Analysis Methods for Search Engine Optimization

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Abstract: Analysis Methods for search engine optimization can be described as a cluster of strategies and techniques used to SEO friendly, (Browser, Mobile, Architecture) Quality and increase the amount of visitors to a website by obtaining a high-ranking position in the search results page of a search engine (SERP) .This review paper things to see different analysis methods to be taken into concern while performing SEO for a website. So the primary goal of SEO Analysis methods is to build the seo friendly website and increase the visitor traffic to your website and convert them to your potential customers.

Keywords: Search Engine Optimization (SEO), Analysis, Testing, Website Optimization

1. INTRODUCTION

Search Engine Optimization (SEO) is very essential for today's businesses. It has proven to be an effective way of increasing the brand value of a business and increasing its visibility. SEO comprises of well thought-out set of steps that need to be executed in a skillful manner. Among these steps, analysis is the most vital aspect. Without analysis one cannot start the process of SEO, host a website or even buy a domain. It is only through a sound analysis procedure that you will be able to have a profit rendering SEO. Without this you may land up in an ad-hoc and ineffective SEO process that would waste your time and efforts.

Search Engine Optimization, or SEO as it is called, is a set of strategies, techniques and mechanisms applied to individual web pages or the whole website with the aim of improving its ranging on the Search Engine Result Page (SERP). A research study conducted in the year 2014 states that 70% [1]of the internet users find their way to the necessary websites through search engine. Therefore, it becomes very important for you to implement SEO for your business sites. Through this you can also strengthen the web presence of your organization and access your potential clients in an easier manner.

The objective of this thesis was to illustrate how analysis plays a crucial role in the SEO process. With sound analysis, you can attract internet traffic and heighten your website's organic ranking. The study also focuses on the key factors and methodologies that are frequently used to build a successful website.

The research used both the qualitative and quantitative methodologies for the case studies. Data was collected by observation done on the case company website. After this, analysis[2] was done on the data collected in terms of the effect it has on the website's SEO. Through this suggestions have been given to improve a website's ranking efficiently.

The conclusion of this project was that any concerned company that employes several different ways to apply SEO based on this analysis method that I propse is a way that might show visible growth. While some of the techniques were good enough, modifications and additions were required in order to push the website up on the SERP ranking list.

2. RESEARCH METHOD

The key research questions answered by this study are given below. Additionally, the study focuses on exploring two kinds of analysis – primary and secondary. By understanding the positive effects of these and knowing how well you can carry out these activities will help your website enormously from the perspective of SEO.

Research Questions

2.1 Why you need SEO analysis?

When you have thorough analysis in place, you can select the right domain and hosting plan. You can also develop an effectual website, and come up with a good SEO and marketing strategy for your business[3]. Analysis gives you a clear picture about the following key factors,

- Your business prospects
- The required business and operational processes
- The services that you would put forth
- Online competition that you need to be ready for
- Website architecture
- Inbound and outbound links
- Branding engagements

This kind of clarity can lead you to take better business decisions and navigate the course of your activities in a successful manner.

2.2 What is SEO analysis?

Analysis can be considered as a research process (Data Mining) that is imperative for the success of your SEO. It is mandatory to perform analysis meticulously before you get on with website activities pertaining to each page. The following questions aid you in the analysis process;

- What type of analysis has been done so far?
- How will you implement SEO and what type of pages will be crawled by the search engine?
- What pages of your site are indexed?
- Do you have a proper landing page and targeted keywords indexed to it?
- How is your site fairing at each search engine?
- Based on the SEO result, how are you going to restart your analysis?

It is important to understand that analysis is a cyclic procedure. Every time an analysis is done, it will yield different result based on the algorithm used by the search engine and the updates that have happened to them. When you attempt to understand the right approach to implement SEO[4], it becomes a daunting task if you base your analysis on whether the website is static or a dynamic one. Rather, you need to understand the algorithm used by the search engine, observe the competitor's strategies and keep track of their social network update. Once you have this information you can then start off the work of website optimization and Social Media Optimization (SMO). Nowadays it is not uncommon to see the websites indexed with verified social media profile, Google Plus business listing, Wikipedia and other Applications. The modern day market makes business targeting through online resources inevitable. That's the reason you need to market your business through website with the support SEO, SEM, ASO, ASM, SMO, SMM and other digital marketing techniques.
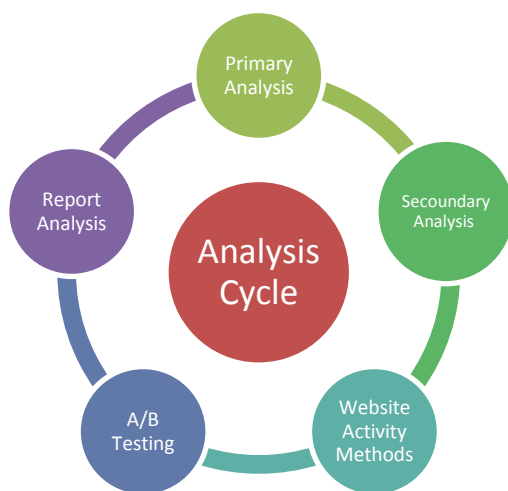
3.ANALYSIS METHOD

Figure 1: SEO Analysis Cycle

SEO analysis method has definitive steps using which you can thoroughly gauge the current state of your website and come up with the right plans to bring in business growth through online resources.

3.1. Primary Analysis

The analysis cycle starts off with primary analysis. This phase is mandatory and has to be considered seriously before creating, updating or deleting content and images on a web page. When this is done rightly, you can devoid your website of duplication of all kinds, whether it is content, links or images. You can also get to understand the business process and project requirement well. Once you have a good idea about your business process, you will be able to have a sound website architecture based on your preferences of static or dynamic website. You can also base the architecture on your services, products or e-commerce solutions.

The following steps need to be done for primary analysis,

- Keyword Analysis[5] - You need to analyze different types of keywords like, Two Phrase keywords, Three Phrase keywords, Log tail Keywords, Geo target keywords, and so on
- Competitor Analysis - You need to analyze your competitor's business based on keywords along with the geographical preference. For example, you will have to examine the keywords for the local (google.co.in) and global (google.com) market separately.
- Competitor Back Link analysis -You have to perform analysis on your competitors' inbound and outbound back links.
- Search Engine Algorithm Analysis - For Google, Search Engine Algorithms have been evolving since 2000. It has seen tremendous growth until recent & will keep getting update frequently, also known as "Google Dance" with the most recent ones being Penguin & Panda. This analysis is necessary to understand how the search engines filter the relevant result on SERPs. Other Search Engines have their own Algorithms for SERPs.

3.2. Secondary Analysis
After you are through with the primary analysis and have the bigger picture in place, you need to get into the secondary analysis phase.

3.2.1 Domain
The domain name[6] represents your brand name and your services. So, it is of utmost importance that you choose a domain name that signifies your business and aids your SEO process.

The elements you need to consider while choosing a domain name are,

- Protocol
- Sub-domain name
- Domain name
- Top Level Domain (TLD)
- Directory
- Sub directory

Figure 2: Elements of domain name

The best practice while performing SEO is to consider the top-level domain which is categorized by,

1. Generic top-level domain (gTLD)- Example: org, com, info and net domains
2. Country code top-level domain (ccTLD) – Example: co.in, .de, .fr, .au, .fi, .jp, .nl, .kr

Your website's domain name should be in-line with the services that you put forth. In accordance to your services or products you need to select an extension that would work well for search engine result. For instance, if you provide education related services, your website should have the ".edu" extension[7]; if you run an organization, you can prefer ".org", and if you have a commercial website, you should select .com as the extension. If you are looking to expand locally it would be preferable for you to choose extensions like, "www.example.co.au" or "www.example.co.in". This will help you have a approach to target your audiences geographically. If you have multiple offices in different locations, you can have sub-domains like "in.example.com" or "us.example.com". Additionally, you need to avoid using special characters like the hyphen in domain names, and keep the name less than 15 characters for optimum results.

Domain name selection:
When you want to select an apt domain name, you start off by listing out 5 to 10 keywords based on your brand name and services.

An ideal domain name would be,
- Short
- Easy to remember
- An exact match with your brand name
- A primary keyword
- Easily spelt

When you scrutinize the different keywords to pick one as your domain name, ensure that you analyze each of them based on the following criteria,
- Local Search volume
- Global Search volume
- Competitor analysis for the keyword

The above stated search volume can be found out via the Google keyword planner. When you target your SEO on local or global search, you can select keywords based on lesser competition and higher visits per month. To handle keyword search volume, you need to be specific about the match type (Board Match, Phrase Match and Exact Match). You also need to understand the usage of long tail and short tail keywords. You need to primarily get to know the search term of the services based on the keyword, after which you can refine keywords according to the competitor. However, you have to know that each service keyword will have different set of competitors.

Exact Match Domain (EMD) and Partial Match Domain (PMD):
When you select a domain name, make sure that it is based on the brand name and the service name. But at the same time, don't make it an exact match of your services. As per Google 2012 algorithm, EMDs and PMDs are considered to be of low quality and project lower rankings on SERPs Mostly, when there is a poor quality website, an exact match domain will affect its SEO to a large extent. If the domain name contains Brand name plus the Services and has good quality, it may fair well in the SERPs.
For example;

Figure 3: Domain name contains brandname plus services

Next, you need to understand the DNS records, Sub-domains and Subfolder details.

Here are the aspects you need to consider for this,
- Canonical name record (Example: 301 redirect)
- Address record (Matches the domain name to an IP address.)
- Start of Authority record (SOA)
- Name Server record(NS)
- Sub-domains or Sub-folders

Certification:
One of the most ignored aspects of a website is its safety certification. While the https encryption will boosts your ranking on the SERP, once you start using SSL, your page ranking will go private. Without authorized SSL certification it is not wise to use the same as it might affect your SERPs.

3.2.2. Server and IP
Apart from all the elements that are stated above, a search engine also reacts to the way hosting is done. If there are issues with hosting, your ranking gets affected[8]. The thumb rule here is to avoid using reverse IP and class IP.

When a search engine performs a reverse IP domain check, it takes the IP address or the domain name of the web server and searches if there are other sites with the same IP and using the same web server. This kind of data gathered by the search engine results cannot be guaranteed to be complete because it might cause website-crossing or DNS crossing issues. To facilitate reverse IP look up, IP-Address.org provides a great website tool. Knowing whether there are other sites that are hosted from the same server will help you have better SEO mechanisms and you can have a sound web filtering procedure. This is especially important if you have a valid shared web hosting plans.

The following analysis steps can be done before you host your website,
- Decide if your website will be on a virtual host or will have a dedicated IP
- If you are opting for virtual hosting then check how many other websites are using the same IP and the same service
- Understand the current status of all websites that are hosted

- Find out the class(Class A, B, C, D) of IP that is currently being used
- See if there are issues like reverse IP, DNS crossing or domain crossing
- Understand the DNS entries for Virtual Hosting or add a domain

The following analysis steps can be done after you have hosted your website,

I.Analyze traffic bandwidth

Use the Formula: Number of daily Visitors x Number of Pages x Avg.

Page Size x 31 (days in a month) = Bandwidth Needed

II.Block all Search Engine bots

There are scenarios where the Google bots stress up the server as they cater to huge number of requests at a time. Therefore hosting protection system could decide to block these bots. Most CMS setups face this challenge, especially if they have not been configured properly.

III.Invalid SSL certificates

Expired, erroneously configured or non-matching SSL certificates that are linked to your domain name could cause problem. So, you need to keep these in check.

IV.Wildcard DNS

If you are facing problem with wildcard DNS, then you can either avoid using it completely, or set up your website in such a way that it does not respond to host names that do not exist. The best way to do so is to setup the DNS to return a 404 header, or refuse establish connection in the first place.

V.Erroneously configured virtual hosting

This problem can be traced directly to the hosting provider. Sometimes when such an issue occurs, the server may return content from only one site, though there could be other sites hosted on the same server.

VI.Duplicate content due to hosting specific URLs

When you face this problem, the solution is easy. You can protect your URL via password or you can completely block the Google bots. Additionally, you can also alter the URL parameters on the Google webmaster tools.

VII.Soft error pages

For this issue, search for soft errors on GWT. You can also run 'fetch' on Google bot tool and check the HTTP status that is being returned. Once you have this information, correct the errors by giving the correct status codes. Else, you may end up having your empty pages indexed. (Ex: 1xx: Information. 2xx: Successful, 3xx: Redirection, 4xx: Client Error, 5xx: Server Error)

VII.Availability Issues

When you encounter websites unreachable issue or crawl errors, know that this could be either due to low performance by the server or because of the server bandwidth and number of connections at the moment which results in server timeout or reset. It could also be because the server has blocked certain bots and so they have become unreachable.

4. A/B TESTING

You have to plan for the A/B testing to last for about one to two months. You need to adopt the top to bottom approach when you analyze the website for this. This will make it easy for you to understand the issues in each part of the website thoroughly. Similar to A/B testing is the multivariate or multinomial testing.

4.1 Website Structure analysis

Another factor that affects the flow of visitors positively is the overall structure and navigational plan of your website. It is hence very important that you analyze these aspects carefully and plan to have them efficiently.

The following steps will help you analyze the structure of your website,
- Analyze website structure based on the SEO needs
- Check for compatibility with different browsers and mobile devices
- Analyze the UI and UX factors
- Perform analysis for the Navigation and the Landing page (Search >Product list> Product Details> Product Review>Purchase)

4.2 Keyword analysis for web pages

Check how the relevant keywords are used in each page. Give prominence to elements such as <b>, <strong>, <body>, <Meta tag>, <Title>, <p>, <br>, <i>, <em> and anchor tags used to navigate to other pages. You will be able to significantly increase the keyword density, proximity and frequency. You can use this for content optimization as well.

4.3 Analysis of Keyword Density

In a web page, the ratio of keywords within the total number of words that can be indexed is called as keyword density[9].

Formula for Keyword: $N_{kr}/T_{kn}*100$
N_{kr} = number of times the keyword is repeated
T_{kn} = total words in the analyzed text

Formula for Key Phrase: $N_{kr}*N_{wp}/T_{kn}*100$
N_{kr} = number of times the keyword is repeated
N_{wp} = number of words in your keyword-phrase
T_{kn} = total words in the analyzed text

Density for the Keyphrases:
$(N_{kr} / (T_{kn} -(N_{kr} * (N_{wp}-1)))) * 100$
N_{wp} = the number of terms in the "long-tail keyphrases.

By using this generic formula, you can avoid the total word count from getting affected by the key phrases. The recommended density for keyword is 2-8% per page.

4.4 Index page Analysis

To analyze the indexed page, start off by counting how many pages you have created, optimized and performed the promotion activity on. During the index analysis, you can see the result of all the pages clearly. You can also analyze keywords and the indexed landing page. The term (site: website.com) can be used for index analysis on search engines. In addition to this, you can view the report on the webmaster tool as well.

4.5 Back-link Analysis

Back-link analysis is another fine way to see the result of the off page SEO that you have done. You can use urls:website.com or url:website.com, for back-link analysis on search engines. There are many tools that can be used to analyze the do-follow and no-follow links.

4.6 CMS, Coding and FTP Files

When you want to analyze your CMS website, you need to be well aware of the tool's version and the plug-in update. Coding analysis involves analyzing the source code of each page, clocking, verifying links and so on.

For FTP analysis, you need to analyze the following elements,
- Sitemap files
- Backup files
- Htaccess (Has the entire redirection of pages happened properly?)
- Robots.txt
- Xml Files
- Site Verfication files
- Pdf, Doc, Image, Video files

4.7 Webmaster Analysis

Webmaster can be used to control your website. You can be the site author, website administrator, website coordinator or web architect to do so. Some of the webmaster tools provided by search engines are Google webmaster, Bing webmaster, Yandex webmaster and so on. Using these you can analyze various aspects like crawl error, security issues, index report and search traffic. You can also find out the search appearance factor.

5. REPORT ANALYSIS

Report analysis is among the essential steps in the SEO analysis cycle. It is only through this that we understand the steps we have taken and their result. By keeping a track of the analysis we can improve both the process and the result. Here are the steps you need to follow,
- Keyword ranking Analysis
- Traffic analysis Model
- Traffic Analysis Method
- Conversion Report

5.1.Keyword Ranking Analysis
Check where your keyword stands in the search engine. The keyword changes when the targeted geographical location changes. When you plan to perform a keyword analysis manually, you first have to change the URL to the corresponding geographic location (Ex: google.co.au, google.com). Ensure that you avoid cache and history result update.

The following are the steps for manual keyword analysis,
- Delete all temp and prefetch files
- Delete all browser cache and history (from beginning) files
- Avoid opening gmail, yahoo or other mail servers while doing keyword analysis
- Set the result page so that it displays 100 results at a time. This will make it easy for you to find your website on the SERP(Ctrl + f and Ctrl + g)
- Avoid human verification of Search engine for continuous search

The ranking result will change based on the search engine's algorithm, trend and website update. You can gauge the performance of your website by comparing it with the older result.

5.2.Traffic analysis model

When you want to have a good idea about what your visitors are looking for, you can perform a traffic analysis. Click-stream data analysis is one of the most used ways of traffic analysis. Nowadays click-stream analysis is considered to be vital for any e-business setup. Through this you can know usage patterns on the company's website and gain highly effective understanding of the customer behavior. This in turn will help you address the customer satisfaction aspect well and gain an edge in the business perspective.

You can find that there are many methods and models that deal with website traffic analysis. Some such models are, time-stamp based click-stream analysis or data packets analysis model for the intranet. For this you need to make use of data mining techniques to get the right kind of information at the right time. A thorough analysis of website traffic analysis models reveals four major factors that influence the website traffic flow. They are,
- Click-stream[10]: Click-stream or click-path refers to the whole click-path taken by a visitor from the entry point of the website to the exit point.
- Timing: Timing refers to the duration the visitor spends on each page and on the whole website. In most cases, with this, you can understand the exact interest of the visitor and if he/she spends more time on a single page.
- Weight: Weight or traffic rate refers to how the traffic is distributed through the structure of the website. Through this you get to know the specific parts of your website that attracted your visitors.
- Source: Source refers to the space from which the visitor came to the website.

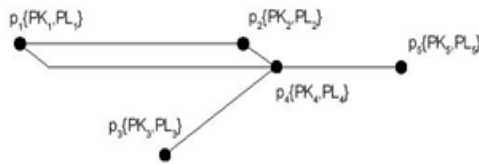If the website structure would be as below

Figure 4: Website page Structure

Let's assume that website had a number of visits in some period of time. A whole set of visitors could be described like:

$$X = \{x_{i_{visitors}}\} = \{x_1, x_2, x_3, L, x_{n_{visitors}}\}. \quad (11)$$

Looking back at the definition of website structure (1) and Figure 1 a single click-path could be like:

$$p_1 \rightarrow p_2 \rightarrow p_4 \rightarrow p_5 \quad (12)$$

A duration of visit for a single page could be described like:

$$\Delta t_j = T_{j_{exit}} - T_{j_{entry}}, \quad (13)$$

Where j is a page index in a click-stream,

$T_{j_{entry}}$ is page

Entry time-stamp and $T_{j_{exit}}$ is page exit time-stamp.

The whole duration of a visit for a single visitor can be easy calculated:

$$t_{visit} = \sum_{i_{clickstream}=1...n_{click}} \Delta t_{i_{clickstream}}. \quad (14)$$

The traffic weight w can be defined as visitors rate n_i through a single page during the website traffic analysis period:

$$N = \{n_{i_{rate}}\} = \{n_1, n_2, n_3, ..., n_{n_{rate}}\}. \quad (15)$$

$$w_i = \frac{n_i}{\max(N)} \quad (16)$$

Traffic flow s also depends on traffic source type and the amount of traffic si it sends:

$$S = \{s_{i_{rsourse}}\} = \{s_1, s_2, s_3, ..., s_{n_{sourse}}\}. \quad (17)$$

$$s_i = \frac{s_i}{\max(S)}. \quad (18)$$

The whole set of factors defined above affects traffic flow and Its Direction on each page

$$p_i\{\Delta t_i, w_i, s_i\}.$$

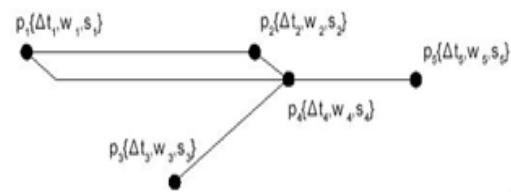The final graphical interpretation of traffic analysis model is shown in Figure 4.

Figure 5: Traffic Analysis Model

5.3. Traffic Analysis Method

When you want to analyze the traffic, you can use many tools that are available online. For instance, you can use search engine marketing tool or digital marketing tool for paid promotion. Examples for this are, Google Analytics (Adwords), Bing Analytics and Omniture. Once you have the website traffic analysis report you can proficiently compare the analysis report and the promotion report. You can then take the next course of action based on the comparison that you have done.

5.4. Conversion Report

Only when there is a conversion, the keyword ranking procedures will come to an end. Conversions can be considered as landing on the contact page, purchase of product, registration for an event and so on. All this is based on the website services. When you make use of paid promotions like SEM and digital marketing, you can see the conversion within the tool.

6. CONCLUSION

As a conclusion of this study, it was made clear that analysis is an inevitable and most important step of SEO. Without this your online marketing strategies may fail miserably. Health and Quality, Traffic and Conversion are the factors that determine the analysis process. Analysis of all the elements of the website is required to have a fine SEO process.

- Back end + Architecture + Front End = Build Health and Quality of Website
- Optimization + Engagement +Promotion + Marketing = Increase Traffic and Conversion

The SEO techniques and the marketing activities depend heavily on the analysis that you carry on. Through the analysis metrics you will be able to understand every little detail thoroughly.

The analysis can be broadly divided into 3 categories,

- Website
- Online trend
- Engagement

You need to consider the content, coding and architecture for your analysis. It's all about making the website more user-friendly and search engine friendly as well. Through rightly analyzed SEO, you can build the trust of your brand and increase the strength of your online presence. When you combine analysis, activity and report you get a stable website plan.

Analysis process will help you get profitable results out of the website business activity and its promotions. Therefore by implementing the analysis phase in the right way, you can reap many benefits for your business and brand.

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