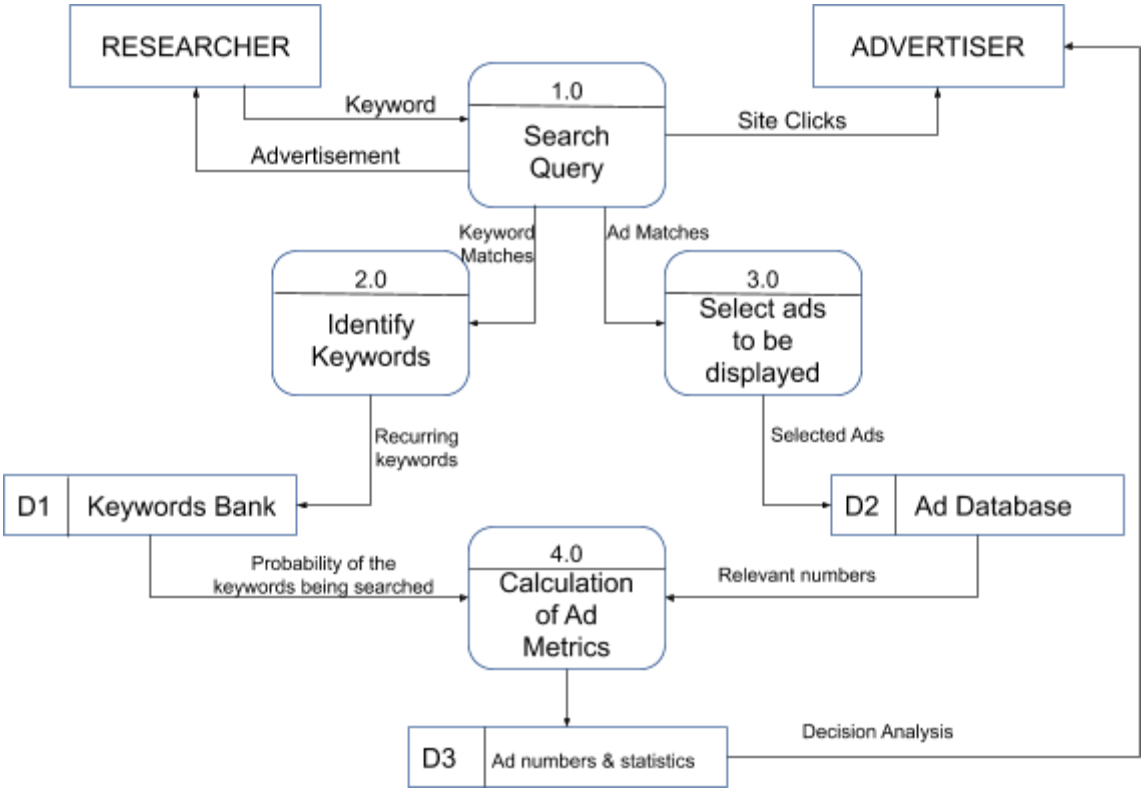


Figure 3.3: Level-0 Data Flow Diagram

Figure 3.3 displays the Level-0 DFD of SEM which represents the system's major processes, data flow, and data stores but at a higher level of detail. Some have been decomposed into more lower-level processes such as *Identify Keywords (2.0), Select ads to be displayed (3.0),* and *Calculation of ad metrics (4.0)*. Moreover, Level-0 DFD now includes data stores which the context diagram did not possess, such as *Keywords Bank (D1), Ad Database (D2),* and *Ad numbers & statistics (D3)*. Notice how this diagram follows the Data Flow Diagramming rules namely that inputs should be different form outputs and that every object must have a unique name.

	Conditions/Courses of Action	**Rules**					
		1	2	3	4	5	6
Condition Stubs	Exact keyword match	Y	Y	Y	N	Y	N
	Close variants of keywords	Y	Y	N	Y	N	Y
	Location match	Y	N	Y	Y	N	N
Action Stubs	Advertisement appears	X	X	X		X	
	Related advertisements appear	X	X		X		X

Figure 3.4: Decision table for Keyword Identification Process

The figure above displays the decision table, a matrix representation of the logic of a decision which specifies the possible outcomes for the decision and the resulting actions. A decision table is best used for complicated decision logic. In SEM, decisions need to be made in order to identify the apt keyword for certain advertisements. Moreover, user data such as location, age, sex, among others are important factors the search engine must consider before displaying a certain advertisement.

Questions to be asked

1. Who is the target audience?
2. What products or services need to be advertised?
3. Which keywords are relevant to your business?
4. What keywords are prospective customers likely to use when searching for your products or services?
5. What keywords are trending across languages, regions, demographics, etc?
6. How much web traffic is desired? What are the key performance indicators?
7. Does the target audience prefer sponsored or organic listings?
8. Where do you want your ads to be seen?
9. Are there competitors using the same strategy?

C. Structuring System Data Requirements

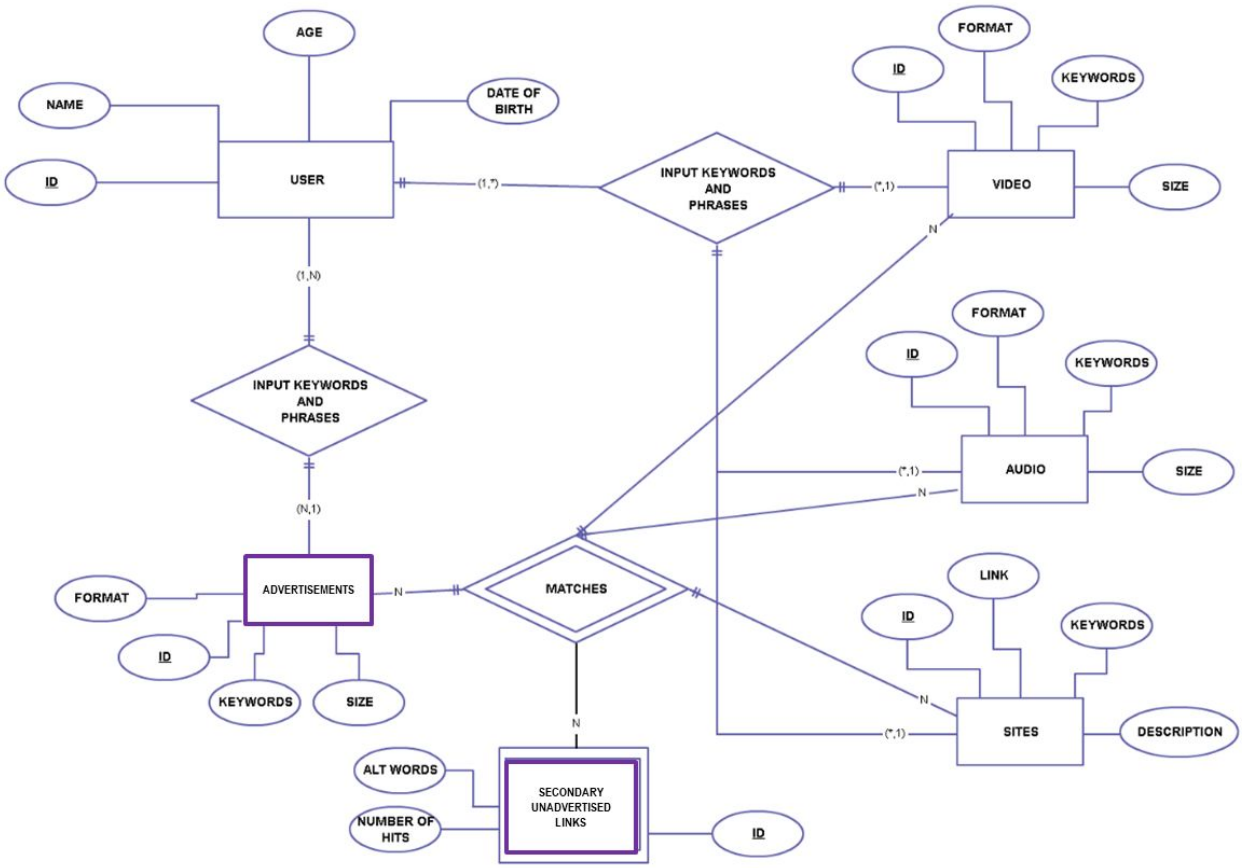


Figure 3.5: Search Engine Marketing Entity-Relationship Diagram

Figure 3.5 is the SEM Entity-Relationship Diagram which portrays a detailed, logical representation of the entities, associations, and data elements for a system. This diagram expresses the system in terms of data entities, such as advertisements, users, audio, video, and sites, as well as relationships between them, whether it may be one-to-one, one-to-many, so on and so forth.

Entity	Attribute	Candidate Key	Identifier
User	Name, age, general location, ID	N/A	N/A
Search Engine	Cookies, user data, inputted keywords, and phrases	Input keywords and phrases	Input keywords and phrases - The unique keywords are what will be used to return results and the appropriate ads
Results	Images, videos, websites, alternative words	ID, link, descriptions	Links - The links from the results are what is unique to the search
Advertisement	Format, ID, Keywords	N/A	N/A

Figure 3.6: Entity attributes, candidate keys, and identifiers

The figure above defines the characteristics of an entity, namely attribute, candidate key, and identifier. The attribute states why it is important, what is included, and the source of values for the attribute. The candidate key, in this case, is an attribute or combination of attributes that uniquely identifies each instance of an entity type. Lastly, the identifier goes even more specific, with it being a candidate key that has been selected as the unique, identifying characteristic for an entity type.

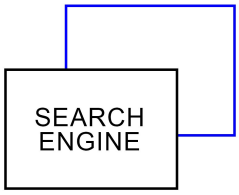


Figure 3.7: Unary Relationship

Figure 3.7 showcases a relationship between the instances of one entity type, also called a recursive relationship. In this instance, search engines may refer to Google, Yahoo, Bing, and the like.

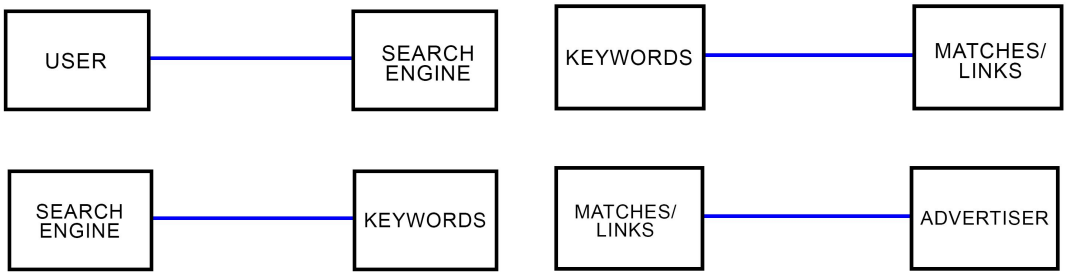


Figure 3.8: Binary Relationship

The next figure shows binary relationships or a relationship between instances of two entity types. The entities above constantly interact with each other in the system. The user would use the search engine and likewise, the search engine would require keywords.

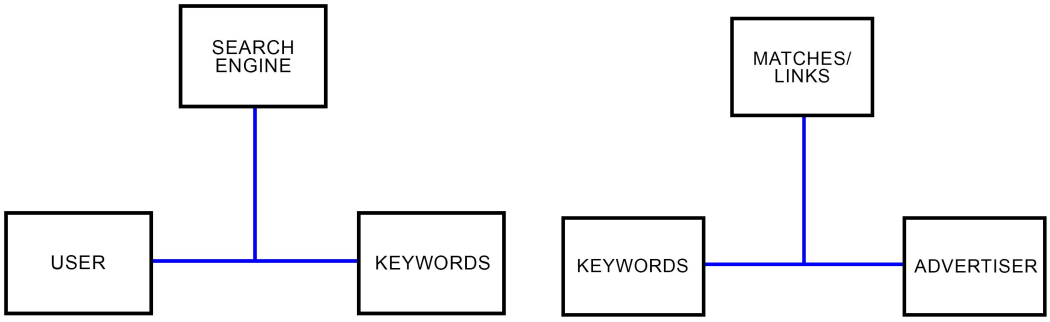


Figure 3.9: Ternary Relationship

Figure 3.9 represents the ternary relationship or a simultaneous relationship among instances of three entity types. For instance, the entities interact in the system when the user inputs keywords and the search engine receives these keywords.

DESIGN

A. Designing Databases

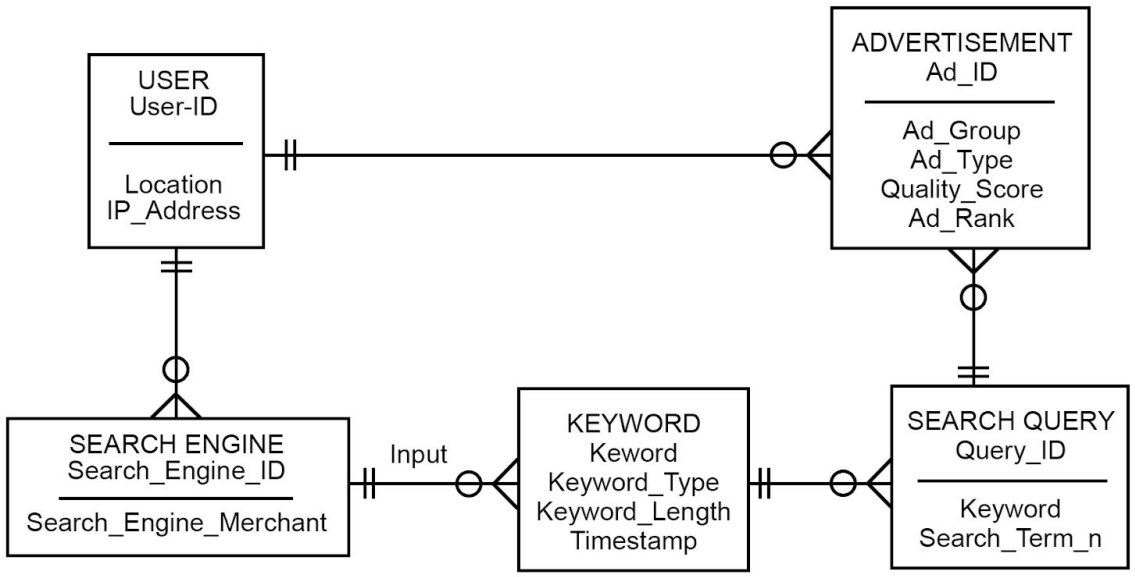
USER		
User_ID	**Location**	**IP_Address**
User1@email.com	Philippines	112.205.244.146
User2@email.com	Japan	115.324.567.995
User3@email.com	Korea	141.186.115.182

SEARCH ENGINE	
Search_Engine_ID	**Search_Engine_Merchant**
Google	Google_Adwords
Bing	Microsoft_Ads
MSN	Microsoft_Ads

KEYWORD			
Keyword	**Keyword_Type**	**Keyword_Length**	**Timestamp**
Island hopping	Text	Medium	Thurs Nov 07 03:36:52 2019.
Top 10 hotels to stay in	Combination	Long	Tues Apr 23 11:08:24 2019.
Siargao	Text	Short	Thurs Feb 14 09:46:11 2019.
7107	Numbers	Short	Sun Jul 07 06:57:39 2019.

SEARCH QUERY				
Query_ID	**Keyword**	**Search_Term_1**	**Search_Term_2**	**Search_Term_3**
109249348	Siargao	Surfing capital of the Philippines	General Luna	Island Hopping
084293758	Boracay	White sand beach	Philippine beaches	Vibrant nightlife
029384756	Palawan	Underground river	7 wonders of the world	Lagoon
102938602	Cebu	Whale sharks	Lechon	Queen City of the South

ADVERTISEMENT				
Ad_ID	**Ad_Group**	**Ad_Type**	**Quality_Score**	**Ad_Rank**
120485038	Food	Pay Per Sale (PPS)	6	#3
298475930	Travel	Pay Per Impression (PPI)	8	#1
574039599	Accommodation	Pay Per Click (PPC)	5	#2



Relations:
USER(User_ID, Location, IP_Address)
SEARCH ENGINE(Search_Engine_ID, Search_Engine_Merchant)
KEYWORD(Search_Engine_ID, Keyword_Type, Keyword_Length, Timestamp)
SEARCH QUERY(Query_ID, Keyword, Search_Term_*n*)
ADVERTISEMENT(Ad_ID, Ad_Type, Quality_Score, Ad_Rank)

Figure 4.1: Logical Database Design and Conceptual Data Model

Figure 4.1 shows the first step in database design which is to develop a logical data model for each known user interface. Each table contains the entities and their corresponding attributes. The entities included in the database are *User, Search Engine, Keyword, Search Query,* and *Advertisement.* Likewise, each entity has attributes, for instance, *User* has attributes *User_ID, Location,* and *IP Address.* Notice how each entity has uniquely named attributes. These entities resulted in a conceptual data model.

B. Designing Forms, Reports, and Interfaces

1. Designing Forms

Forms are business documents that contain some predefined data and include some areas where additional data are to be filled in. An instance of a form is typically based on one database record. *(See Appendix E)*

2. Designing Reports

Reports are business documents that contain only predefined data. It is a passive document used solely for reading or viewing data. A report typically contains data from many unrelated records or transactions. *(See Appendix F)* Some common types of reports are as follows:

- Scheduled: produced at predefined time intervals for routine information needs
- Key-indicator: provides summary of critical information on regular basis
- Exception: highlights data outside of normal operating ranges

- Drill-down: provides details behind summary of key indicator or exception reports
- Ad-hoc: responds to unplanned requests for nonroutine information needs

3. Designing Interfaces

➔ **Dropdown menu (Appendix G)**
- We will be providing dropdown menus, which is a menu-positioning method that places the access point of the menu near the top line of the display. This will ease the process of navigating through the search engine for our users.

➔ **Icons (Appendix H)**
- We will be placing graphical pictures that represent specific functions within a system. Moreover, we will use icons that are easily understood by users and maximize space as much as possible. For example, we can use a “magnifying glass” icon for the search function.

➔ **Color (Appendix I)**
- We will be using different colors to distinguish advertisements from links. For example, we can use green to indicate that it’s an advertisement and blue to highlight links. In effect, it will provide an accent to a display filled with words. Moreover, our users will have an easier time distinguishing one from the other.

➔ **Pop up menu (Appendix J)**
- We will also be providing pop up menus, which is a menu-positioning method that places a menu near the current cursor position. With this, the users would be able to perform a series of actions in the most efficient way possible.

➔ **Easy Navigation System (Appendix K)**
- To ensure that our users can navigate through our system easily, we will be showing users how to move forward and backward, and where they are currently. Moreover, we will be providing related links and actions in order to speed up their navigation.

➔ **Meaningful Titles (Appendix L)**
- To avoid confusion among our users, we will be using clear and specific words to describe the information displayed. Moreover, we will ensure that our information is current and accurate, as well as related to the meaningful titles presented in the display.

➔ **Natural Language Interaction**
- We will be providing all conventional spoken languages, such as English, Tagalog, Spanish, etc. to accommodate all our users. In our system, we will let the user indicate their country of origin and preferred language to adjust to their needs.

➔ **Balanced Layout (Appendix M)**
- In order to make a display that is aesthetically pleasing to the eye, we will be using adequate spacing, margins, and clear labels to attract our users. Through this, our users will be inclined to use our information system.

➔ **Cookie Crumbs (Appendix N)**
- We will be utilizing cookie crumbs, which is the technique of placing “tabs” on a Web page that shows the user where he or she is on a site and where he or she has been. With this, it will allow users to navigate to a point previously visited and will assure they are not lost.

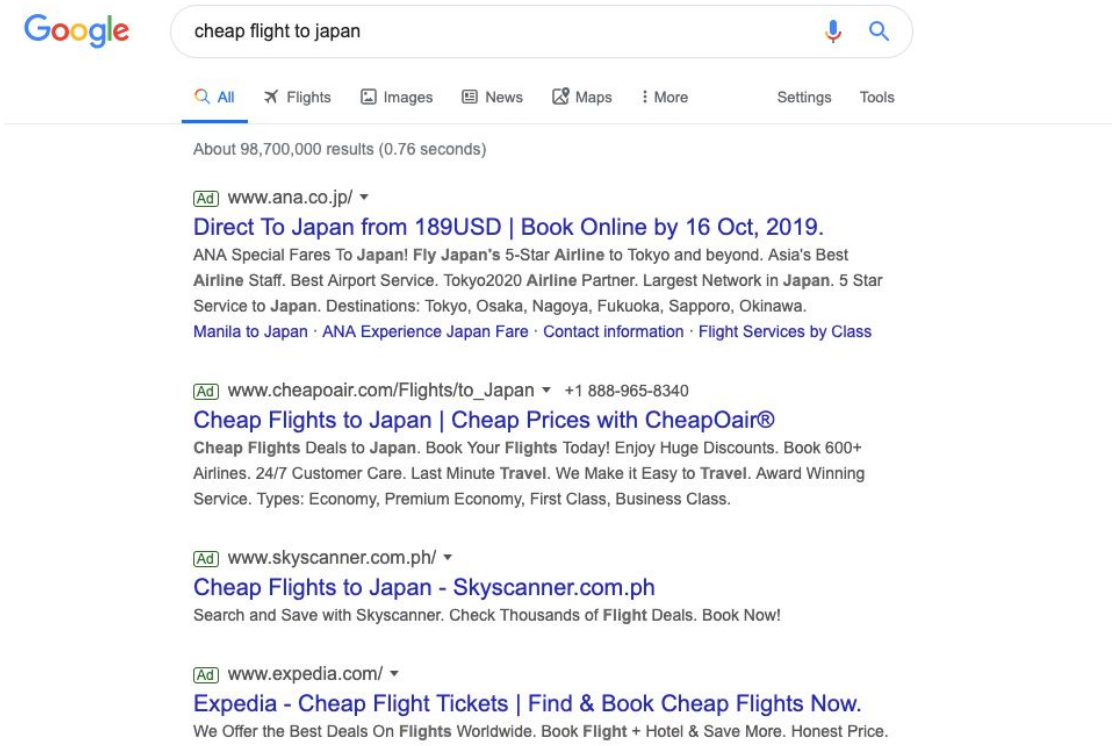
CONCLUSION

Search Engine Marketing has its established uses in the industry as a tool for businesses to gain reach and grow the current customer base through the use of targeted ads in the form of website links that appear on search engine results. Current Search Engine Merchants such as Google Ads and Microsoft Ads have utilized this as a profit generating avenue for their respective search engines. These merchants have worked to make the use of search engine marketing more convenient from the perspective of an advertiser or business owner. Throughout this paper, this process was described in detail to understand the procedures and factors that contribute to the end results of SEM.

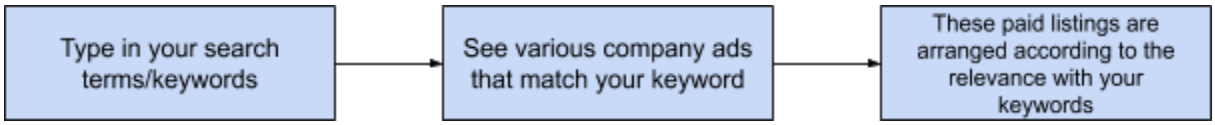
The Breakdown of System Processes, Procedures, System Relationships, and the Design of Search Engine Marketing was analyzed for its strengths and weaknesses to understand the value that the current systems bring to businesses and advertisers. With this diagnosis, search engine marketing is more easily understood and can be better utilized by different users, no matter the background or prior knowledge of SEM tools.

APPENDICES

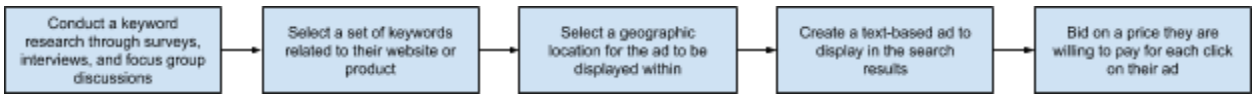
Appendix A: Searcher's view of Search Engine Marketing



Appendix B: Searcher's end

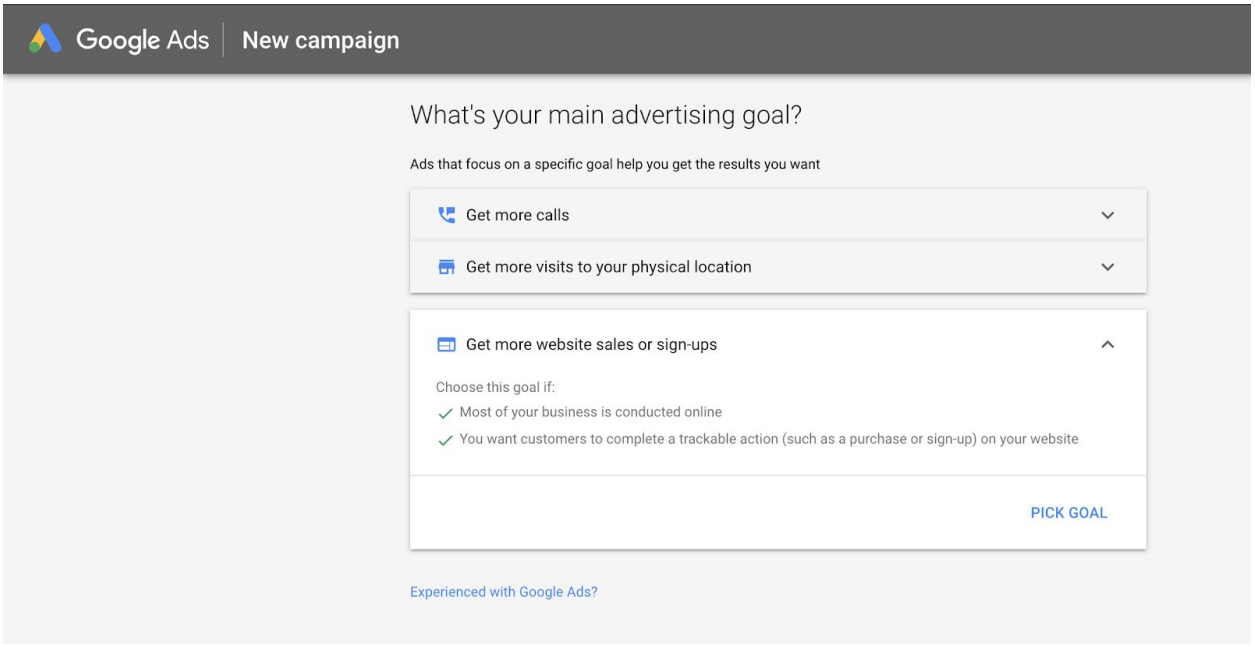


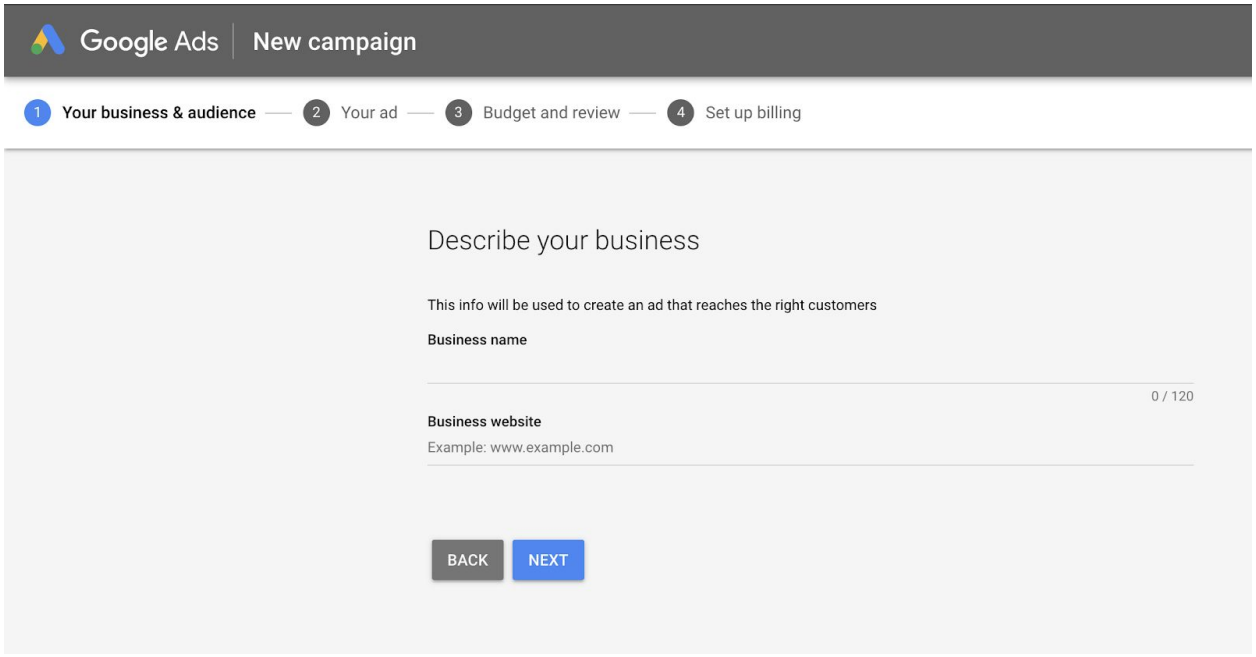
Appendix C: Advertiser's end



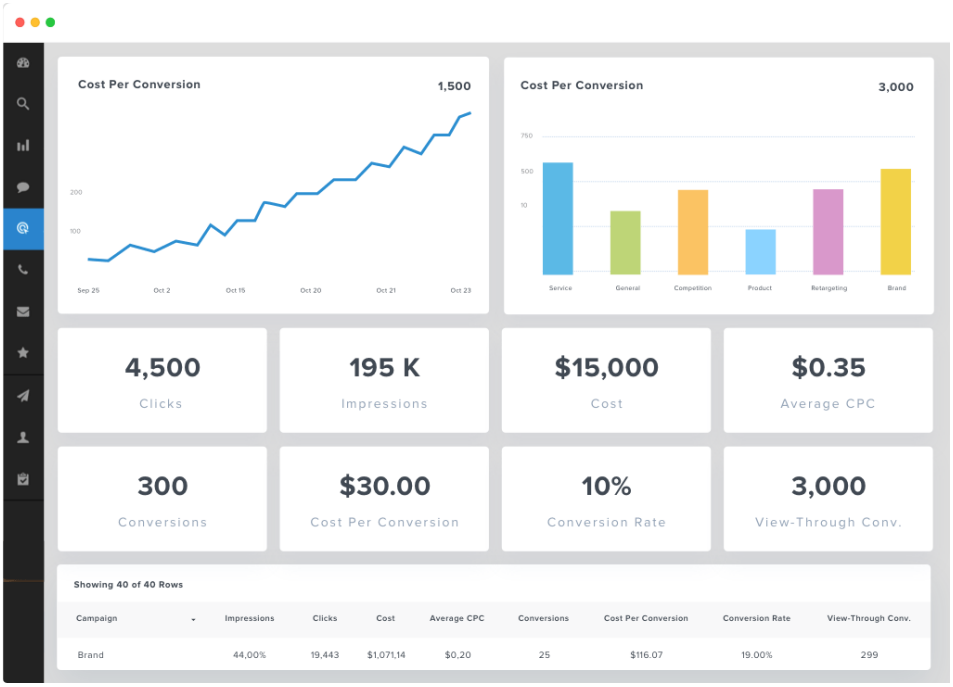
Appendix D: Ad Auction Process

Appendix E: Designing Forms

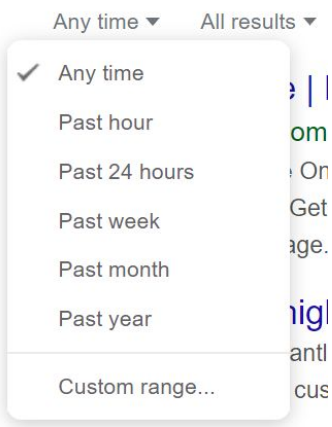




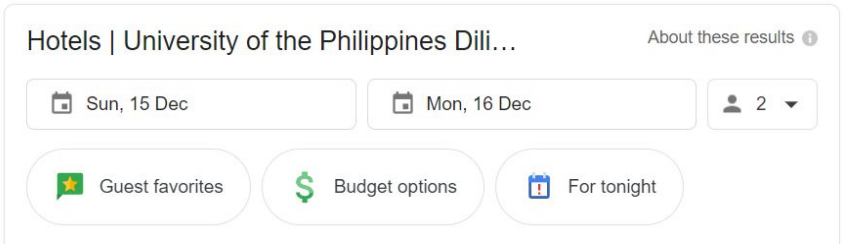
Appendix F: Designing Reports



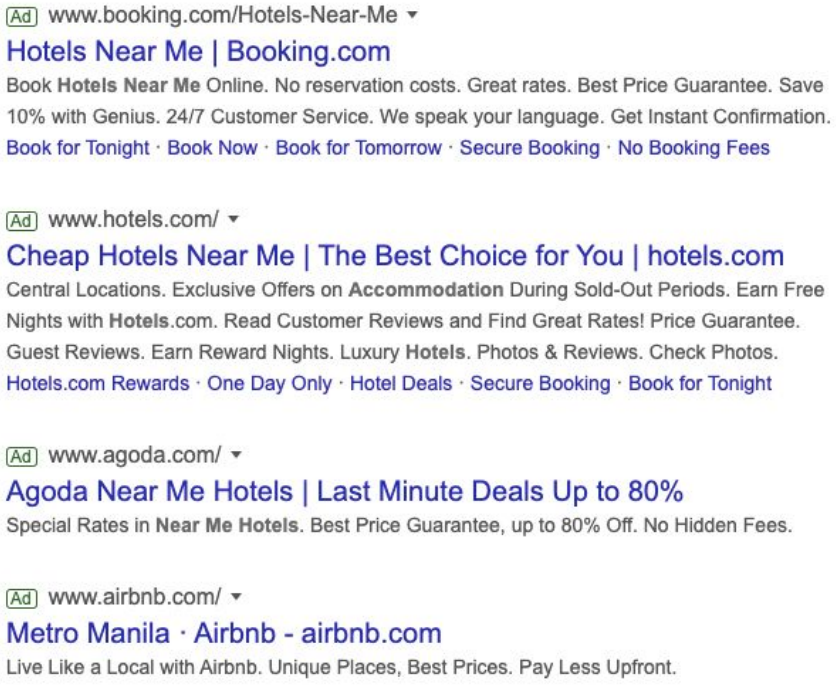
Appendix G: Drop-down menu



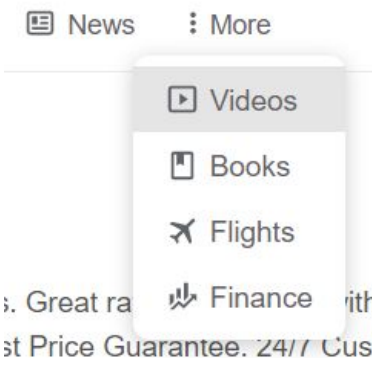
Appendix H: Icons



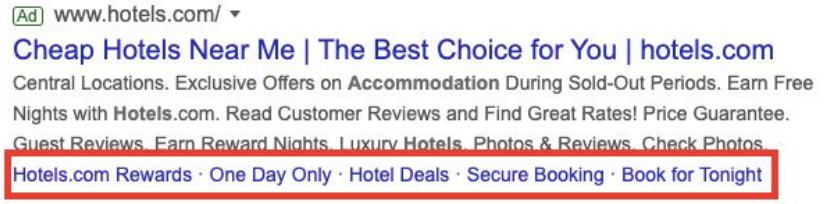
Appendix I: Color



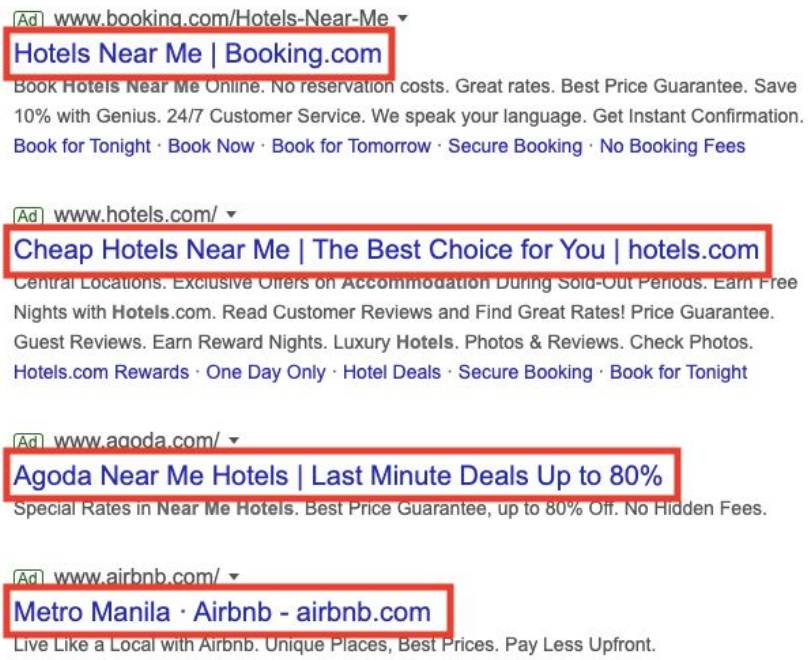
Appendix J: Pop-up menu



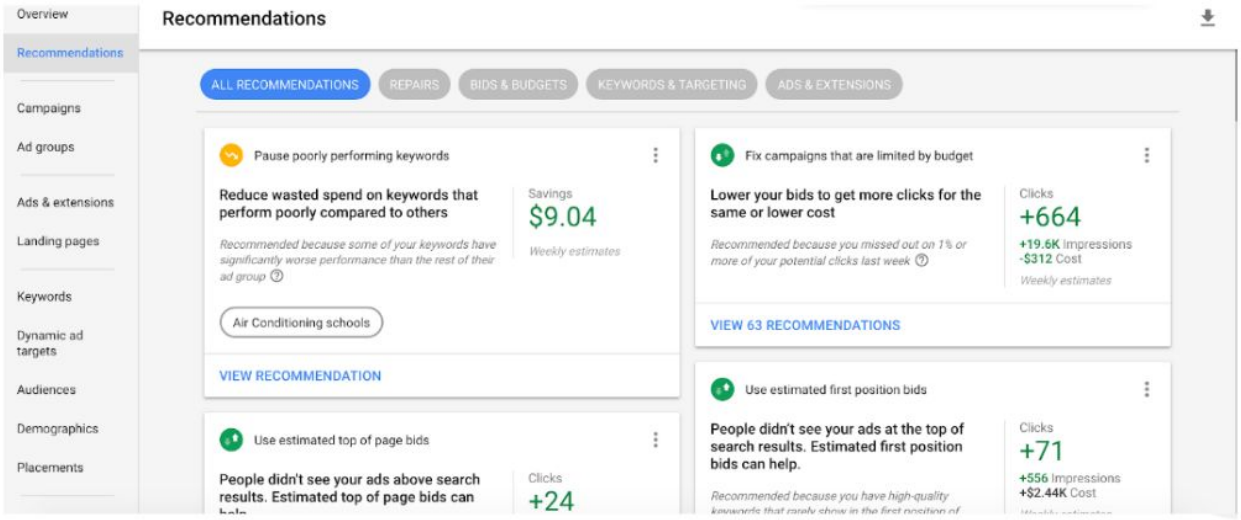
Appendix K: Easy Navigation System



Appendix L: Meaningful Titles



Appendix M: Balanced Layout



Appendix N: Cookie crumbs