Search Engine Optimization (SEO) As A Promotional Media On Google Search

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Abstract

In the current era, people's interest in using the internet is getting higher, this is because internet media has become an informative tool that can be accessed at any time. In searching for information, internet users usually use search engines. One of them is Google, the most widely used search engine. To find information in the Google search engine, we must use keywords. With SEO technique the website will be easy to find. A website optimization based on keywords, its implementation using On-page SEO and Off-page SEO mechanisms. On-page SEO is changing web pages according to the target keywords. By paying attention to important elements such as meta title, meta description, heading tags, text format, alt text, content, robot.txt, and sitemap.xml. Off-page SEO is a method that is carried out outside the website, creating relevant backlinks to the targeted website. This method can make the website as an organic promotional medium that brings traffic. In this research applying the concept of SEO both On-page and Off-page, the results obtained that there was a significant increase in traffic and based on the results of using the User Acceptance Test (UAT) with five aspects of component quality, this SEO support system can help in analyzing the website and as many as 82.3% of respondents said that the system built was very good.

I. INTRODUCTION

In the current era, people's interest in using the internet is getting higher [1]. Internet media has become a means of information that can be accessed at any time. Looking for information sometimes internet users must visit several websites. One of them through search engines or commonly called search engines. According to Lewandowski [2] search engines are indicators that are specifically designed to search for information or products needed. Google is a search engine that uses the concept of a meta crawler search engine. Google is the most used search engine globally, compared to other search engines like Bing. Seen in this case, as many as 80% of internet users use Google more than Bing [3]. Yahoo search engine has also been surpassed by the Google search engine as the largest advanced search tool, Google is seen as the main search engine that is growing rapidly to date [4] [5].

Search Engine Results Page (SERP) is a page of search results displayed by the Google search engine [6]. SERP has a dynamic nature, where every search engine will still try to display the most relevant results even though sometimes there are still search results that are not relevant at all. In detail when typing keywords in the search engine column, several pages will appear in the form of a web list containing url links, meta titles and a brief description of the website. Search Engine Optimization (SEO) is a website optimization technique on search engines using keywords that contain indicators. The keywords contained must be relevant to the information presented. Kumar and Saini [7] state that SEO is the idea of developing a methodology for search engines, so that it can be used as an organic promotional tool to find information. Many well-known practitioners who have pursued the field of SEO, such as Neil Patel, Brian Dean, Felix Tarcomnicu, Jayson Demers, and Daniel Louis [8].

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II. LITERATURE REVIEW

Website is a collection of pages that contain a collection of text information, videos, images, and other types of data. Sir Timothy John Tim Berners-Lee who was born in 1955 in Geneva, Switzerland is the inventor of the website or WWW who used to create a website as a medium for exchanging information with fellow researchers at work [9]. Therefore, based on the shape of the website, it is divided into 2 types, that is static websites and dynamic websites. The website uses the Hyper Text Markup Language (HTML) format which is accessed via the Hypertext Transfer Protocol (HTTP) as the delivery of information from the web server. To access the website, we must use a software called a web browser, such as Internet Explorer, Google Chrome, Mozilla Firefox, and so on.

Content Management System (CMS) is an application to create websites easily [10]. CMS is a practical application without having to understand coding to create a website, because CMS can create articles, edit pages, adjust menus, and change the appearance by drag and drop. Examples of CMS websites, namely wordpress, joomla, drupal, opencart, to prestashop. The advantage of using a CMS is that we can easily add plugin features along with their installation, structure and appearance to make a website with a CMS easier to learn for beginners.

Document Object Model (DOM) is a programming command developed by the W3C to interact with objects in HTML, XML, or XHTML. DOM can be cross-platform or language-independent. HTML DOM is a standard way used to access objects and properties of all HTML document elements using javascript [11]. The HTML DOM defines the objects and properties of all elements in HTML. To access HTML elements, we can use the getElement function. Meanwhile, to get the HTML content, we can use the property's innerHTML function.

Research conducted in 2018 by Mardhiya Hayaty and Dwi Meylasari [12] on the implementation of a Search Engine Optimization (SEO) as a promotional media. This optimization is carried out according to the target keyword, so that the website successfully appears on the first page of search engines. Then in previous research also on e-commerce websites. Bawono Aji and Lauw Li [13] implemented an online store e-commerce website with a litaid using the SEO method and the business model canvas.

This is done to be able to compete with other websites and get the best ranking on the Google search engine page. As for other research using the concept of allintitle [14], the way is by doing keyword research first before optimizing the website. In research journals, keyword research optimization using the allintitle technique on the Google search engine gives the best search results. However, this method is not yet effective, because it only uses title for optimization. Therefore, the implementation of good SEO must consist of two important things, that is SEO on page and SEO off page [15].

Prototype is a system development model according to user needs for an overview in building the required system. This method is often used by system owners who are not very familiar with the system, but only require an overview of the system being developed [16]. With the prototype method, developers can make a blueprint in advance according to user needs. Prototype development function in SEO can save time and costs, produce better quality, easier implementation, developers can perform system maintenance again. Types of prototype, Evolutionary prototype and Requirements prototype. Evolutionary prototype is a form of continuous development until it fulfills its functions and procedures. Requirements prototype that defines the functions and procedures of the system.
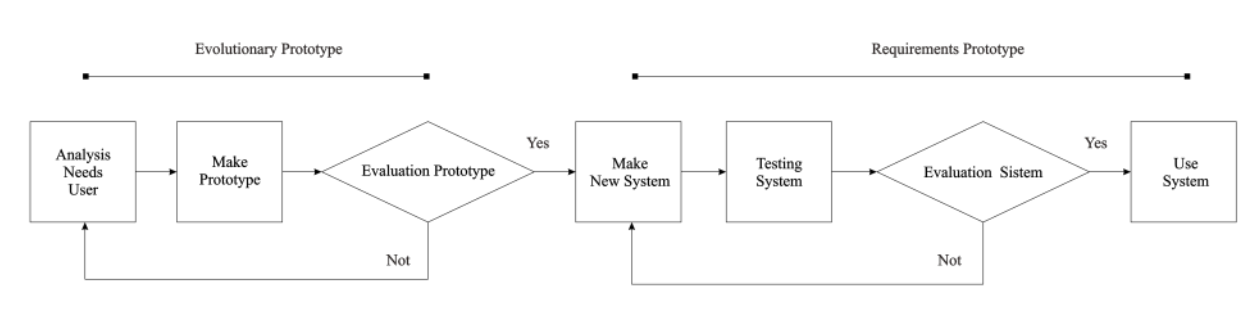

Figure 1. Prototyping Methodology

III.   METHODS

a) SEO On Page

   On-page SEO is optimization on web pages (internal). This method involves modifying the content of the page, so it must be in accordance with the target keyword. For keyword phrases and keyword formats can be placed on several important elements of the website, see on figure 2 below [13]:
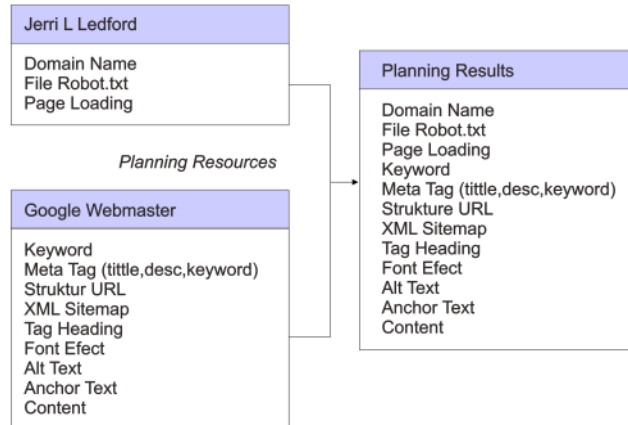

Figure 2. On-Page SEO

b) SEO Off Page

   Off-page SEO is optimization that is carried out outside the website (externally). This method is called a backlink, a link made from another website to the targeted website. Backlinks are like recommendations on online sites, the more backlinks the better, see on figure 3 below [13]:
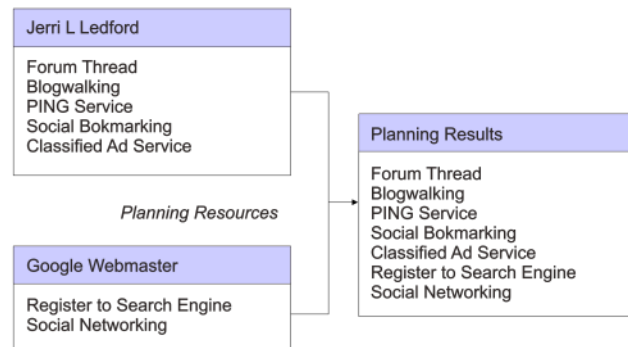

Figure 3. Off-Page SEO

c) User Acceptance Test (UAT)

   UAT is a test method for end-users directly to find out respondents' responses to the system being built [17]. In this test, we will use a Likert scale questionnaire related to systems research. The scale between 1-5 with the following description shown on table 1. below:

Table 1. Likert Scale Description

Question	Scale
Very Bad (VB)	1
Bad (B)	2
Enough (E)	3
Good (G)	4
Very Good (VG)	5

For the Questionaire questions made according to usability aspects which consist of 5 quality components:

a) Learnability, is the level of ease of users in using the system to complete their tasks for the first time using the system.
b) Efficiency, is the ability of the system to support users in completing their tasks in a relatively fast period of time.
c) Memorability, is the level of user convenience in using the system well after not using it for a time.
d) Errors, is the possibility of an error or error to the system that is being used by the user and they can recover from errors.
e) Satisfaction, is the level of user satisfaction in using the system, both in the appearance of the system and in its use.

And this is the User Acceptance Test (UAT) formula:

$$Qn = \sum_{i=1}^{5} F(i) * \text{Scale}(i) \ldots\ldots\ldots\ldots\ldots(1)$$

$$P = \left(\frac{\text{Total } Qn}{N}\right) / 5 * 100\% \ldots\ldots\ldots\ldots(2)$$

where :

Qn	= Question (1,2,3….n)
n	= 1,2,3,…….10
F	= Answer Frequency
Scale	= Likert Scale
P	= Percentage
N	= Total Respondent

For interval criteria range value shown on tabel 2. below:

Table 2. Interval Value Percentage

Score	Information
0% - 19,99%	Very Bad
20% - 39,99%	Bad
40% - 59,99%	Enough
60% - 79,99%	Good
80% - 100%	Very Good

IV. FRAMEWORK

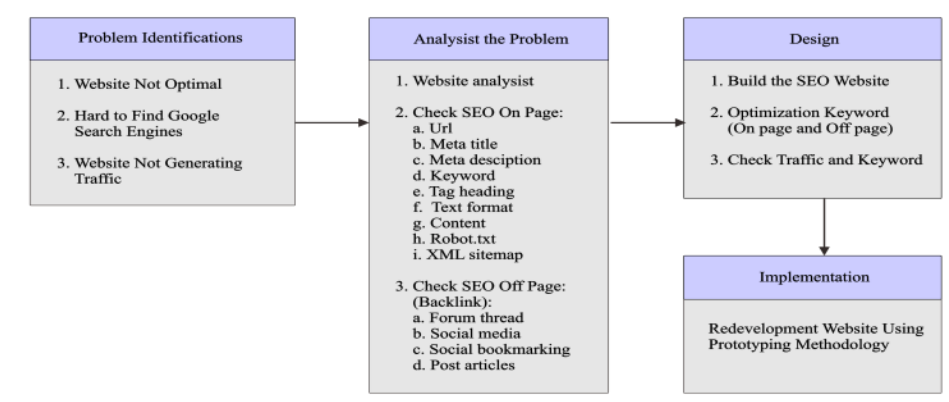This is framework for website optimization:

Figure 4. Framework

V. RESULTS

At this stage, website optimization is carried out using a system that has been designed as an SEO test. For the website, the Content Management System (CMS) is used. The website of one of the respondents with the domain name "kasirjempol.com" and the target keyword "server aplikasi PPOB". This optimization is carried out according to the SEO stages, that is on-page SEO and off-page SEO.

a) On Page Optimization

In on-page optimization, changes or modifications are made to the content of the website. This is done to pay attention to several important elements needed in optimization, namely url, meta title, meta description, heading tags, text format, alt text, content, robot.txt, and sitemap.xml.

Figure 5. Before and After the website implementation

Using the features system for website optimization, seen on figure 6. below:
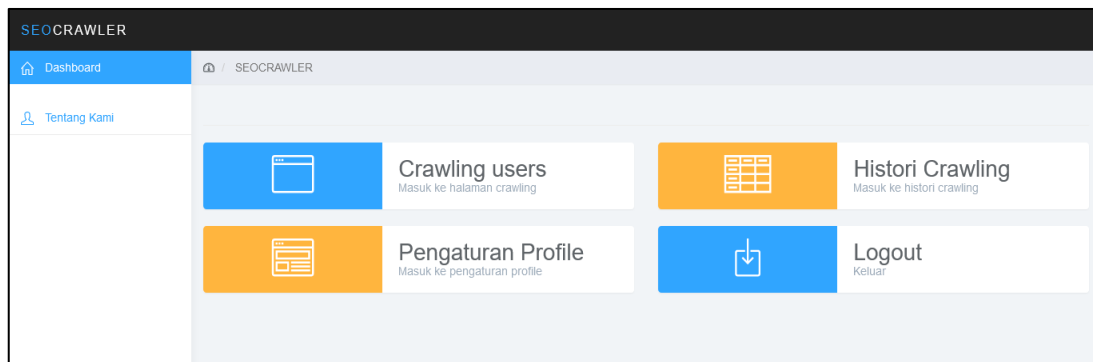

Figure 6. System Dashboard Display

On the main dashboard page there will be several menu options, including:

Crawling users   : To crawl the website based on the url address
Histori Crawling   : To display the data stored on the crawl results
Pengaturan Profile : To set and change password
Logout   : To exit the dashboard page

For the beginning, the user can select the crawling menu, the url input field will appear and the start crawling button will appear. If the user has entered the website url, then system will process and display the results of website crawling. On the crawled data, the user can save it and print it, later the saved data will appear in the crawling history menu.
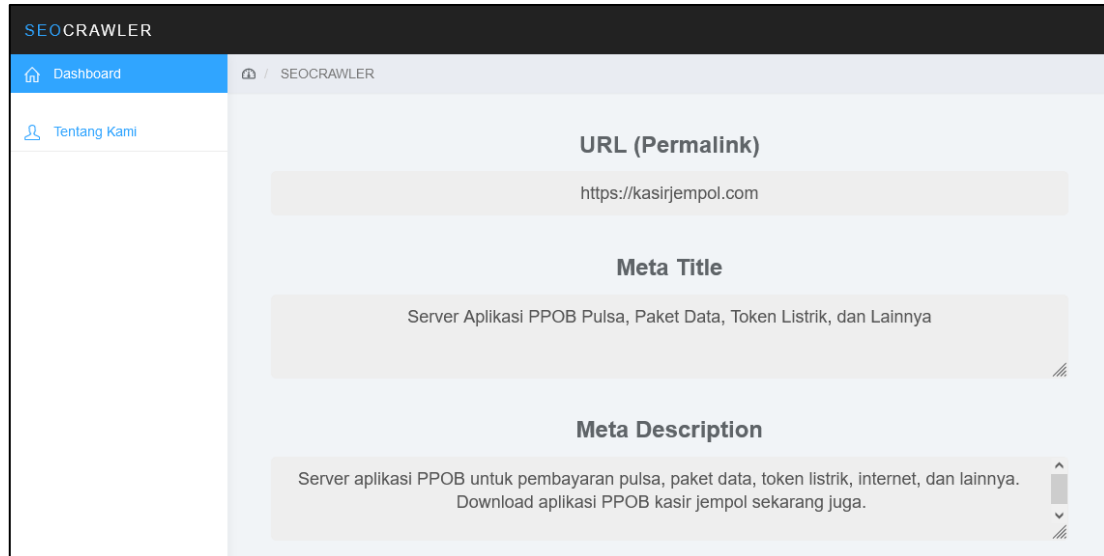
Figure 7. Display of Crawling Results

1) Url

   In the url kasirjempol.com the target is the homepage. This page is only made adjustments based on the target keyword.

2) Meta Title

   In the meta title of kasirjempol.com, changes are made according to the target keyword. Previously there was no target keyword in the meta title.

3) Meta Description

   In the meta description of kasirjempol.com, changes are also made according to the target keyword. Previously there was no target keyword in the meta description.

4) Tag Heading

   The kasirjempol.com heading tag has also been added according to the target keywords. These words are located in heading 1, heading 2, and heading 3.

5) Text Format

   In the text section of the kasirjempol.com format, additional sentences in the form of bold or bold have also been added according to the target keyword.

6) Image Alt Text

   In the image, the alt text of kasirjempol.com has also been adjusted to the target keyword. Words in the form of descriptions of the names of the pictures that exist.

7) Content

   The kasirjempol.comcontent has been added to 9,500 words. For the number of words listed, it is taken from the body element of the website..

8) Robot.txt

   The robot.txt file kasirjempol.comhas also been created and added. Robot.txt serves as a path for search engines to crawl websites.

9) Sitemap.xml

   In the sitemap.xml file kasirjempol.comhas been created and added. Sitemap.xml serves as a navigation address to facilitate search engine indexing.

b) Off Page Optimization

   In off page optimization, backlinks will be created from other websites to the kasirjempol.com. The making of the backlinks in question refers to the kasirjempol.com so that it has value and authority. Several types of web are used to create backlinks, such as forum threads, social media, social bookmarking and posting articles.

The results of the optimization of the kasirjempol.comwebsite which were carried out on June 20, 2021 to July 20, 2021, have been successfully carried out. Based on data from Google Search Console as an application to check traffic, it appears that the kasirjempol.com is starting to increase seen on figure 8. below:
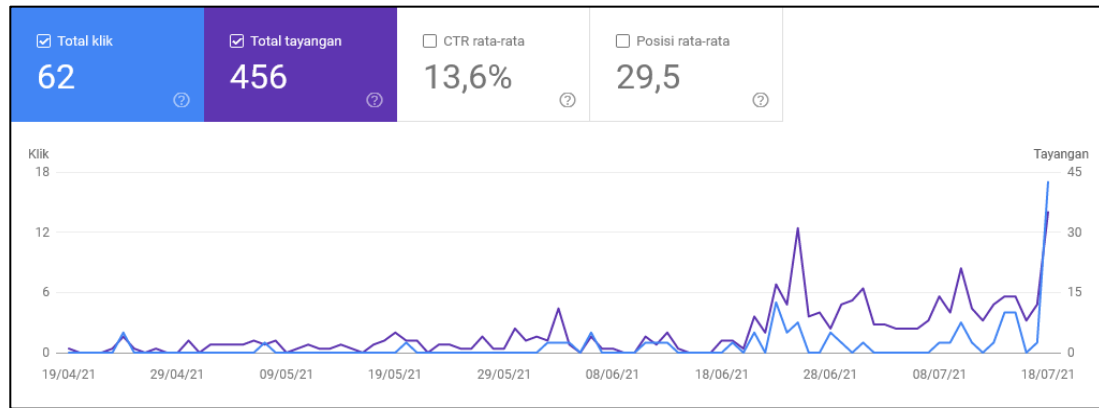

Figure 8. Website Traffic Kasirjempol.com

For this research we are using judgment sampling or purposive sampling where sampling is based on the criteria determined by the researcher [18][19], in this case respondents must have a website so that the results of the answers from respondents can be measured objectively. The questionnaire which is prepared refers to User Acceptance Test (UAT) based on 5 quality component and uses a likert scale [20], it distributed to 13 respondents. The result of answer shown on tabel 2. below:

Table 2. Results of Respondents' Answers

Question		Frequency of Scale					Calculation					Total
Aspects of Learnability		1	2	3	4	5	1	2	3	4	5	
Q1	Is the system easy to understand?	0	0	1	7	5	0	0	3	28	25	**56**
Q2	Are the features on the system easy to use?	0	0	3	7	3	0	0	9	28	15	**52**
Aspects of Memorability												
Q3	Is the system easy to use for website analysis?	0	0	1	5	7	0	0	3	20	35	**58**
Q4	Does the system make it easy to implement SEO?	0	0	2	4	7	0	0	6	16	35	**57**
Aspects of Efficiency												
Q5	Can the system perform crawling process quickly?	0	0	4	8	1	0	0	12	32	5	**49**
Q6	Can the system analyze the website properly?	0	0	4	7	2	0	0	12	28	10	**50**
Aspects of Errors												
Q7	There no errors on the system crawling?	0	0	4	7	2	0	0	12	28	10	**50**
Q8	The features on the system not having problems?	0	0	2	10	1	0	0	6	40	5	**51**
Aspects of Satisfaction												
Q9	Does the system have an attractive appearance?	0	0	2	11	0	0	0	6	44	0	**50**
Q10	Does the system help in website optimization?	0	0	0	3	10	0	0	0	12	50	**62**

Calculating total Q1 using formula (1). The result shown on below:

$$Q1 = \sum_{i=1}^{5} F(i) * \text{Scale}(i)$$

Q1 = ((1*3) + (7*4) + (5*5))
Q1 = 56

Percentage calculation for P1 using formula (2). The result shown on below:

$$P1 = \left(\frac{56}{13}\right) / 5 * 100\%$$

P1 = 4.31/5 * 100%
P1 = 86.20%

Table 5. Overall Average Score

Question		Percentage	
Aspects of Learnability			
Q1	Is the system easy to understand?	86.20%	83.10%
Q2	Are the features on the system easy to use?	80.00%	
Aspects of Memorability			
Q3	Is the system easy to use for website analysis?	89.20%	88.50%
Q4	Does the system make it easy to implement SEO?	87.70%	
Aspects of Efficiency			
Q5	Can the system perform crawling process quickly?	75.40%	76.20%
Q6	Can the system analyze the website properly?	76.90%	
Aspects of Errors			
Q7	There no errors on the system crawling?	76.90%	77.70%
Q8	The features on the system not having problems?	78.50%	
Aspects of Satisfaction			
Q9	Does the system have an attractive appearance?	76.90%	86.20%
Q10	Does the system help in website optimization?	95.40%	
Overall Average			**82.30%**

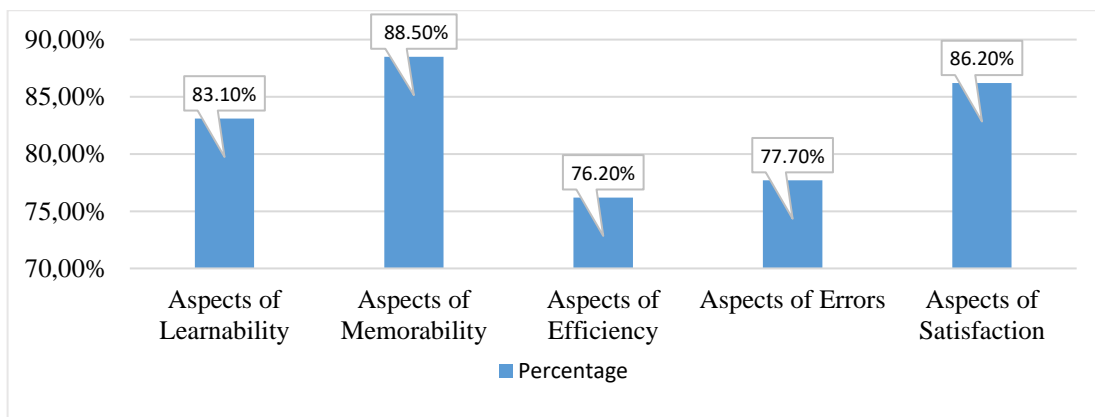The results of the calculation values above are represented in Figure 9. below:

Figure 9. Graph of Overall Average Result

VI. CONCLUSIONS

Based on the research that has been done, it is found that to optimize the website, it is necessary to carry out proper analysis based on keywords by optimizing using the Off page and On page SEO methods. This can make the website easier to find on Google search engine pages. Based on testing using the User Acceptance Test (UAT) on 5 quality components consisting of learnability, memorability, efficiency, errors and satisfaction, it was found that 82.3% of respondents agreed with the system designed, and this was included in the very good assessment interval.

REFERENCES

[1]   S. Kemp, "DIGITAL 2021 : GLOBAL OVERVIEW REPORT," *we are social and Hootsuite*, 2021. [Online]. Available: https://datareportal.com/reports/digital-2021-global-overview-report. [Accessed: 10-May-2021].

[2]   D. Lewandowski, *Web Search Engine Research*, 1st ed. United Kingdom: Emerald Group Publishing, 2012.

[3]   R. Y. Endra and D. Prasetya, "Analisis Perbandingan Teknik SEO Antara Google Webmaster Dan Bing Master Menggunakan Gap Analisis," *Explor. J. Sist. Inf. dan Telemat.*, vol. 8, no. 1, 2017.

[4]   E. Van Couvering, *The History of the Internet Search Engine: Navigational Media and the Traffic Commodity*. Springer Berlin Heidelberg, 2008.

[5]   Z. Wugang and T. Edison, "Competition in Search Engine Market," *J. Bus. Strateg.*, vol. 28, no. 2, pp. 123–150, 2011.

[6]   J. Strickland and J. Donovan, "How Google Works," *howstuffworks.com*, 2019. [Online]. Available: https://computer.howstuffworks.com/internet/basics/google.htm. [Accessed: 04-May-2021].

[7]   Rakesh Kumar and S. Saini, "A Study on SEO Monitoring System Based on Corporate Website Development," *Int. J. Comput. Sci. Eng. Inf. Technol.*, vol. 1, no. 2, pp. 42–49, 2011.

[8]   A. B. Harto, "Implementing Website Design Based on Search Engine Optimization (SEO) Checklist to Increase Web Popularity," *J. Appl. Information, Commun. Technol.*, vol. 6, no. 2, pp. 87–97, 2019.

[9]   J. Porterfield, *Tim Berners-Lee : Inventor of the World Wide Web*. New York: Rosen Publishing Group, 2015.

[10]   R. Abdulloh, *Trik Mudah Membuat CMS Website dari Nol*. Jakarta: Elex Media Komputindo, 2016.

[11]   V. Mitra, H. Sujaini, and A. Negara, "Rancang Bangun Aplikasi Web Scraping untuk Korpus Paralel Indonesia - Inggris dengan Metode HTML DOM," *J. Sist. dan Teknol. Inf.*, vol. 5, no. 1, pp. 1–6, 2017.

[12]   H. Mardhiya and D. Meylasari, "Implementasi Website Berbasis Search Engine Optimization (SEO) Sebagai Media Promosi," *Proc. - IEEE 2018 Int. Conf. Adv. Comput. Commun. Control Networking, ICACCCN 2018*, vol. 5, no. 2, pp. 674–678, 2018.

[13]   B. B. A. Salim and L. L. Hin, "Implementasi Website E-Commerce Pada Toko Online Berlitaid Menggunakan Metode Seo Dan Business," *J. Idealis*, vol. 3, no. 1, pp. 361–366, 2020.

[14]   S. N. Wahyuni and D. A. Wijaya, "Optimasi Riset Keyword Dengan Teknik Allintitlle Pada Mesin Pencari Google," *J. Comput. Networks, Archit. High Perform. Comput.*, vol. 1, no. 1, pp. 1–5, 2018.

[15]   H. Artanto and F. Nurdiyansyah, "Penerapan SEO (Search Engine Optimization) Untuk Meningkatkan Penjualan Produk," *JOINTECS (Journal Inf. Technol. Comput. Sci.*, vol. 2, no. 1, pp. 2–5, 2017.

[16]   S. Muylani, *Metode Analisis dan Perancangan Sistem*. Bandung: Abdi Sistematika, 2017.

[17]   J. Nielsen, "Usability 101: Introduction to Usability," 2012. [Online]. Available: https://www.nngroup.com/articles/usability-101-introduction-to-usability/. [Accessed: 15-Jul-2021].

[18]   I. Etikan and K. Bala, "Sampling and sampling methods. Biometrics & Biostatistics International Journal," *Biometrics Biostat. Int. J.*, vol. 5, no. 6, pp. 215–217, 2017.

[19]   C. Sibona and S. Walczak, "Purposive sampling on Twitter: A case study," *Proc. Annu. Hawaii Int. Conf. Syst. Sci.*, pp. 3510–3519, 2012.

[20]   R. Agustina and D. Suprianto, "Analisis Hasil Pemanfaatan Media Pembelajaran Interaktif Aljabar Logika Dengan User Acceptance Test (UAT)," *Smatika J.*, vol. 8, no. 2, pp. 67–73, 2018.