

Czech University of Life Sciences Prague

Faculty of Economics and Management

Department of Information Technology



Master's Thesis

**The Comparative Analysis of On-Page and Off-Page
Search Engine Optimization Methods on Website
Rankings and Business Outcomes**

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DIPLOMA THESIS ASSIGNMENT

Kundan Verma

Informatics

Thesis title

The Comparative Analysis of On-Page and Off-Page Search Engine Optimization Methods on Website Rankings and Business Outcomes

Objectives of thesis

The objective of this thesis is to conduct a comparative analysis of on-page and off-page search engine optimization (SEO) methods to determine their impact on website rankings and business outcomes. The study will involve the implementation of different SEO methods on a sample of websites, followed by the evaluation of their performance in terms of website rankings and business outcomes. The study aims to provide insights into the effectiveness of different SEO methods and their ability to improve website rankings and drive business outcomes.

Methodology

The methodology of this thesis will involve the following steps:

1. Selection of sample websites: A sample of websites from different industries and sectors will be selected to participate in the study. The selection criteria will include website age, domain authority, and current website rankings.
2. Implementation of SEO methods: The selected websites will be divided into two groups, with one group receiving on-page SEO methods and the other group receiving off-page SEO methods. The implementation of SEO methods will include keyword research, content optimization, link building, and other relevant strategies.
3. Monitoring and evaluation: The performance of the websites will be monitored over a period of six months, with regular evaluations of website rankings and business outcomes. Business outcomes will be measured through metrics such as website traffic, leads, conversions, and revenue.
4. Data analysis: The data collected from the study will be analyzed using statistical techniques to determine the effectiveness of different SEO methods in improving website rankings and driving business outcomes.

The conclusion of the thesis will be formulated on the basis of the synthesis of the theoretical knowledge and the results of the practical part.

The proposed extent of the thesis

60 – 80 pages

Keywords

Search engine optimization (SEO), On-page SEO, Off-page SEO, Website rankings, Business outcomes, Keyword research, Link building, Content optimization, SEO tools, Online visibility

Recommended information sources

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Declaration

I declare that I have worked on my master's thesis titled "The Comparative Analysis of On-Page and Off-Page Search Engine Optimization Methods on Website Rankings and Business Outcomes" by myself and I have used only the sources mentioned at the end of the thesis. As the author of the master's thesis, I declare that the thesis does not break any copyrights.

In Prague on 2024

A handwritten signature in black ink that reads "Kundan". The signature is written in a cursive style and is positioned above a horizontal line.

Kundan Verma

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The Comparative Analysis of On-Page and Off-Page Search Engine Optimization Methods on Website Rankings and Business Outcomes

Abstract

This thesis aims to conduct a comprehensive comparative analysis of the influence of on-page and off-page SEO strategies on website ranking and subsequent business outcomes. Focusing on the prominent e-commerce platforms i.e. Carrefour UAE, and Dubizzle, in the competitive market of the United Arab Emirates, the study explores the correlation between SEO optimization, search engine rankings, and overall business success. Preliminary findings indicate that all these websites, Carrefour UAE, and Dubizzle, exhibit high levels of SEO optimization, reflected in their elevated search engine rankings. The research begins by delving into the intricacies of on-page SEO, examining factors such as keyword optimization, content quality, and user experience. Simultaneously, the study investigates off-page SEO elements, including backlink profiles, social signals, and brand mentions, to evaluate their impact on search engine algorithms and rankings. The thesis seeks to decipher whether this optimization directly contributes to their robust business outcomes, as evidenced by sustained high annual revenue. By understanding the nuanced interplay between SEO tactics and business success, this research aims to provide actionable insights for businesses seeking to enhance their online presence and competitiveness.

Keywords:

- Search engine optimization (SEO)
- On-page SEO
- Off-page SEO
- Website rankings
- Business outcomes
- Keyword research
- Link building
- Content optimization
- SEO tools
- Online visibility

Srovnávací analýza metod optimalizace pro vyhledávače na stránce a mimo stránku týkající se hodnocení webových stránek a obchodních výsledků

Abstrakt

Tato práce si klade za cíl provést komplexní srovnávací analýzu vlivu on-page a off-page SEO strategií na hodnocení webu a následné obchodní výsledky. Studie se zaměřuje na prominentní platformy elektronického obchodu, jako jsou Carrefour UAE a Dubizzle, na konkurenčním trhu Spojených arabských emirátů, a zkoumá korelaci mezi optimalizací SEO, hodnocením ve vyhledávačích a celkovým obchodním úspěchem. Předběžná zjištění naznačují, že všechny tyto webové stránky, Carrefour UAE a Dubizzle, vykazují vysokou úroveň SEO optimalizace, což se odráží v jejich zvýšeném hodnocení ve vyhledávačích. Výzkum začíná ponořením se do složitostí on-page SEO, zkoumáním faktorů, jako je optimalizace klíčových slov, kvalita obsahu a uživatelská zkušenost. Studie zároveň zkoumá prvky SEO mimo stránku, včetně profilů zpětných odkazů, sociálních signálů a zmínek o značkách, s cílem vyhodnotit jejich dopad na algoritmy a hodnocení vyhledávačů. Práce se snaží rozluštit, zda tato optimalizace přímo přispívá k jejich robustním obchodním výsledkům. svědčí o trvale vysokých ročních příjmech. Na základě pochopení jemné souhry mezi taktikou SEO a obchodním úspěchem si tento výzkum klade za cíl poskytnout užitečné informace pro podniky, které chtějí zlepšit svou online přítomnost a konkurenceschopnost.

Klíčová slova:

- optimalizace pro vyhledávače (SEO)
- SEO na stránce
- Off-page SEO
- Hodnocení webových stránek
- Obchodní výsledky
- Výzkum klíčových slov
- Budování odkazů
- Optimalizace obsahu
- SEO nástroje
- Viditelnost online

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1. Introduction

Datareportal (2023) estimates that there are 727.62 million internet users in Europe, many of whom use search engines to look for products. Kareem (2009) highlighted that Enhancing Search engine optimization, referred to as SEO, is the process that optimizes a page or site to boost the volume and consistency of traffic that comes naturally from search engines. An SEO-optimized website increased likelihood of appearing higher on search engine results pages (SERPs).

According to Yalcin et al. (2010), In order to increase a website's visibility, a collection of strategies known as search engine optimization seeks to rank it highly in search engine results pages.

According to Egri et al. (2014), search engine optimisation, or SEO, has become essential for all organisations and businesses to raise their position in search results. Additionally, search engine optimisation is an assortment of methods for positioning a website so that search engines may index it and list it among the results of Search Engine Result Pages (SERPs), as noted by Park et al. (2015). According to Hasugian et al. (2018), a website may be utilised as a promotional tool for a product and is an effective and modern way to spread information to a wider audience because it is readily available online.

The 4.2 billion people who use online resources every day, make 4 billion Google searches, and account for an average of 51% of website traffic from direct web browsing, make search engines with the highest search engine ranks essential tools for any organisation hoping to remain relevant in the digital age (Aswani et al., 2018).

It is easy to swiftly obtain insights into the results of site-wide or page-specific search engines with SEO tracking tools like Google Search Console (Kareem & Okur, 2020b).

For a specified period, users can obtain statistics about the position and page rates of particular keywords and details about the inquiries that result in the most traffic. While search engine ranking may be the best indicator of a page's SEO efficacy, there are several other important performance metrics to consider.

Another tool for monitoring websites is Google Analytics, which offers context for extra variables that could affect a blog's SERP ranking directly or indirectly. Some examples

of these metrics are page size, webpages per visit, bounce percentage, traffic from mobile devices, and visits returned (Schwartz, 1998). SEO may help you grow your business, get more customers to your website, and position yourself as an industry leader by raising your website's rating on Google and other search engines (Kareem & Okur, 2020a).

The importance of Search Engine Optimization (SEO) in the dynamic world of today digital marketing cannot be overstated. Due to the fact that businesses want to be more visible and recognized online, SEO has a significant impact on on-page ranking and the resulting business outcomes. This thesis examines and contrasts the two main elements of SEO, namely SEO both on and off the page, and their relative implications on web page ranking and overall business performance.

The historical development of SEO reflects the dynamic nature of the internet itself. In the past, search engines mostly relied on on-page information such as keyword density and meta tags to determine relevancy. However, as the internet developed, so did search engine ranking algorithms. Off-page SEO has grown in effectiveness as a result of its emphasis on the significance of external factors including backlinks, signals from social media, and online presence.

Understanding the complex relationship between search algorithms and website optimisation was made possible by the seminal works of SEO pioneers, such as Danny Sullivan's (2005) "A Webmaster's Guide to Search Engines" and Brin and Page's (1998) ground-breaking "Google: Anatomy of a Search Engine". These classic books act as compass points for figuring out the background history that has influenced the state of SEO today.

Businesses are investing heavily in SEO due to the huge popularity of search engines, their potent capacity to drive traffic, and the change in current marketing towards digital marketing. SEO appears to have established itself as one of the main pillars for most firms, as seen by the improved performance that results from proper optimisation.

A significant obstacle for businesses to effectively communicate with their clientele has been the shift in marketing and the sheer number of competitors in the industry. Even with high-quality items, many businesses continue to struggle to attract new clients or remain undiscovered. loss of visibility, which prevents them from performing at their best, declining

financial performance, and, in the worst case, being driven out of the market. Incorporating search engine optimisation can therefore be a useful business approach to deal with such situations and can present enormous prospects down the road.

The thesis has concentrated on assessing SEO approaches for organic ranking in search engine result pages (SERPs), given the prevalence of these techniques. For businesses to be successful in the digital world, they need to employ methods for both on-page and off-page SEO. The process of improving the value, relevance, and organization of website content is known as on-page SEO. Search engines prioritize high-quality content, and optimized on-page elements enhance visibility and user experience. According to Moz's SEO Guide, on-page SEO requires relevant, high-quality content because it influences both user engagement and search engine rankings (Moz, 2022).

The thesis has concentrated on assessing SEO approaches for organic ranking in search engine result pages (SERPs), given the prevalence of these techniques. For businesses to be successful in the digital world, they need to employ both on-page and off-page SEO approaches. The process of improving the value, relevance, and organization of website content is known as on-page SEO. Search engines prioritize high-quality content, and optimized on-page elements enhance visibility and user experience. According to Moz's SEO Guide (2022), on-page SEO demands significant top-notch material because it influences both user interaction and search engine rankings.

Off-page SEO involves building strong backlinks from reputable domains. Search engines view high-quality backlinks as a strong indicator of the credibility and reliability of a website.

Research from Backlinko highlights the relationship between higher search engine ranks and the quantity and quality of backlinks (Backlinko, 2022). Off-page SEO helps establish brand authority and trust in the online space. Positive comments, evaluations, and social signals from external sources enhance a company's reputation. Chevalier and Mayzlin (2006). Social media presence and participation are essential off-page components. Search engine rankings may be indirectly impacted by social signals generated by engaging content shared on social media platforms (Hootsuite, 2022).

In this thesis, we thoroughly examine and contrast On-Page and Off-Page SEO to determine the unique contributions they contribute to On-Page ranking. By fusing historical perspectives with current research, this study aims to offer enterprises aiming to enhance their entire digital strategy and maximize their online presence with practical insights.

The strategy used in this thesis comprised a thorough comparison of Tactics for On-Page and Off-Page SEO relative impact on website rankings and business results. The investigation of how different SEO tactics affect page rank, brand queries, and the reduction of page difficulty was based on real-time data from well-known websites: Dubizzle, and Carrefour.

Reputable sources including MOZ, Ahrefs, and Semrush provided data that was used to calculate SEO Difficulty, Off-Page SEO, and On-Page SEO. The assessment of the selected United Arab Emirates e-commerce and shopping websites was bolstered by the use of authentic data. Through website visits and data extraction from reputable SEO tools, the study sought to determine a thorough grasp of these businesses' SEO environment.

The result of these efforts was a comparative analysis that contrasted and presented the computed results for SEO Difficulty, Off-Page SEO, and On-Page Optimization in a methodical manner. This methodical technique ensures that the outputs are grounded in factual data and provides valuable information about how SEO strategies can be applied in real-world scenarios to enhance website rankings and ultimately influence business outcomes.

Companies that want to stay ahead in the fiercely competitive digital space need to have a complete SEO plan that incorporates both off-page and on-page strategies. Focusing on the quality of content, consumer experience, link building, and brand authority may help businesses become more visible online, attract a larger audience, and ultimately drive growth and success.

2. Objectives and Methodology

2.1 Objectives

The objective of this thesis is to conduct a comparative analysis of on-page and off-page search engine optimization (SEO) methods to determine their impact on website rankings and business outcomes. The study will involve the implementation of different SEO methods on a sample of websites, followed by the evaluation of their performance in terms of website rankings and business outcomes. The study aims to provide insights into the effectiveness of different SEO methods and their ability to improve website rankings and drive business outcomes.

2.2 Methodology

The methodology of this thesis will involve the following steps:

1. Selection of sample websites: A sample of websites from different industries and sectors will be selected to participate in the study. The selection criteria will include website age, domain authority, and current website rankings.

2. Implementation of SEO methods: The selected websites will be divided into two groups, with one group receiving on-page SEO methods and the other group receiving off-page SEO methods. The implementation of SEO methods will include keyword research, content optimization, link building, and other relevant strategies.

3. Monitoring and evaluation: The performance of the websites will be monitored over a period of six months, with regular evaluations of website rankings and business outcomes. Business outcomes will be measured through metrics such as website traffic, leads, conversions, and revenue.

4. Data analysis: The data collected from the study will be analyzed using statistical techniques to determine the effectiveness of different SEO methods in improving website rankings and driving business outcomes.

3. Literature Review

3.1 Overview

The quest to appear first on the search engine result pages (SERP) is consistently intensifying, making it increasingly challenging to attract traffic to websites. Internet visitors typically click on the links that appear first on search results. Search engines (SE) frequently use indexation to identify which pages on the internet are more relevant and appear higher on the results page.

On the other hand, website owners use Search Engine Optimisation (SEO) strategies to optimise their content so that it shows up higher in search results, improving both traffic and revenue for their websites. The main resources we utilise to find information on the Internet are the well-known search engines like Google and Bing. Chuklin et al. (2013) and Eric et al.(2015) have found that most users visit websites that are ranked higher on search engine results pages, with very few users visiting pages that are listed after the third one. If a source's material is on the third page, this number sharply drops.

As a result, SEO has emerged as one of the main tools used by organisations today to boost traffic and provide customers with accurate information Xing (2006). To locate content on the World Wide Web, search engines are essential (WWW). Searching through billions of webpages to get the one you need takes time. A few well-known search engines are Google, Yahoo, Ask, and Bing. Search engines must crawl through every webpage in order to index it. The contents are dynamic; therefore, dynamic indexing could be sluggish. Although the search engine's indexing performance is getting better every day, the amount of content available on the Internet is expanding far more quickly. The World Wide Web contains billions of pages So, Search engines must produce a staggering amount of words.

3.2 The World Wide Web

In the year 1990, British computer scientist Tim Berners-Lee introduced World Wide Web (WWW, W3). When W3 arrived, it soon became apparent that consumers could not find the information they were searching for by just navigating the internet. It has made a big difference in how people get information. The development of search engines satiated this need.

The World Wide Web, abbreviated as WWW, comprises a compilation of diverse information pages featuring hyperlinks and data. Due to the expansion of the World Wide Web, it has become more challenging to locate the necessary information that satisfies user demand and interest.

3.3 Search Engine Optimisation (SEO)

Among the best resources for knowledge exchange are search engines. Increasing the exposure and prominence of a website on a search engine's results page (SERP) can be accomplished through a set of techniques known as search engine optimization (SEO). The four main components of SEO techniques are keyword research, web page optimization, off-site optimization, and search engine ranking. Sorting and choosing different webpages in search engines is a laborious process. Using a variety of techniques, search engine optimisation (SEO) is a technique that pulls relevant information from billions of webpages.



Figure 1: Search Engine Optimization (SEO), Source: Own Processing

Some of the key researches relevant to our topic of study are as follows: Smith and Johnson (2018) investigate how specific aspects of on-page SEO, like headers, meta descriptions, and keyword placement, influence user behaviour and subsequent business outcomes. While, Chen and Patel (2019) research focus on the correlation between off-page

SEO efforts, such as backlink quality and quantity, and their impact on website rankings and business success. On the other side, Gupta and Brown (2020) explore how the strategic use of keywords in on-page SEO contributes to increased brand visibility and positively affects business outcomes. However, Wang and Lee (2017) hypothetical study investigate the synergistic effects of both on-page and off-page SEO strategies on the revenue and sales performance of e-commerce platforms. Hernandez and Kim (2016) focus on a specific industry, examining how on-page and off-page SEO strategies impact online bookings and overall revenue for hotels or travel businesses.

To offer users improved outcomes, prominent search engines consistently work on advancing their technology to conduct more thorough web crawling. Nevertheless, certain limitations have been identified, particularly in the functionality of search engines. Effective SEO has the potential to attract thousands of visitors and garner increased attention. However, choosing the incorrect tactics can cause the user site to be hidden or buried in the search results, with little chance of being found. Moreover, SEO, which is the act of preparing material for search engines, aids in improving rankings in order for things to be shown where searchers may readily find it. The online landscape is growing more competitive, and companies that engage in SEO will enjoy a significant advantage in terms of attracting visitors and customers.



Figure 2 : Types of Search Engines, Source: Google

Furthermore, Ricardo et al. (2006) indicated the results that search engines have retrieved, sorted, and presented consist of hundreds of millions of linked pages. Some of the material on these result pages might not be pertinent or helpful to the user. Consequently, in this case, web page ranking algorithms are crucial for optimising this kind of outcome.

Web searches are gaining increasing popularity as a preferred method on search engines. In this case, it is essential to give the user appropriate, respectful documentation and high-quality information upon request. And the major difficulty in solving the difficulties is that research uses algorithms for assistance. Various types of algorithms are designed and altered to accomplish the objective.

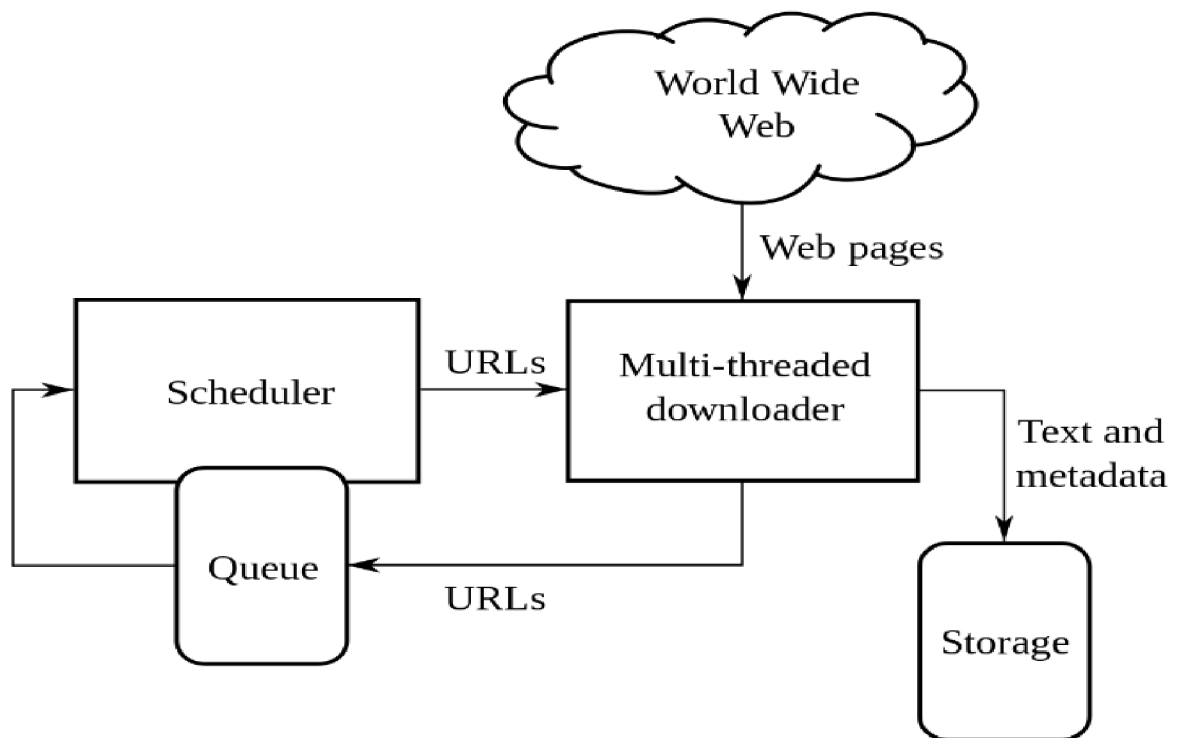


Figure 3: Web Searching Process, Source: Google

A search engine, a software tool, employs keywords or phrases to aid users in locating the desired information on the internet. The most widely used search engine on the internet is Google. There are three steps involved in a Google search:

Crawling: A search engine builds its list of known pages by continuously searching for fresh and updated content. We call this process URL discovery. When the crawler finds a page, it

reads its contents. The search engine uses an algorithm to decide which pages to crawl and how often.

Alternatively, a web crawler can also be referred to by other names, such as web spider, web robot, bot, crawler, and automatic indexer. A spider reads text, hyperlinks, and the content of different tags, including key words and meta tags, when it visits a webpage. HU et al. (2004)

Indexing: Once a page undergoes crawling, its textual content is processed, analyzed, and tagged with attributes and metadata. These elements assist the search engine in comprehending the subject matter of the content. This helps the search engine to identify and eliminate duplicate pages as well as gather information about the content, such the country or region the page is located in and how user-friendly it is.

Searching and ranking: The search engine returns the results that seem to be the most pertinent on the search engine results page (SERP) after a user submits a query and the index is searched for matched sites. Content is ranked by the engine based on several variables, including keywords contained on the page, backlinks pointing to the page, and the authority of the page. GUY et al. (2016).

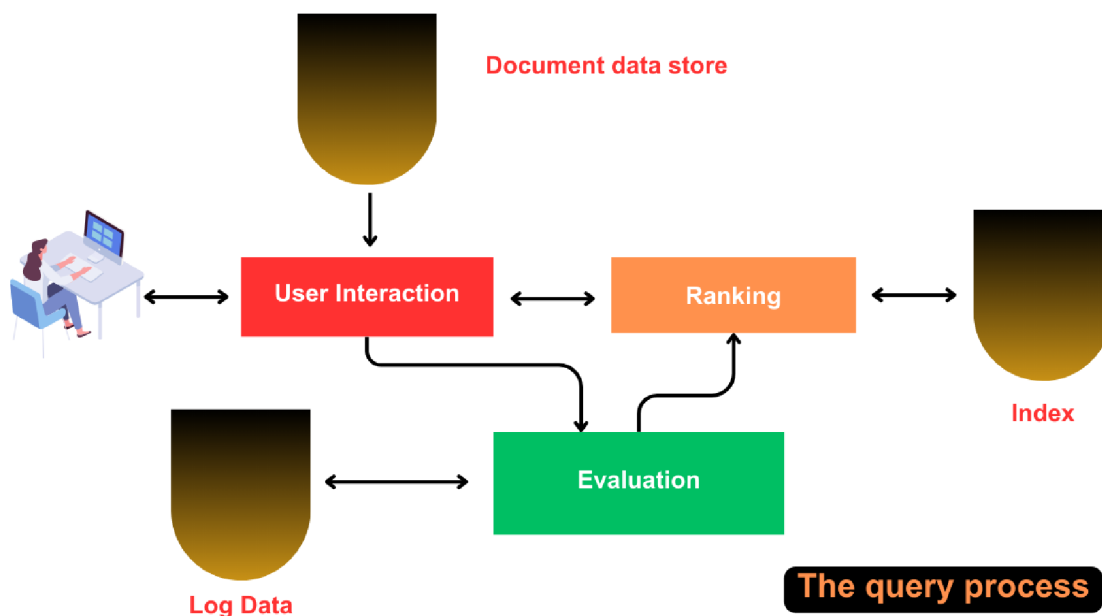


Figure 4: The Query Process, Source: Own Processing

Not all search engines use identical content-ranking methods, although some share similar algorithms. Alguliev et al. (2013)

Google Search and other search engines employ the following criteria to rank relevant results:

Query meaning: The particular kind of information a user is looking for is known as searcher intent, and the search engine determines this by analysing user queries. To do this, search engines make use of language models. Algorithms known as language models are able to comprehend user input, identify the information that the user is searching for, and read it.

Relevance: Content keywords are matched with keywords from search queries. Multiple keyword occurrences indicate greater importance than one keyword at a time in the material.

Quality: Search engines scan content for signs of authority, competence, and reliability. If the article has links from other well-known websites, it is seen as more reliable.

Usability: Search engines award material with a better page experience based on their evaluation of accessibility and overall user experience. Mobile friendliness, which gauges how simple a webpage is to use on a mobile device, is one type of page usability.

User data: Search engines employ a variety of data kinds, including location information, search history, and search preferences, to decide which content ranks to display.

Other website performance measures, such bounce rate and time spent on page, may also be used by search engines to decide a website's position on a results page. When someone looks for the same term in text-based content as opposed to images or videos, search engines may provide different results. To benefit from the aforementioned procedures, content writers employ search engine optimisation, or SEO. Search engine optimisation raises a page's visibility to users and SERP ranking for its content. To enhance search results for a certain query, for instance, a content writer could include keywords related to that question. The content developer may include the keywords "bone," "leash," and "hound" if they want individuals looking for dogs to find their page.

The Google search engine has more than 211 on- and off-page criteria in its complex algorithm. The importance of placing the resultant websites and having material that is most

pertinent to the user's inquiry is directly impacted by these aspects. For example, 33% of all visits originate from the first place on the search engine results page (SERP) of Google,

whereas 17.7% of all clicks from SERPs originate from the second slot. Killoran (2013). Consequently, content producers for websites have a better chance of having their page rank as high as possible in search engine results. According to Kumar et al. (2011), a website's likelihood of attracting visits increases with its ranking on search engine results pages (SERPs).

3.4 SEO Advantages: Navigating the Landscape of Online Success

Due to the rise of online criminality, search engine optimisation has seen significant growth in value (King, 2008). Search engine optimisation offers a company the following benefits: The axioms or fundamental limits described would promote dominance in the viewer both locally and globally. This would be incredibly beneficial for businesses who operate overseas. When used with important and pertinent ideas and keywords, the business's website would receive the most visitors from the search engine.

Because SEO aims to turn searchers' visits into potential customers, it is considered the best strategy for growing a firm. The visibility component of the corporate website will begin following the optimization process.



Figure 5: SEO benefits, Source: Own Processing

Visitors are also aware of the unique goods and services that the involved company provides. It becomes clear that search engine optimization is superior than all other forms of traditional marketing in terms of benefits and utility. Search engine optimization is superior to all other forms of marketing when it comes to increasing significant returns on investment. As a result, the company's revenue and earnings would increase (Kareem, 2009). The SEO rating is far less expensive than other strategies and aids in keeping businesses' websites up to date for a very long time (Wahid et al. 2019).

From the discussion above, it is clear that search engine optimisation will give businesses deadly advantages like reduced capital requirements, control over traffic volume, higher profits, sales and revenues, more beneficial ways to advertise a company's services and products, cost-effectiveness, high visibility, both local and global visibility, and so on (Kareem, Yousif & Abdalwahid, 2020).

Prior to the implementation of the search engine optimisation procedure, the conventional approach involved entering a single article and submitting it to several additional directories for inclusion in their index (Telnic Limited, 2009).

Prior to the inclusion of this search engine option, the webpages were submitted to all directories and included an identical version of the article in each directory (Schwartz, 1998).

3.5 SEO Realities: Understanding and Overcoming Limitations

There are several restrictions and challenges associated with SEO (UKEssays, 2018). A select few of these are examined as follows:

Idiom and key constraint limitations: The biggest limitation is that, for search engine optimization, the same axioms and important constraints cannot be adequately applied to the same domain on a single platform (Amin et al. 2018). This would have a negative impact and decrease the population in that specific location. This is due to a lack of confidence in the sufficient assumptions set.

Competition limitation: When two different websites are shielded by the same primary or fundamental constraints, the level of competition rises. In this instance, websites face resistance in their quest to reach a particular rank.

Subpage restriction: The websites' subpages must continue to follow the basic rules and axioms, which are subject to recurrent alteration, in an effort to raise traffic and rank higher (Berman & Katona, 2013).

Linguistically: The majority of traditional search engine optimizers are limited to a single language platform, which may limit the search to a particular area.

Crawl ability limitation: After navigating through a vast number of web pages, the crawling process will become more difficult, which will slow down the search (Zhang & Cabage, 2016).

Limitation on duplication: When a certain page is submitted multiple times with identical material, the search engine considers it to be duplicate content (Yang & Ghose, 2010).

Conflicting terms and major constraints, limitations resulting from intense rivalry, subpage limitations, lingual concerns, crawl capacity limitations, and problems with web page replication in indexing by search engines are a few of the restraints.

SEO Innovation Techniques: Search engine optimization is currently accepted as standard practice. a complex process used by the PPC, or pay per click, systems as indicated by (Wallace, 2003). Because the SEO is aware of how difficult it might be to come up with certain Idioms or terms that are essential to modern business, Customer trafficking will ultimately turn into an issue if the search parameters are useless, these websites are not displayed. The aforementioned suggests that new solutions that address the drawbacks of conventional search engine optimization have emerged as a result of recent technological advancements. Ketu and Askar (2015).

3.6 Digital Foundations: Integrating SEO for Business Advantage

Recent advancements in search engine optimization offer a range of benefits that surpass traditional methods. Innovations have significantly minimized the effort needed to duplicate original web page content, contributing to a more streamlined process. The speed of the crawler has seen a noticeable boost, ensuring faster search capabilities. Scalability, a key essence in contemporary technologies, has witnessed marked improvement. Businesses can expect increased traffic and enhanced efficacy. The outcomes are notably promising, making it evident that modern technologies bring several advantages over traditional search

engines, including traffic augmentation, duplication reduction, accelerated search speeds, scalability facilitation, improved efficacy, and more.. (Smith, 2010)

In the cutthroat internet world of today, the website has to be optimised for search engines (SEO). Approximately 68% of online encounters start with a search query on Google or another search engine. Consequently, ranking highly in search results for your web pages offers numerous advantages, such as a rise in organic visitors and enhanced website reputation.

3.7 On Page Optimization Strategy

On-page SEO is what comes to mind when most people think of the "basic" components of search engine optimisation, such as keywords, HTML elements, page titles, and mobile friendliness. Its all about making sure the information on website can be indexed, crawled, and interpreted by search engines and is the main goal of this SEO component. The on-page SEO tactics, improve the way people who visit the site interact with it. Making the website "delightful" for visitors is another aspect of on-page SEO, as internet search engines like Google aim to recommend the finest websites for users to visit. Zhang et al. (2005).

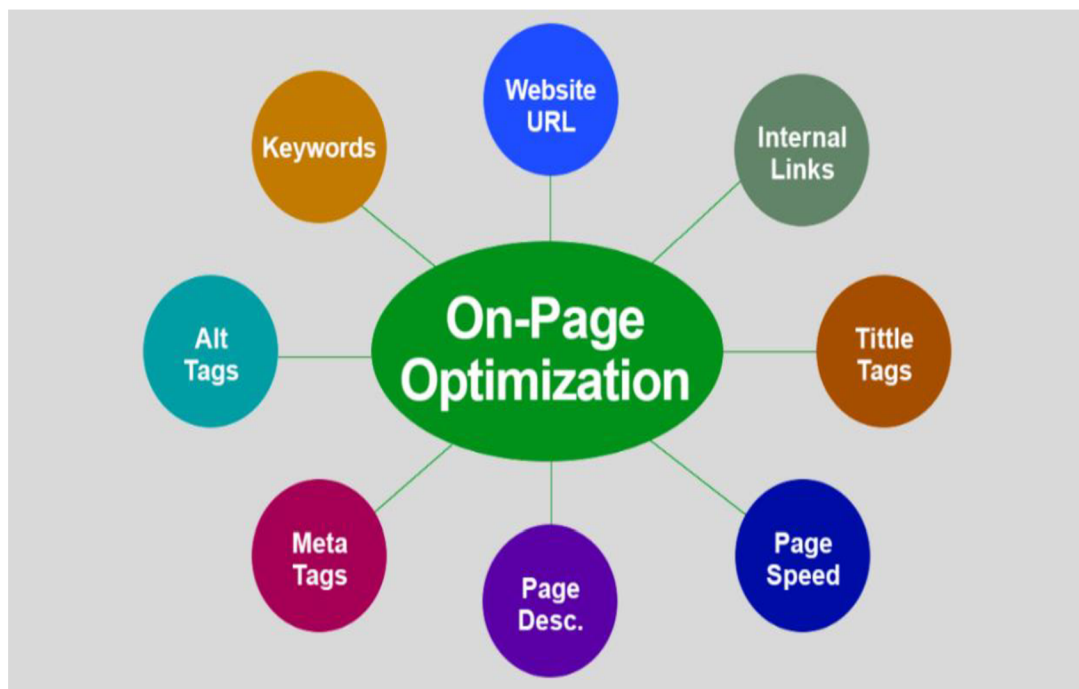


Figure 6: On-Page Optimization, Source: Google

On-page SEO may be impacted by the following factors:

Core Web Vitals: Core Web Vitals, a collection of practical indicators that evaluate a website's user experience, is one of the latest ranking factor of Google. Essential aspects including load time (Largest Contentful Paint), clarity (Cumulative Layout Shift), and responsiveness (First Input Delay) are measured. Improving the performance of your site Core Web Vitals tells Google that visitors are finding their experience satisfactory.

Page Speed Optimization: As a result of Google preferring faster websites over those with slower speeds, Page speed, sometimes referred to as load time, is a crucial component of on-page SEO. Increasing page speed can also aid in increasing the number of pages that Google indexes. While there are many ways to speed up a page, some helpful areas to start are with cache, the compression process, Js files, and graphics.

Mobile Friendly: Mobile friendliness is a metric used to assess how well a website functions on a mobile device. Mobile-friendly websites may shrink to fit any screen size while still providing all the features customers need to navigate and complete their tasks. They also prioritize user experience on mobile devices by using responsive layouts, straightforward menus, and fast page loads.

Title tags: Frequently referred to as "page titles," these tags in the HTML code indicate the title of the page and give a summary of the content that will be displayed. For example, the post's headline asks, "What is Search Engine Optimization?" Thus, the title tag of the page is `<title> What is Search Engine Optimization? </title>`. Among other things, Google looks for themes on pages in order to decide whether or not they are linked to the query of the user. This includes looking for information in title tags.

Meta descriptions: Although descriptions are used by Google to determine The primary objective of search engine optimization is to direct users from search results to a website if the page is pertinent to the query being searched. SEO meta descriptions are the best approach to increase a page's rate of click-through (CTR) in results from search engines.

High Quality Content: When it comes to on-page SEO, content is crucial.

Search engines can evaluate the quality of content using a number of techniques, but the most crucial one to consider is: 1) Is it beneficial to the user? 2) Is it easy to read? 3) Is it

unique? and 4) Does it relate to the question posed by the user? If "yes" responses to these questions are given, the content is of a high caliber.

HTML tags: used to identify headlines and subheadings in the content of a webpage. They facilitate readers' ability to read and understand online material. These tags aid in on-page SEO by helping search engines comprehend the topic of a page and how it connects to a user's search query.

Image Alt Text: The term "alt text" describes an attribute that appears in the HTML tag of an image and holds a text description of the image. When an image on a page doesn't load, assistive devices like screen readers and browsers use alt text as a fallback. Alt text is a factor that search engines use to assess a picture's relevance to a user's question. Because of this, alt text is a crucial component of on-page SEO for both conventional web search and image searches.

Link Building: Link Building is an important factor in on page seo optimization When you connect to other pages on the site from inside the material you've written, it helps users find pertinent information with more background or context. By providing links to longer, more comprehensive guides that clarify key points about on- and off-page SEO. By assisting search engines in discovering fresh information, internal linking enhances the SEO of your website. Furthermore, the anchor text for inner Links notify search engines about the content to be found on a destination's site and its relationship to other information.

Navigation or Tracking: "Navigation" refers to ensuring that all users are able to access and utilise the material on a web page. Google gives careful consideration to the type of page it suggests to users, making sure that everything they suggest is viewable by all users, regardless of browser or disability.

3.8 Off Page Optimization Strategy

The range of methods, techniques, and initiatives use to market content on various websites all through the internet is referred to as off-page SEO. The primary objective of this SEO technique is to secure your site, business, and/or brand cited on a different website. Langville et al. (2011).



Figure 7: Off-Page Optimization, Source: Google

Off-page SEO is probably something like constructing links to your website. Although, off-page SEO is much more than just building links.

Backlinks: One of the most crucial elements for off-page SEO remains to be the quantity and quality of backlinks. Google has devoted several algorithm improvements to combating link schemes and link spam because of how crucial backlinks are. Links are crucial to off-page SEO because they give your website "link juice," which makes it seem more reliable and authoritative to search engines.

Social media: Social networking is a useful technique for promoting websites online even though the number of shares, likes, or comments on a page has no bearing on its ranking. Social media provides a means for people to locate and communicate with businesses online, thereby increasing their clientele.

Unlinked mentions: Anytime a company name or website is mentioned online by an unaffiliated site without providing a backlink to the site, this is known as an unlinked mention. It is extremely difficult, if not impossible, for a backlink to be included with every internet reference of your website or business. If this was the scenario, Google might penalize the website and consider it to be highly suspect.

Nevertheless, brand mentions without links are still beneficial for off-page SEO. Nevertheless, they can serve as references for the legitimacy and authority of the website. Remarks also offer an excellent chance to build fresh backlinks.

Google My Business: Businesses may easily and quickly provide Google with essential information by using Google My Business, or GMB. This information includes the type of business, its location or services area, its contact information, and its operating hours. Google also uses GMB to deliver search results on Google Maps. For this reason, it's an essential component of off-page SEO for any local firm that depends on customers from a specific area.

In a nut shell, selecting between on-page and off-page SEO isn't the crux of a sound SEO approach. Choosing between tyres and an engine for your automobile would be similar to trying to pick which is more important—we need both to go where we want to go.

4. Practical Part

4.1 Data Analysis

For Comparative Evaluation of Off-Page and On-Page Techniques for Search Engine Optimization on Website Rankings and Business Outcomes.

I have selected websites, Carrefour uae & Dubizzle and divided them into two groups, with one group receiving on-page SEO methods and the other group receiving off-page SEO methods. This means I have applied on-page SEO methods on website Carrefour uae and off-page SEO method on website Dubizzle. The implementation of SEO methods will include keyword research, content optimization, link building, and other relevant strategies. Then I analysed the result of combining off-page and on-page SEO on these websites with regular evaluations of website rankings and business outcomes. Business outcomes are measured through metrics such as website traffic, leads, conversions, and revenue.

The selection criterion for website is as follows:

- Website age
- DA
- Current website ranking

Website age: In the realm of search engine optimization, or SEO, a website's rating is influenced by numerous variables. The most prevalent and important of these are keyword density, backlinks, and on-page SEO. Nevertheless, webmasters and SEOs frequently ignore another aspect that could influence a website's ranking: the domain age.

Domain Age Checker makes it easier to determine the precise age of a domain or website, from the moment of registration to the present. Search engines view domain age as one of the most significant variables in website ranking.

What is the effect of domain age on SEO?

- Trust and authority: Search engines are more likely to regard a domain as trustworthy and authoritative the longer it has been in existence.

- Backlinks: More backlinks from other websites are typically found on older domains, which helps improve search engine rankings.

Domain Authority (DA)

The Domain Authority (DA) score, developed by Moz, gauges a website's probability of showing up in search engine result pages (SERPs). A better likelihood of ranking is indicated by higher domain authority scores. Scores for domain authority range from one to hundred.

Connected root domains and the total number of connections are two of the elements that are combined to get a single Domain Authority (DA) score. This figure can then be utilized to evaluate websites against one another or track a website's "ranking power" over time. Both search engine result pages and Google's ranking are unaffected by Domain Authority.

Current website ranking

Google developed a tool called Google Search Console especially for examining website rankings. It not only reveals the website's rating for a specific keyword, but it also reveals the number of visitors clicking on the page, the people linking to the website, and the areas of the website that require improvement to raise your ranks. Therefore, I also take this into account when choosing.

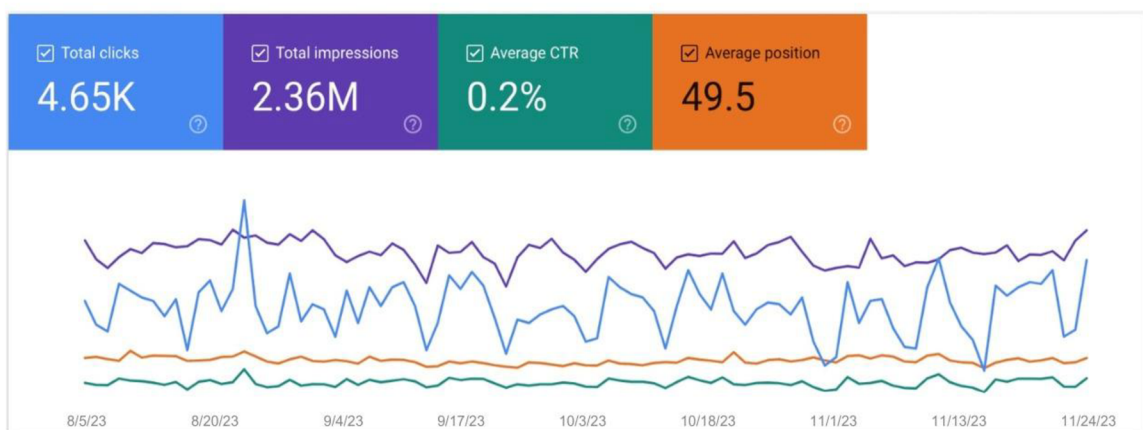


Figure 8: Current website ranking using google search console, Source: (Google Search console 2023)

Clicks

The amount of times a website has been clicked is the total clicks measure.

Impressions

The total impressions metric is the number of times website has been seen but not clicked. (This could be through organic search, ads, etc.)

Average CTR

The average click-through rate is calculated by dividing the total number of impressions by the number of clicks.

Average position

The place a page appears on a Google searches is known as its average position. The search results are arranged with positions 1–10 on page 1, positions 11–20 on page 2, and so on. The ultimate goal is to rank #1 or #2 as those are the pages that get the most traffic.

So on the basis of this criteria i have selected these two websites Carrefour uae and Dubizzle. Both these websites are 10 plus years old. I have taken this benchmark to select websites because Older domains typically have more backlinks from other web pages, which can assist in increasing their visibility in search results. Another reason why engines such as Google are more likely to see a domain as reliable and credible is the longer it has been in existence.

I analysed the real-time data from two websites, Dubizzle and Carrefour, in order to examine how issues like webpage position, brand inquiries, and the elimination of page difficulty may be addressed with the SEO technique. Choosing pertinent keywords is also crucial for every website. Selecting the appropriate keyword could increase brand query and decrease the complexity of the page for both on and off the page. I have taken into account real data while calculating Off-page SEO, On-page SEO, and SEO Difficulty. I visited the websites of two prominent ecommerce and shopping websites in United Arab Emirates, for the purpose of illustration. I'm able to ascertain the SEO Difficulty, Both off-page and on-page SEO using real data and SEO. I have taken the Data for these websites from MOZ, Ahrefs and Semrush. The computed results have now been compared and presented.

Implementation of SEO Method:

ON PAGE SEO

For the scope of this thesis I have divided the website in two groups. In group 1 I have included Carrefour uae website and in group 2 I have included Dubizzle website. I applied on page seo on group 1 website and have applied off page seo on group 2 website. For on page seo analysis I have used Rank math as a tool for doing on page seo. Using rankmath I have optimised the listings of Carrefour uae website which include keyword optimisation, images optimisations, meta deta, internal linking, url optimisation, heading and content optimisation.

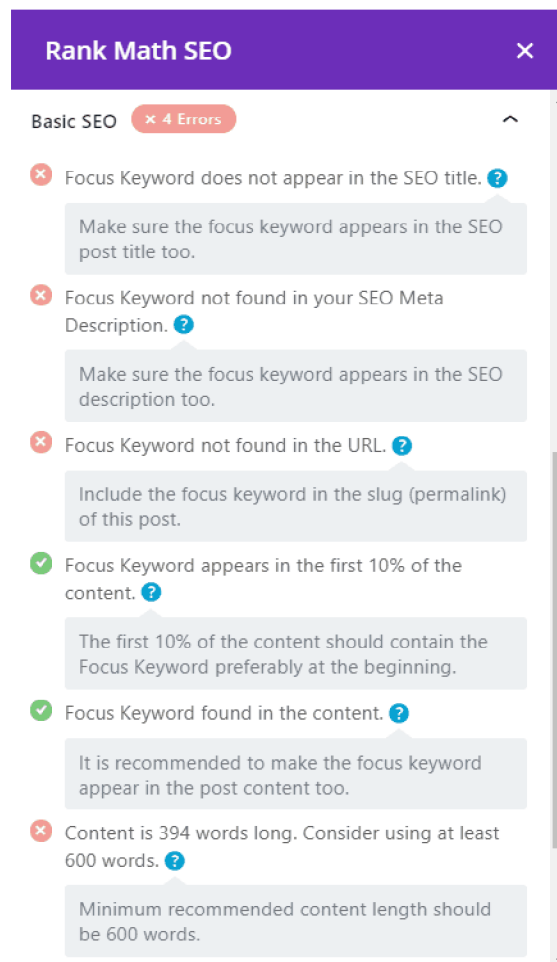


Figure 9: Rankmath for On-page SEO, Source: (Rankmath, 2024)

For on page seo as I have used rank math . Rank Math offers a range of SEO features to optimize website. It provides on-page optimization tools such as keyword analysis, XML

sitemaps, and schema markup. With its advanced SEO analysis, we can easily identify areas for improvement and optimize content accordingly.

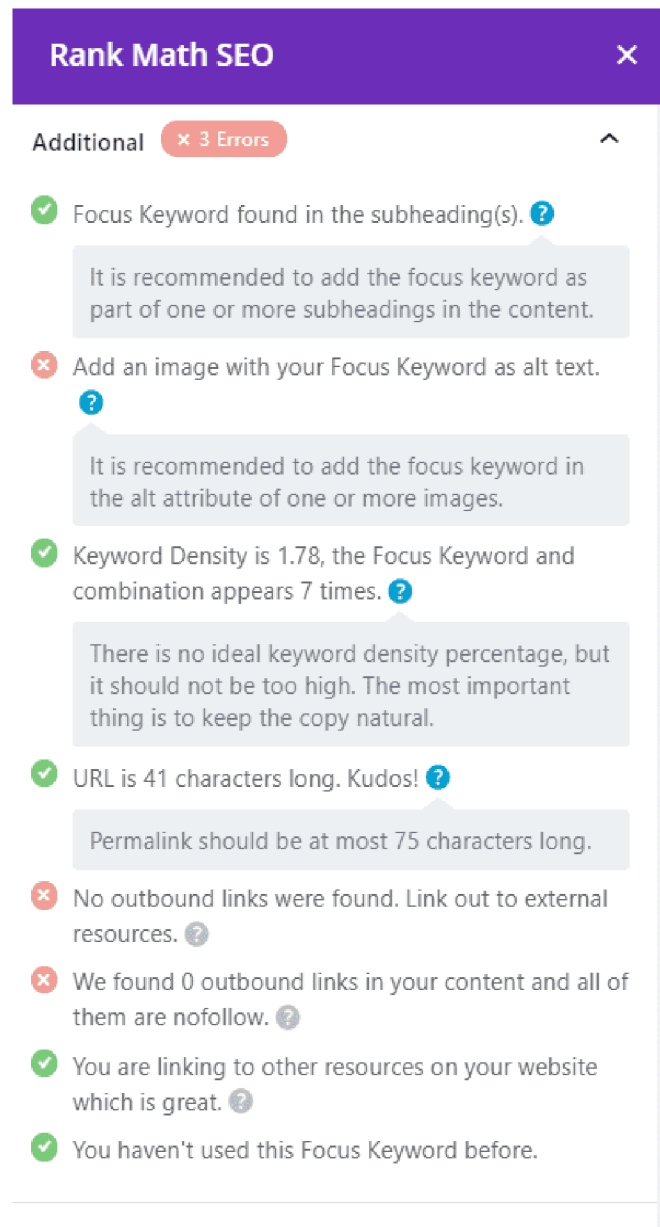


Figure 10: Rankmath for On-page SEO, Source: (Rankmath, 2024)

For keyword research I have used Moz Keyword explorer tool and ahrefs keyword explorer tool in order to find best keywords for on on page seo optimisation. These tools provide keyword search volume monthly along with ranking and SERPs.

Top Suggestions

Keyword	Monthly Volume
carrefour uae	30250
carrefour dubai	4950
carrefour drive	0
carrefour uae offers	800
carrefour france	210

Figure 11: Keyword Research For On page SEO, Source: (Moz, 2024)

Your current position for "carrefour": #1

Ranking & SERP updated 3 days ago

Search result	DR	UR	Backlinks	Domains	Traffic	Keywords
1 كارفور الإمارات - تسوق أونلاين منتجات البقالة, الموبيلات Car... https://www.carrefouruae.com/mafuae/ar/	69	13	54	17	133K	725
<ul style="list-style-type: none"> 3 siteLinks Carrefour products Great... الإلكترونيات والأجهزة المنزلية Mobiles & Electronics 						

SERP overview

Search result	DR	UR	Backlinks	Domains	Traffic	Keywords
1 كارفور الإمارات - تسوق أونلاين منتجات البقالة, الموبيلات Car... https://www.carrefouruae.com/mafuae/ar/	69	13	54	17	133K	725
<ul style="list-style-type: none"> 3 siteLinks 						
2 Carrefour Group: Home - Welcome at Carref... https://www.carrefour.com/en	76	29	48K	2.7K	6.8K	525
3 Carrefour - Grocery, Food, Electronics & Mor... https://www.carrefouruae.com/?gclid=Cj0K...	69	0	0	0	748	79

Figure 12: Keyword Research For On page SEO, Source: (Ahrefs, 2024)

For Off page SEO

Off- Page SEO methods include Link building, blogging, guest posting, forums , social media, brand mentions, reviews, question answers, local SEO, influencer marketing. For off page seo analysis of website dubizzle I have used link building strategy which is also known as backlinks, Question and answers, brand mentions, and reviews. Off-page SEO aims to increase a website's perceived credibility and integrity among visitors and search engine spiders. It is a crucial component of an effective SEO plan. Getting other web pages to link to your website is known as link building. In SEO, these links are known as backlinks. If a domain or website has more backlinks, Google may view it as more reliable particularly if those backlinks originate from other authoritative domains.

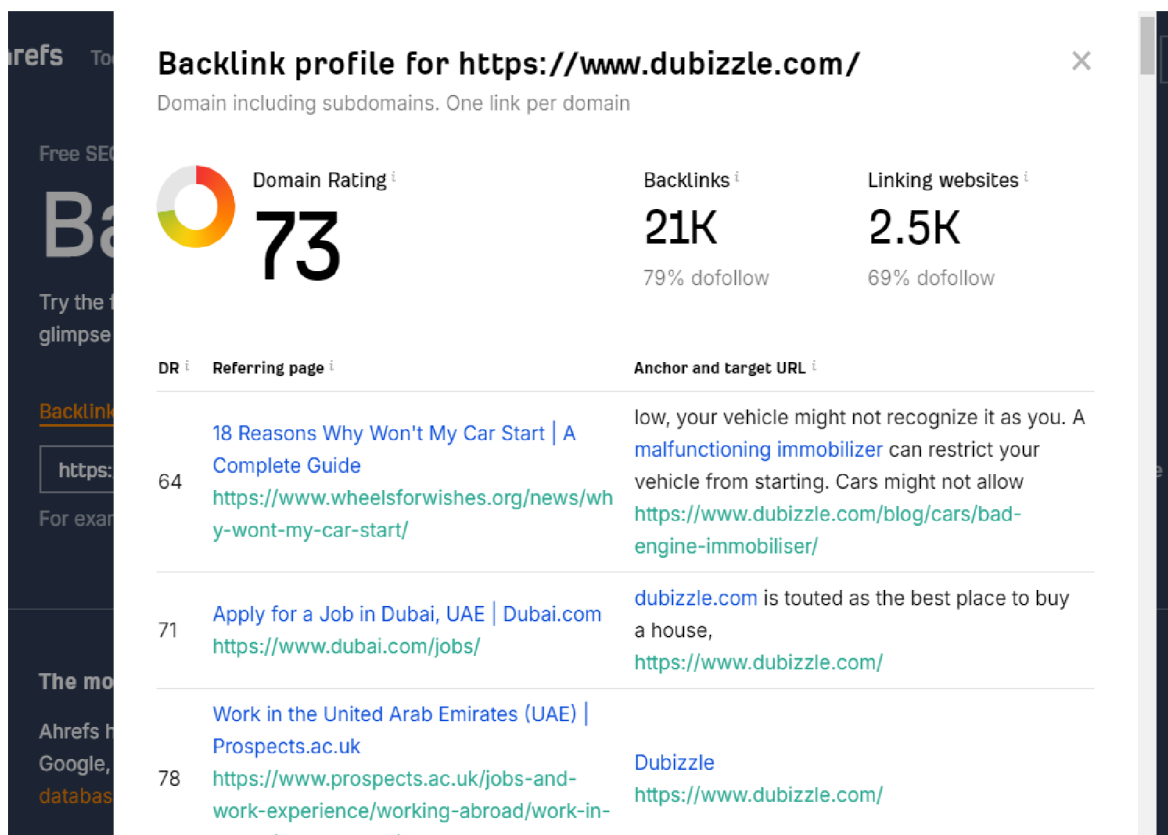


Figure 13: Backlink Profile of Dubizzle, Source: (Ahrefs, 2024)

Prior to obtaining the blacklinks, we must take into account three crucial factors: reputation, authority, and significance. Relevance is the idea that the website you are attempting to obtain backlinks from should be associated with your particular niche. Furthermore,

authority suggests that a website should be authoritative in terms of its backlink profile, degree of establishment, etc. and reputation relates to things like traffic volume and total brand reviews, among other things.

Table # 1: On-Page & off-Page Scores for websites

website	On-page seo	Off- page seo
https://dubai.dubizzle.com/	98.51	52.33
https://www.carrefouruae.com/	96.81	59.53

Source: (Moz, 2024)

4.2 Foundational Technical Concepts

This section has covered a number of technical topics to help set the stage for the remaining work.

- **Domain Authority (DA)** is a search engine ranking statistic developed by MOZ for websites that indicates the probability of a website appearing in the result pages of search engines (SERPs). On a scale of 1 to 100, a higher DA number denotes a higher likelihood of obtaining a good ranking.
- **Open Page Rank** Reviving Page Rank metrics was the goal of the Open Page Rank project, which made it easier to compare different sites with ease.
- **Off-page SEO Difficulty** for a given search query, A grade of 100 is assigned to the Off-page SEO Difficulty, assesses the highest listings on Google's home page in terms of link value. This formula (as used by Maitra et al. (2023)) is used to compute it:

Off-Page SEO Difficulty Score = 0.75 Moz - DA Score + 0.25 × 10x Open Page Rank Score

- **On-page SEO Difficulty** The percentage of The On-page SEO Difficulty, which is graded out of 100, displays the top ten optimized results for a specific search term.

The set of standards listed below can be used to score it:

Principle Number 1: If the precise search term, or in the plural, accurately corresponds to the page title, fifteen points will be awarded.

Principle Number 2: If the URL precisely contains the search phrase, or if it is plural There will be a five-point bonus.

Principle Number 3: If the description includes the precise search term, or the plural, 15 points will be awarded.

Principle Number 4: If search term fits the page title, it will receive 25 points, regardless of how many words it contains.

Principle Number 5: If the URL includes a thorough search term, or if it is plural, the score will be 10 points.

Principle Number 6: To receive ten points, the description needs to include a thorough search query, or its plural.

Principle Number 7: If Google underlined any terms in description the score was going to be 30.

The On-page SEO Difficulty score often falls between 90 and 100.

- **Brand Inquiries** Brand-related questions are terms used for searches that contain the name of a brand. When displaying hyperlinks from social media, Google will give preference to the website of the brand over any other website. It is far more difficult to rank for brand queries as a result.

The following scenarios show how a search query can be seen as a question about a brand:

- (a) Google provides links to websites for the highest-ranked related results.
- (b) The website that produced the first three responses is the same.
- (c) Google's first page of search results features at least two results from social media sites, such as Facebook, Instagram, LinkedIn, Twitter, and so on.

- **SEO Difficulty** The SEO Difficulty score is influenced by Brand Enquiry Difficulty, Off-page Difficulty, and On-page Difficulty. The quantity of backlinks going to the website and its page determines these scores. They range from 1,000 (the highest rank) to 0 (no backlinks found). Following completion, the page rank is multiplied

by 0.9 and the domain rank by 0.1. The final values are divided by 500 after being added.

4.3 Hypothesis Formulation

In order to study in detail our research question which is the Comparison of On-Page and Off-Page Techniques for Search Engine Optimisation with Regard to Website Rankings and Business Outcomes, I have formulated certain hypothesis in order to evaluate the impact of off-page and on-page SEO on business outcomes and website ranking.

This study demonstrates the impact of utilizing Approaches for On-Page and Off-Page SEO in raising website ranking and business results, or overall brand awareness.

Hypothesis formulation for ON-PAGE SEO impact on website ranking and business outcomes

H₀: It is believed that On-Page SEO has no discernible beneficial effects on website ranking or business outcomes

H₁: It is believed that On-Page SEO has significant beneficial effects on website ranking or business outcomes

Hypothesis formulation for Off-PAGE SEO impact on website ranking and business outcomes

H₀: It is believed that Off-Page SEO has no discernible beneficial effects on website ranking or business outcomes

H₂: It is believed that Off-Page SEO has significant beneficial effects on website ranking or business outcomes

Hypothesis formulation for both ON-PAGE and OFF PAGE SEO impact on website ranking and business outcomes

H₀: It is believed that Both off-page and on-page SEO has no discernible beneficial effects on website ranking or business outcomes

H₃: It is believed that Both off-page and on-page SEO has significant beneficial effects on website ranking or business outcomes

4.4 Uniform or Rectangular Distribution

A random variable x has a uniform or rectangular distribution if its probability density function looks like this:

$$f(r) = \begin{cases} \frac{1}{b-a} & a \leq r \leq b \\ 0 & \text{otherwise} \end{cases}$$

The symbol $U(a, b)$ denotes this distribution, where a and b are two actual values such that $a < b$.

The $RAND()$ function in Excel is used to generate random numbers. It returns random integers between 0 and 1. Therefore, the following procedure can be used to create any random value between a and b if a is less than b .

Algorithm

Step1: Read as inputs a and b

Step2: Let m be equal to $RAND()$

Step3: Return back $a+m(b-a)$

In this study in order to analysis Both off-page and on-page SEO on group of websites linear regression model is used to determine whether on page seo on group of websites influence website ranking and business outcomes.

$$y_1 = \beta_0 + \beta_1 X_1 + \varepsilon \quad (1)$$

$$y_2 = \beta_0 + \beta_1 X_1 + \varepsilon \quad (2)$$

Where y_1 represents website rankings and y_2 represents business outcomes X_1 is the on page seo scores of websites. Equation number 1 explains the impact of on page seo on website ranking and equation number 2 represents the impact of on page seo on business outcomes.

For off page seo analysis, linear regression model will be

$$y_3 = \beta_0 + \beta_2 X_2 + \varepsilon \quad (3)$$

$$y_4 = \beta_0 + \beta_2 X_2 + \varepsilon \quad (4)$$

Where X_2 represents off page seo on website ranking y_3 and business outcomes y_4 respectively.

Lets assume website ranking and business outcomes to be a combined term brand awareness then on page analysis on website Carrefour uae the model will become

$$Y_1 = \beta_0 + \beta_1 X_1 + \varepsilon \quad (5)$$

Where X_1 implies on page seo score and Y_1 implies brand awareness i.e the impact of on page seo on business outcomes and website ranking

For off page analysis on website Dubizzle the model will be,

$$Y_2 = \beta_0 + \beta_2 X_2 + \varepsilon \quad (6)$$

Where X_2 implies off page seo score and Y_2 implies brand awareness i.e the impact of off page seo on business outcomes and website ranking of dubizzle website. afterward i have analysed the combined affect of Both off-page and on-page SEO on business outcomes of carrefour uae and dubizzle website. For this purpose, I have use multiple linear regression analysis for finding Both off-page and on-page SEO impacts on business outcomes. Then the regression will be as follows,

$$\text{Model 1 } Y_3 = \alpha_0 + \beta X_1 + \gamma X_2 + \epsilon \quad (7)$$

$$\text{Model 2 } Y_4 = \alpha_0 + \beta X_1 + \gamma X_2 + \epsilon \quad (8)$$

Where equation 7 represents the impact of on page seo and off page seo on Carrefour uae website business outcomes and website ranking. while equation 8 represents the impact of on and off page seo of dubizzle website on its business outcomes and website ranking.

Statistical Analysis

For comparative analysis of Both off-page and on-page SEO method on a group of websites, First I will apply Ordinary Least Square (OLS) methodology on linear regression model in order to check whether just applying one technique on page seo or off page seo on website, the business outcomes and website ranking affects or not. Next, I'll examine how both on-page and off-page SEO affect both websites. for this purpose, I'm using multiple regression model to test whether Both off-page and on-page SEO techniques have an influence on website ranking and business outcomes.

4.5 On-Page SEO Analysis

Search engine optimization for websites, often known as on-page or on-site optimization, is the process of creating the content they contain more user- and search-engine-friendly. Both organic traffic and a page's Google rating may rise as a result. Common on-page SEO practices include optimizing for searcher intent, tags for titles, links within the page, and URLs.

For on page seo analysis i have selected Carrefour uae website, after implementation of on page seo methods i have recorded on page seo scores for 4 months on regular basis. For analysing how on page seo impacts business outcomes of carrefour website The linear regression model that I use which is as follows,

$$Y_1 = \beta_0 + \beta_1 X_1 + \varepsilon \quad (5)$$

For statistical analysis i'll apply OLS (Ordinary Least Square) Method to check the impact of on page seo on website ranking and business outcomes. Because of its effectiveness, the Ordinary Least Squares (OLS) approach is the most commonly employed model. The true population regression line's best approximation is provided by this model.

OLS Regression Results						
=====						
Dep. Variable:	y	R-squared:	0.669			
Model:	OLS	Adj. R-squared:	0.667			
Method:	Least Squares	F-statistic:	299.2			
Date:	Mon, 15 Jan 2024	Prob (F-statistic):	2.33e-37			
Time:	16:19:34	Log-Likelihood:	-88.686			
No. observations:	30	AIC:	181.4			
Df Residuals:	28	BIC:	187.4			
Df Model:	1					
Covariance Type:	nonrobust					
=====						
	coef	std err	t	P> t	[0.025	0.975]

const	-3.2002	0.257	-12.458	0.000	-3.708	-2.693
x1	0.7529	0.044	17.296	0.000	0.667	0.839

Omnibus:		3.538	Durbin-Watson:		1.279	
Prob(Omnibus):		0.171	Jarque-Bera (JB):		3.589	
Skew:		0.357	Prob(JB):		0.166	
Kurtosis:		2.744	Cond. No.		43.4	
=====						

After applying ordinary least square method, the fitted regression line is

$$Y_1 = -3.2002 + 0.7529X_1 + \varepsilon$$

In the above regression line, constant terms is the intercept. The intercept from the regression line is -3.002. In the above regression line we have omitted some variables with little impact. The intercept indicates the average value of the missing variables and noise in the model, which are certain independent variables that have little effect on the dependent variable.

With a unit change in X, the coefficient term indicates the change in Y. That is, if X grows by one unit, Y increases by 0.7529. or in other words if on page seo score rises by 1 unit website ranking and business outcomes increase by 0.7529.

To calculate t-statistics, the following hypothesis is made –

- $H_0 : \beta_1 = 0$ *Y is unaffected by variable X*
- $H_1 : \beta_1 \neq 0$ *Y is affected by variable X*

T- statistics computations:

$$t = (b_1 - B_1) / s.e(b_1)$$

After putting values from the above calculations in t- statistic formula the calculated value of t-statistic is

$$t = -12.458 \text{ and } 17.296 \text{ respectively}$$

We determine that on-page SEO scores affect website ranking and business outcomes since the computed value of the t statistic is bigger than the tabulated value of the t.

The degree of variation in the provided data set is shown by the coefficient of determination, or R². The square of a correlation (r), or the coefficient of determination, is what determines its range: 0 to 1. In linear regression, the coefficient of determination is determined by the square of the correlation between the x and y variables. Here, X (on page SEO) can account for 66.9% of the variation in Y (business outcomes). Since R² has a maximum value of 1, a higher R² value indicates a better regression.

The F test indicates how well a regression fits data. Given that the F-statistic's computed value is higher than the F's probability value. Thus, the alternative hypothesis—that on-page SEO rankings affect website ranking and business outcomes—will be accepted in place of the null hypothesis.

4.6 Off-Page SEO Analysis

The term "off-page SEO" (sometimes known as "off-site SEO") describes activities that are done outside of a website to influence how visitors locate and engage with its content as well as its ranking in search engine results pages (SERPs). Stated differently, improving a website's organic search engine ranks without modifying the website's content is known as off-page SEO, or search engine optimization. Digital marketing, guest posting, and link development are common strategies.

For off page seo analysis i have selected dubizzle website, after implimentation of off page seo methods i have recorded off page seo scores for 4 months on regular basis. For analysing how off page seo impacts business outcomes of dubizzle website i'm using linear regression model.

For off page analysis on website Dubizzle the model will be,

$$Y_2 = \beta_0 + \beta_2 X_2 + \varepsilon \tag{6}$$

OLS Regression Results						
Dep. Variable:	y	R-squared:	0.643			
Model:	OLS	Adj. R-squared:	0.656			
Method:	Least Squares	F-statistic:	345.65			
Date:	Mon, 15 Jan 2024	Prob (F-statistic):	2.33e-37			
Time:	18:20:11	Log-Likelihood:	-88.686			
No. observations:	30	AIC:	172.5			
Df Residuals:	28	BIC:	178.5			
Df Model:	1					
Covariance Type:	nonrobust					
	coef	std err	t	P> t	[0.025	0.975]
const	-5.6772	0.342	-13.544	0.000	-3.708	-2.693
x2	0.6553	0.056	15.66	0.000	0.667	0.839
Omnibus:	3.76	Durbin-Watson:	1.342			
Prob(Omnibus):	0.165	Jarque-Bera (JB):	4.565			
Skew:	0.466	Prob(JB):	0.177			
Kurtosis:	2.655	Cond. No.	35.2			

After applying ordinary least square method, the fitted regression line is

$$Y_2 = -5.6772 + 0.6553X_2 + \varepsilon$$

The regression line's intercept is the constant term. The intercept from the regression line is -5.6772. Some independent variables that have little effect on the dependent variable are excluded during regression; the intercept indicates the mean of these omitted variables as well as any noise in the model.

The coefficient term indicates how much Y changes for every unit change in X; that is, if X increases by one unit, Y increases by 0.6553. or in other words if off page seo score rises by 1 unit website ranking and business outcomes increase by 0.6553.

- $H_0 : \beta_2 = 0$ *Y is unaffected by variable X*
- $H_2 : \beta_2 \neq 0$ *Y is unaffected by variable X*

since calculated value of t statistic is greater than tabulated value of t so we reject ho and conclude that off page seo scores have their impact on website ranking and business outcomes.

The coefficient of determination, or R2, indicates the percentage of the dependent variable's variance that the independent variable can account for.

Here, X (off page SEO) can account for 64.3% of the variation in Y (business outcomes). Since R² has a maximum value of 1, a higher R² value indicates a better regression.

The F test indicates how well a regression fits data. Given that the F-statistic's computed value is higher than the F's probability value. So, we reject null hypothesis and will accept Alternative hypothesis that off page seo scores have an impact on website ranking and business outcomes.

4.7 Comparative Analysis of On-page & Off-page SEO

For multiple regression model analysis I will apply several tests. Which includes Multicollinearity test, heteroscedasticity test and then will do multiple linear regression analysis.

4.7.1 Multicollinearity Test

Multicollinearity in a multivariate regression model refers to the existence of robust intercorrelations among two or more independent variables.

Table # 2: Multicollinearity Test

Model	Independent Variable	Calculation		Information
		Tolerance	VIF	
Model 1	On-Page SEO	0.513	1.905	Absence of multicollinearity
	Off-Page SEO	0.521	1.912	Absence of multicollinearity
Model 2	On-Page SEO	0.663	1.509	Absence of multicollinearity
	Off-Page SEO	0.624	1.326	Absence of multicollinearity

Source: Own Processing

The SPSS collinearity diagnostics results were used to test multicollinearity by looking at tolerance and VIF (Variance Inflation Factor) using regression results. According to Pallant's (2010) recommendation, this is the most crucial multicollinearity test.

The tolerance runs from 0.513 to 0.663, which are significantly more than 0.1, and the VIF ranges from 1.326 to 1.905, which is acceptable as being below 10. These findings are shown in the above table.

According to Pallant (2010), the findings demonstrate that multicollinearity is absent from this investigation because tolerance values are greater than 0.10 and VIF values are less than 10. The multiple regression model's correlation between the independent variables does not result in multicollinearity.

4.7.2 Heteroscedasticity Test

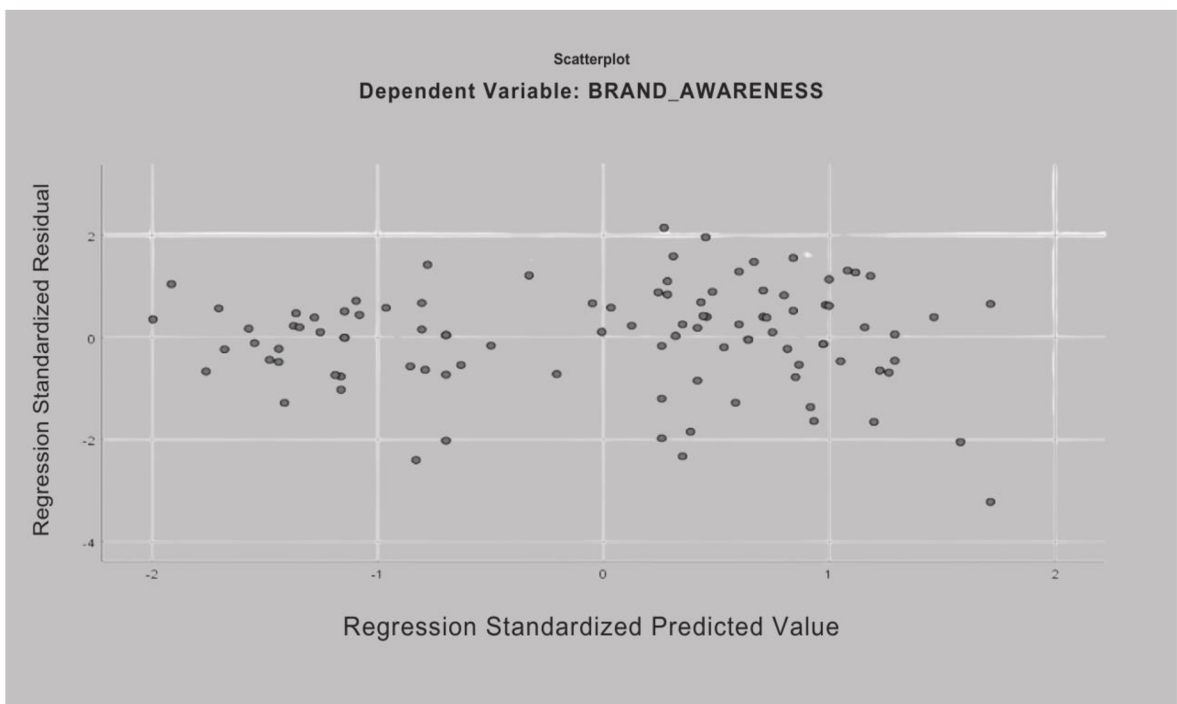


Figure 14: ScatterPlot Graph, Source: Own Processing

There isn't a single, obvious pattern or location in the image above that indicates error variance is uncorrelated. As Heteroskedasticity is the term used to describe the uneven variation of the residuals over a range of measured values. If heteroskedasticity exists and the population included in the regression has unequal variance, the findings of the analysis may be incorrect.

4.7.3 Multiple Linear Regression Analysis

Table # 3: Multiple Linear Regression Analysis

	B	Coefficients a		t	Sig.
		Unstandardized Coefficients	Standardized Coefficients		
		std. Error	Betas		
(Constant)	9.507	3.417		2.782	.006
SEO_ON_PAGE	.266	.056	.459	4.734	.000
SEO_OFF_PAGE	.633	.190	.324	3.338	.001
(Constant)	6.534	2.453		3.541	.005
SEO_ON_PAGE	.352	.031	.356	4.721	.000
SEO_OFF_PAGE	.721	.213	.524	2.233	.001

Source: Own Processing

*a. BRAND_AWARENESS is the dependent variable.

The fitted regression line is as follows,

$$Y_3 = 9.507 + 0.266 X_1 + 0.633 X_2 + e.$$

In the above regression analysis, As the constant or intercept value is 9.507, it may be presumed that neither the Off-Page SEO nor the On-Page SEO variables exist. In the above regression line we have omitted some variables with little impact. The intercept indicates the average value of the missing variables and noise in the model, which are certain independent variables that have little effect on the dependent variable. On Page SEO coefficient has a value of 0.266 which indicates Variable for On-Page SEO (x1) has a regression coefficient value of 0.266 when compared to Brand Awareness while Off Page SEO coefficient has a value of 0.633 which indicate variable for Off Page SEO (x2) has a regression coefficient value of 0.633 when compared to Brand Awareness.

On-page SEO's (X1) positive direct effect on brand recognition (Y3)

With a significance value of 0.000 less than 0.05, the T test results for the On-Page SEO variables indicate that the value of t statistic = 4.734 is greater than tabulated value of $t = 1.98472$, rejecting H_0 and accepting H_1 . This indicates that On-Page SEO has a major and favourable impact on website ranking and business outcomes.

Brand Awareness (Y3) is directly positively impacted by Off-Page SEO (X2)

With a significance value of 0.001 smaller than 0.05, the T-test findings for the Off-Page SEO variable indicate that H_2 is accepted and H_0 is rejected since the calculated value of $t = 3.338$ is more than the value in the t table = 1.98472. This indicates that Off-Page SEO has a major and favourable impact on website ranking and business outcomes.

Calculations for Model 2 showing the impact of on and off page seo of dubizzle website on its business outcomes and website ranking are as follows,

$$Y_4 = 6.534 + 0.352 X_1 + 0.721 X_2 + e.$$

In the above regression analysis, As the intercept value is 6.534, it may be presumed that neither the Off-Page SEO nor the On-Page SEO variables exist. In the above regression line we have omitted some variables with little impact. The intercept indicates the average value of the missing variables and noise in the model, which are certain independent variables that have little effect on the dependent variable. On Page SEO coefficient has a value of 0.352 which indicates Variable for On-Page SEO (x_1) has a regression coefficient value of 0.352 when compared to Brand Awareness while Off Page SEO coefficient has a value of 0.721 which indicate Variable for Off-Page SEO (x_2) has a regression coefficient value of 0.721 when compared to Brand Awareness.

Positive direct impact of on-page SEO (X1) on brand awareness (Y4)

With a significance value of 0.000 less than 0.05, the T test findings for the On-Page SEO variables indicate that the calculated value of t statistic= 4.721 is greater than tabulated value of $t = 1.98472$, rejecting H_0 and accepting H_1 . This indicates that On-Page SEO has a major and favourable impact on website ranking and business outcomes.

Brand Awareness (Y4) is directly positively impacted by Off-Page SEO (X2).

With a significance value of 0.001 smaller than 0.05, the T-test findings for the Off-Page SEO variable indicate that H2 is accepted and Ho is rejected since the t calculated = 2.233 is more than the t tabulated = 1.98472. This indicates that Off-Page SEO has a major and favourable impact on website ranking and business outcomes.

4.7.4 Determination Coefficient Test (R2)

R-squared calculates a regression model's variation. When more predictors are added to the model, R-squared either rises or stays the same. A multiple regression model's variation is measured using adjusted R-squared, which aids in determining the model's goodness of fit.

Table # 4: Test of the Coefficient of Determination (R2)

		Summary Model**		
Model	R	R Square	Adjusted R Square	std. Error of the Estimate
1	.722*	.521	.511	3.871
2	.547	.535	.643	3.784

Source: Own Processing

*. Predictors: (Constant), On-Page-SEO, Off-Page-SEO

**. Dependent Variable: Business Outcomes

The computation of the coefficient of determination in model 1 yields 0.511 as the Adjusted r-squared score as we can see from the findings above. This suggests that both the independent variables On-Page and Off-Page SEO contributed 51.1% of the business outcomes. Another factor, accounting for 48.9% of the total, is impacted by variables not covered in this research. whereas the independent variables On-Page and Off-Page SEO in model 2 have an Adjusted R Square value of 0.643, indicating that they influence 64.3% of the Brand Awareness or Business outcomes. Another variable, accounting for 35.7% of the total, is impacted by variables not covered in this research.

4.8 Discussion

In light of the test findings the comparative analysis of On-Page SEO and Off-Page SEO on business outcomes and website ranking, the study's findings and analysis can be summed up as follows:

1. On-Page SEO on Business Outcomes & Website Ranking

The value of the On-Page SEO variable (X1) indicates that H1 is acceptable. This demonstrates that H1 only partially asserts the link between On-Page SEO and Brand Awareness (i.e., website ranking and business outcomes) being positive and direct. The study's findings clarify that On-page SEO implementation is the process of optimizing sites or posts to rank well on Google and be easy for users to discover. This raises the rating of a website in search results. This, in turn, impacts website ranking.

2. Off-Page SEO on Business Outcomes & Website Ranking

The findings of earlier research (Hariguna, 2020) indicate that Off-Page SEO tactics can be improved by doing social media sharing and building more high-quality backlinks, which will stabilize website rankings and have an impact on website or brand awareness. As the above table illustrates, H_0 is rejected and H_2 is approved based on the T-test findings for the Off-Page SEO factors.

3. On-Page SEO and Off-Page SEO on Business Outcomes & Website Ranking

Based on the results On-page SEO (X1) and off-page SEO (X2) have a continuous influence that significantly affects website ranking and business outcomes, such as business outcomes and website ranking(Y). Thus, this study is relevant.

In a nutshell, off-page SEO aims to build the domain's authority by obtaining links from other websites. On the other hand, on-page SEO is the act of improving different aspects of a website that affect rankings in search engines. To put it simply, off-page factors largely decide how high you rank in the search results, whereas on-page factors primarily dictate what you rank for. For the best business results, on-page and off-page SEO are therefore complementary.

4.9 Analysing Various SEO Metrics and Factors

I've calculated the SEO Difficulty, Off-Page SEO, and On-Page SEO of ecommerce websites in United Arab Emirates (UAE) Namely Carrefour uae, and dubizzle.

French retail and wholesale giant Carrefour is an international corporation with its main office in Massy. With 13,894 hypermarket, grocery, and convenience store locations spread throughout more than 30 countries as of December 2021, the firm ranked eighth in the world's retail revenue rankings. Carrefour UAE will be examined when I look into e-commerce websites in the United Arab Emirates. The second platform I'll look at is Dubizzle. Dubizzle is the most widely used classifieds website in the United Arab Emirates. Since its launch in 2005, Dubizzle has developed into the most well-liked marketplace for people trying to buy, sell, or find anything in their neighbourhood.

Table 5 shows the Name of ecommerce websites I used for this research along with website's Moz DA (domain authority), Ahrefs DR (domain rating), and the corresponding industry in which these websites fall.

Table # 5: Websites DA, DR and Industry

ECOMMERCE PLATFORMS	MOZ DA(current)	Ahrefs DR(current)	INDUSTRY
https://dubai.dubizzle.com/	62	72	Computers Electronics and Technology
https://www.carrefouruae.com/	61	69	eCommerce & Shopping Marketplace

Source: (Moz & Ahrefs, 2024)

Table 6 shows each website name and url, their monthly visitors, annual revenue, linking root domains, number of ranking keywords and spam score.

Table # 6: Traffic, Annual Revenue, Backlinks and Ranking Keywords.

ECOMMERCE PLATFORMS	Monthly visits (DEC 2023)	Annual Revenue	BACK LINKS	LINKING ROOT DOMAINS	RANKING KEYWORDS	SPAM SCORE
https://dubai.dubizzle.com/	3.4M	-	4.4M	26.2k	23.5k	36%
https://www.carrefouruae.com/	1.8M	> \$1B	658K	6.2k	5.9k	12%

Source: (Moz & Ahrefs, 2024)

Domain Rating (DR), a ranking metric developed by Ahrefs, rates the strength of a website's backlink profile on a range from 1 to 100. On the other hand, Domain Authority (DA), a metric created by Moz, shows how highly a website will position in search results.

Now, I'll separately analyse each website data to understand further how on page SEO and off page SEO is helping these websites to rank higher in search engine results pages (SERP) and what are the possible business outcomes as a result of on-page SEO and off page SEO measures.

4.10 For Carrefour UAE

Firstly, I will analyse Carrefour UAE website in order to find out how the Implementation of SEO methods i.e. On Page SEO & Off Page SEO the performance of the website is affected.

For Carrefour, The MoZ DA maximum and lower bounds are, respectively, 70.00 and 60.00. After analyzing the data for 15 days, I used a uniform distribution to analyze 10 values within the range of $60 < x < 70$.

The calculated 10 MoZ DA values are shown in Table 7. Table 8 provides information about Carrefour UAE's Off-page, On-page, and SEO Difficulty.

Table # 7: Computed DA Values for Carrefour UAE

no	1	2	3	4	5	6	7	8	9	10
Moz DA	66.65	64.52	62.25	65.01	61.36	68.72	69.42	64.23	60.25	66.42

Source: (Moz, 2024)

Table 7 shows computed DA values for Carrefour UAE using uniform distribution where upper and lower limits are 70.00 and 60.00 respectively.

Table 8 shows off page SEO, on page SEO and SEO difficulty calculated using the method/formulas described above.

Table 8: Off-page SEO, On-page SEO and SEO Difficulty for Carrefour UAE

website	OFF-PAGE SEO	ON-PAGE SEO	SEO DIFFICULTY
https://www.carrefouruae.com/	61.28	93.84	74.42
	59.68	95.27	72.18
	60.21	95.73	72.71
	59.28	92.45	72.47
	60.34	98.35	72.47
	60.95	99.36	73.68
	60.72	96.62	73.33
	61.03	98.85	73.46

	61.09	99.47	73.69
	50.75	98.24	72.93

Source: (Moz, 2024)

Using the live data for Carrefour UAE provided by Google Page Rank Checker, I have compiled the Open Page Rank of Carrefour UAE. The top pages of Carrefour UAE that have links to them are listed in Table 9. Table 10 displays Carrefour UAE's Domain Authority (DA) across several search engines.

Table 9: Top pages by links of Carrefour UAE

Page URL	PA (Page Authority)
www.carrefouruae.com/	54
carrefouruae.com/	49
www. carrefouruae.com/medias/sys_master/r..	48
www. carrefouruae.com/mafuae/en/	47
www. carrefouruae.com/v3/search?keyword=...	46
www. carrefouruae.com/v4/search?keyword=..	46
www. carrefouruae.com/shop/storespromotio..	45

Source: (Moz, 2024)

Based on important metrics, a website's Top Pages are its most valuable pages. This might help to identify the pages that are bringing in traffic to website and those that might

want to concentrate on optimizing in the future. Table 10 displays the main pages of the Carrefour UAE website.

Table 10: Top linking domains of Carrefour UAE

Domain	DA
microsoft.com	99
apple.com	99
docs.google.com	98
en.wikipedia.org	98
play.google.com	98
fr.wikipedia.org	95
medium.com	95

Source: (Moz, 2024)

A Moz measure known as Top Linking Root websites by Domain Authority shows which websites have the most backlinks pointing to them, along with a score depending on how authoritative those domains are. More linking root domains can improve a site's visibility and search engine rating.

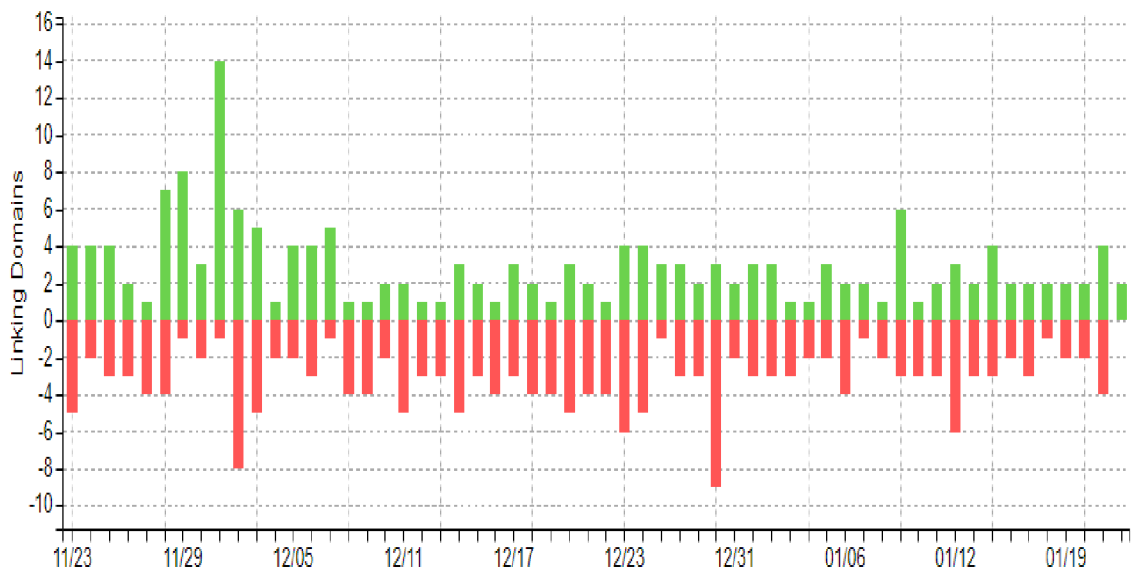


Figure 15: Discovered and lost linking domains of Carrefour UAE, Source: (Moz, 2024)

A graphical depiction of the Carrefour UAE found and lost connecting domain can be shown in Figure 15. Green indicates found connectivity, and red indicates lost linking. It will be noted in the Discovered and Lost Linking Domains if a domain has lost all of its links or if a new domain having a link to the website is discovered.

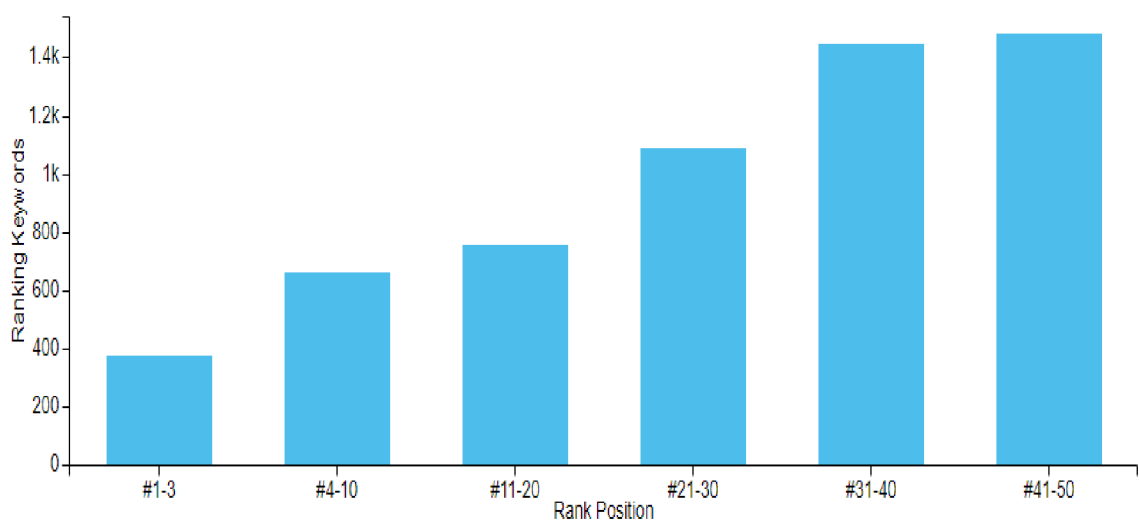


Figure 16: Keyword Ranking Distribution of Carrefour UAE, Source: (Moz, 2024)

In order to determine a website's overall visibility, the Keywords Ranking Distribution measure displays the percentage of keywords that rank inside specific positions on a search engine results page (SERP).

Carrefour UAE has a high number of ranking keywords that is impacting its overall rank on search results as well as positive business outcomes.

4.11 For Dubizzle

Next, I will analyse Dubizzle website in order to find out how the Implementation of SEO methods i.e. On Page SEO & Off Page SEO the performance of the website is affected.

For dubizzle.com, the MoZ DA's bottom and higher bounds are 55.00 and 63.00, respectively. Additionally, I added data collected over a 15-day period. I then approximated 10 values, largely in the spectrum (55.00, 63.00), using a uniform or rectangular distribution. The computed DA values for dubizzle employing a uniform distribution are displayed in Table 11, with corresponding upper and lower bounds of 63.00 and 55.00.

Table 11: Computed 10 MoZ DA Values for Dubizzle

no	1	2	3	4	5	6	7	8	9	10
Moz DA	56.65	55.52	61.25	54.01	59.22	58.72	60.42	61.23	63.25	58.42

Source: (Moz, 2024)

The calculated DA values are shown in Table 11. Table 12 provides information about dubizzle.com's off-page, on-page, and SEO difficulty. The top Dubizzle pages by links are shown in Table 13. Table 14 lists the Domain Authority (DA) of dubizzle.com for each search engine.

Table 12: Off-page SEO, On-page SEO and SEO Difficulty for Dubizzle

website	OFF-PAGE SEO	ON-PAGE SEO	SEO DIFFICULTY
https://dubai.dubizzle.com/	51.28	99.84	68.42
	52.68	99.27	68.18
	52.21	99.73	68.71
	52.28	97.45	68.47
	52.34	98.35	68.47
	52.95	97.36	68.68
	52.72	97.62	68.33
	52.03	98.85	68.46
	52.09	98.47	68.69
	52.75	98.24	68.93

Source: (Moz, 2024)

Using the live data for dubizzle provided by Google Page Rank Checker, I have gathered the Open Page Rank of dubizzle. The top pages of Dubizzle with links to them are included in the table.

Table 13: Top pages by links of dubizzle

Page URL	PA (Page Authority)
www.dubizzle.com/	59
dubai.dubizzle.com/	56
dubizzle.com/	56
uae.dubizzle.com/	55
dubai.dubizzle.com/jobs/	54
dbz-images.dubizzle.com/images/2023/04/3...	53
abudhabi.dubizzle.com/	53

Source: (Moz, 2024)

Based on important metrics, a website's Top Pages are its top-performing pages. This might help to identify the pages that are bringing in traffic to the website and those that might want to concentrate on optimizing in the future. Table 13 displays page authority and the top pages of the Dubizzle website. The Domain Authority (DA) of dubizzle across various search engines is displayed in Table 14.

Top Linking Root Domains by Domain Authority is a Moz metric that shows the domains that have the most backlinks pointing to the site and how authoritative those domains are based on their DA score. A higher number of linking root domains can positively impact site's visibility and search engine ranking.

Table 14: Top linking domains of dubizzle

Domain	DA
apple.com	99
en.wikipedia.org	98
plus.google.com	97
github.com	96
uol.com.br	96
cnn.com	95
wikimedia.org	95

Source: (Moz, 2024)

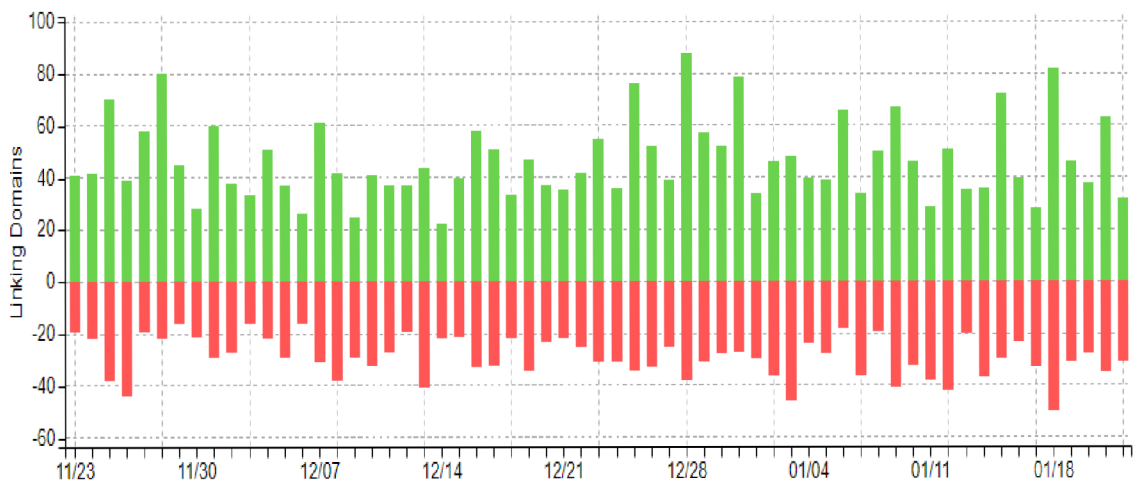


Figure 17: Discovered and lost linking domains of dubizzle, Source: (Moz, 2024)

A graphical illustration of the dubizzle discovered and lost linkage domain is shown in Figure 17. Green indicates found connectivity, and red indicates lost linking. It will be noted in the Discovered and Lost Linking Domains if a domain has lost all of its links or if a new domain having a link to the website is discovered.

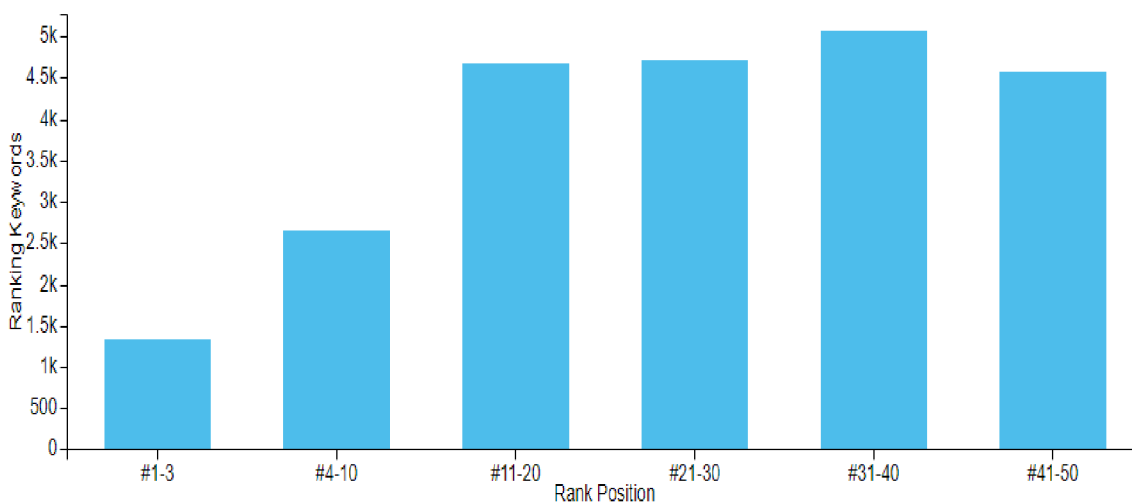


Figure 18: Keyword Ranking Distribution of dubizzle, Source: (Moz, 2024)

In order to determine a website's overall visibility, the Keywords Ranking Distribution measure displays the percentage of keywords that rank inside specific positions on a search engine results page (SERP). Dubizzle has a high number of ranking keywords that is impacting its overall rank on search results as well as positive business outcomes.

4.12 Expected values of SEO parameters

I have provided expected values for parametric variables in terms of the next integer for Off-page SEO, On-page SEO, and SEO Difficulty out of 100 for the websites listed here, Carrefour UAE, and Dubizzle.

Table 15: Expected values of SEO parameters

Name of Website	Off-Page SEO	On-Page SEO	SEO Difficulty	Brand Query
Dubizzle https://dubai.dubizzle.com/	52	99	75	Yes
Carrefour https://www.carrefouruae.com/	59	97	73	Yes

Source: (Moz, 2024)

From the table 15 One finding is that off-page SEO of Dubizzle and Carrefour are 52 and 59 respectively. As Off-page SEO is the term for SEO strategies used off a website to raise its search engine rankings. Typically, these tactics include link building, guest posting, digital marketing, and more. Off-page SEO works to make a site look more reliable and credible to search engines.

Or we can say, What off-page SEO tells Google and other search engines the opinions of other users regarding a website. For example, If a large number of excellent links are leading to their websites, search engines will assume that they have great content that provides users with value.

Indicators of on-page SEO ranking can significantly affect a web page's potential to rank if they are set up correctly. Search engine results are influenced by improved On-page SEO factors such as the quality of a content, well-written material, etc. It helps make a website more visually appealing to both human users and web search bots.

It simply isn't enough to just build and launch a website. we need to optimise the website for In case we like it to appear in Google and other web searches well and attract visitors. An SEO metric called keyword difficulty (also referred to as keyword competition or SEO difficulty) gauges how challenging it is to rank for a certain phrase.

Because of the intense rivalry among the ranking websites, it becomes more difficult to rank on the first SERP the more tough the keyword is. or to put it simply, SEO difficulty tells you how hard it will be to rank well for the term in Google's unpaid search results.

On page SEO score of websites Dubizzle and Carrefour has 99 and 97 which indicates that website is optimised as On page SEO score over 80 represents a strong Site Health SEO score. It means website ranks in the top 10% of the most technically optimised websites on the internet if On page SEO score is greater than 90.

All these three websites have higher SEO difficulty score. As SEO Difficulty shows how difficult it is to achieve a ranking in organic search. And the SEO difficulty score here indicates websites are highly ranked for specific high quality keywords.

Figure 19 shows a graphical depiction of the information. Which makes it clear that these websites have a greater influence on society and these websites SEO scores indicates their spiking business outcomes.

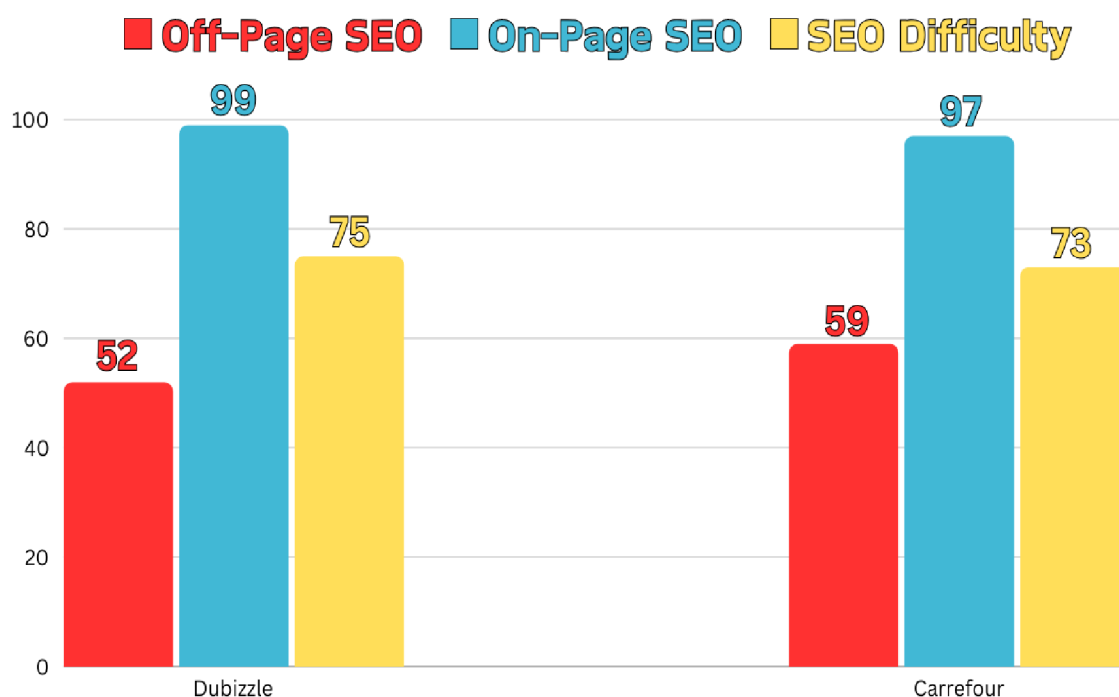


Figure 19: Comparative analysis of Off-page SEO, On-page SEO, and SEO Difficulty, Source: (Moz, 2024)

4.13 Before and after Optimization Comparison

4.13.1 On-Page SEO

I have utilised rank math for on-page SEO. A variety of SEO tools are available from Rank Math to improve websites. It offers tools for on-page optimisation like XML sitemaps, schema markup, and keyword analysis. We can quickly pinpoint areas for improvement and adjust content with our sophisticated SEO research. The before and after on page seo scores are shown below following the use of on page seo tools, Kw research, content optimisation, image optimisation, meta description, internal linking, header, mobile responsiveness, external linking, page speed optimisation, and kw in url on website.

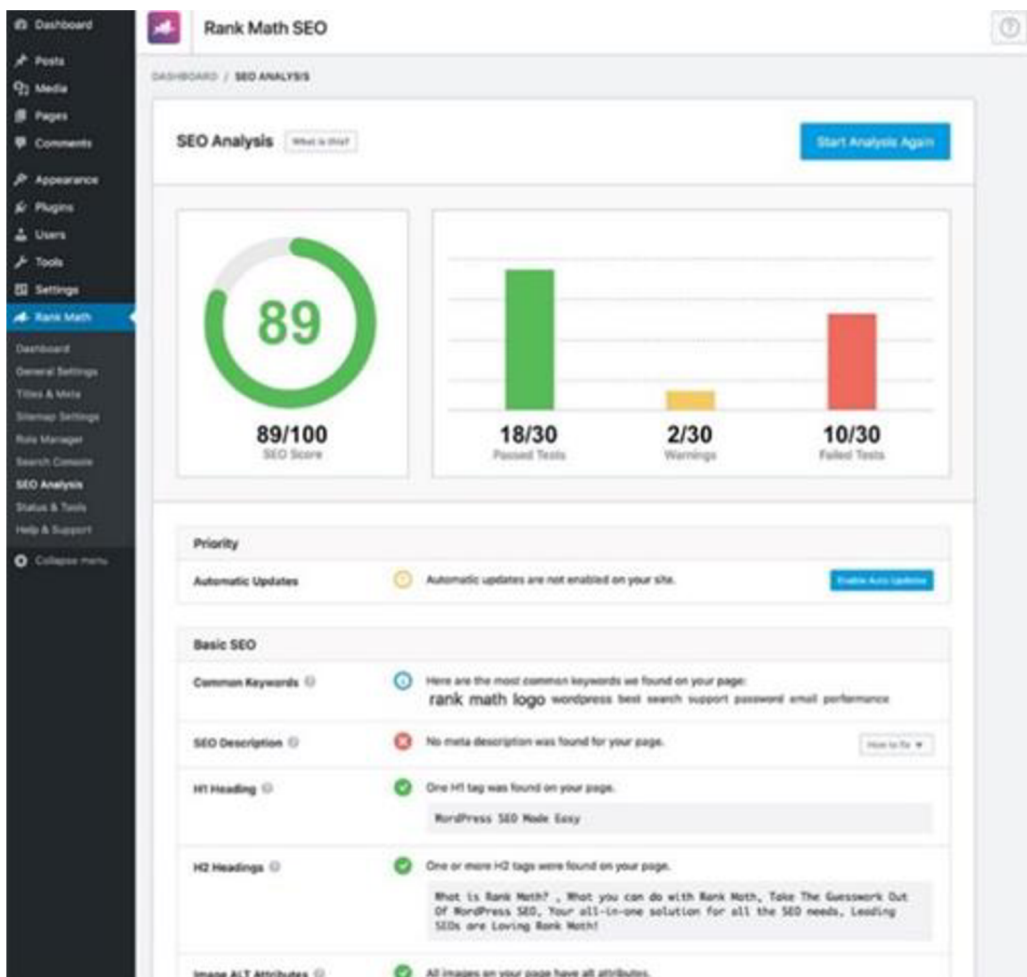


Figure 20: On page seo score for Carrefour before applying On- Page seo tools, Source: Own Processing

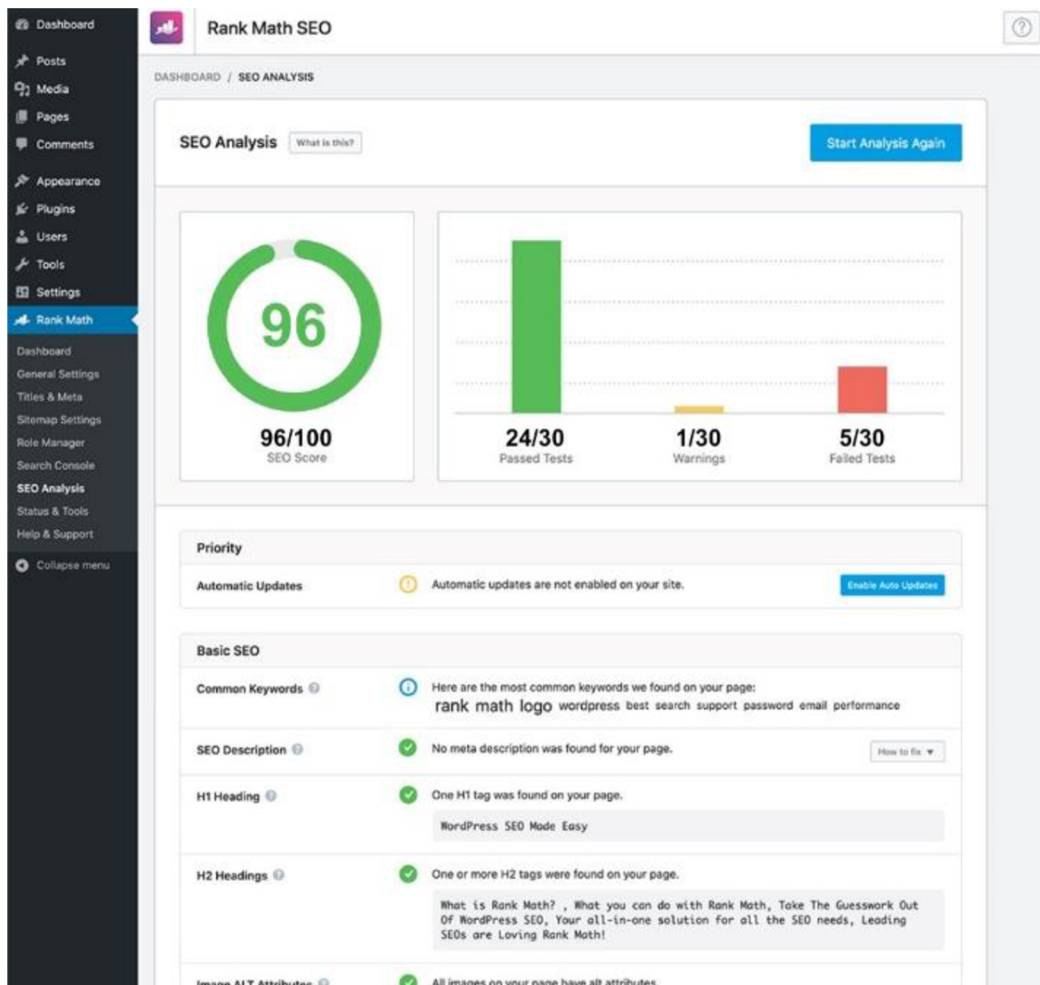


Figure 21: On page seo score for Carrefour After applying On- Page seo tools, Source: Own Processing

4.13.2 Off-Page SEO

Link building, writing blogs, guest blogging, social networking, forums, brand mentions, reviews, Q&A, local SEO, and influencer marketing are examples of off-page SEO techniques. For an examination of the website Dubizzle's off-page SEO I have employed brand mentions, reviews, Q&A sessions, and link building strategies, commonly referred to as backlinks. Off-page SEO aims to increase a website's perceived authority and trustworthiness among visitors and search engines. It is a crucial component of an effective SEO plan. Getting other websites to link to your website is known as link building. These links are referred to as backlinks in SEO. A website or domain may appear more authoritative to Google if it has more backlinks. particularly if those backlinks originate from other authoritative domains.

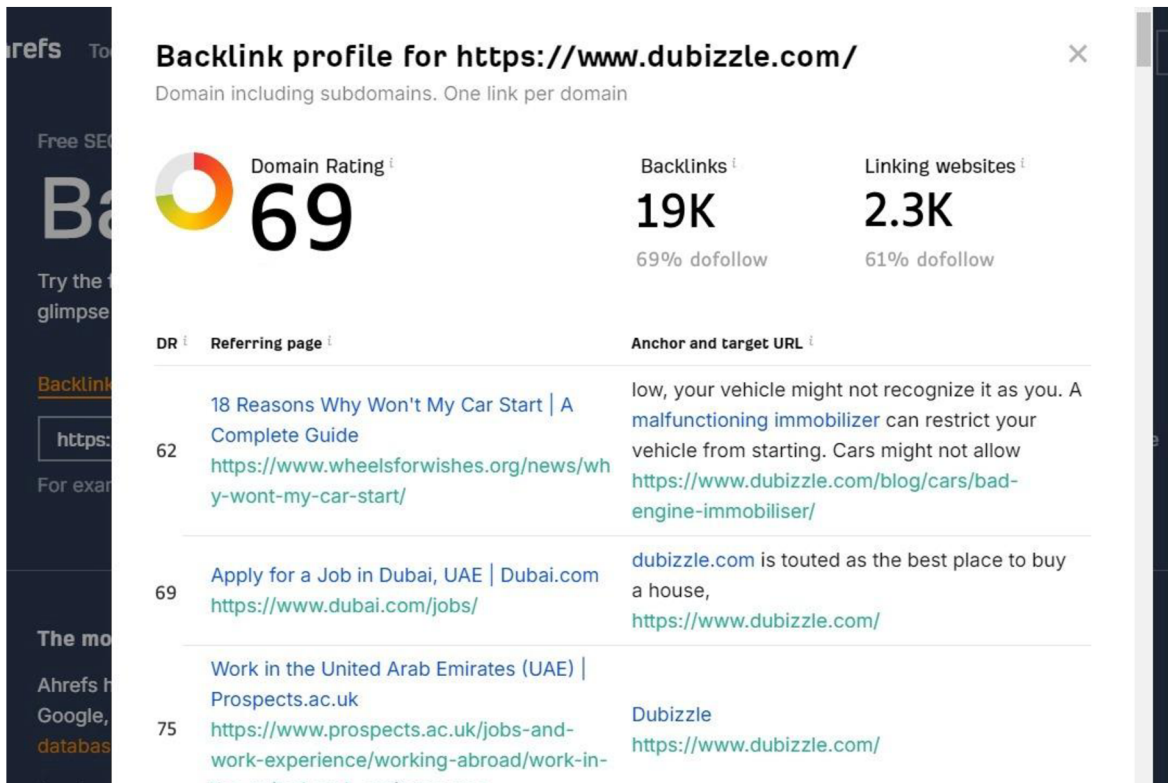


Figure 22: Backlink Profile of Dubizzle, Before SEO, Source: Ahrefs

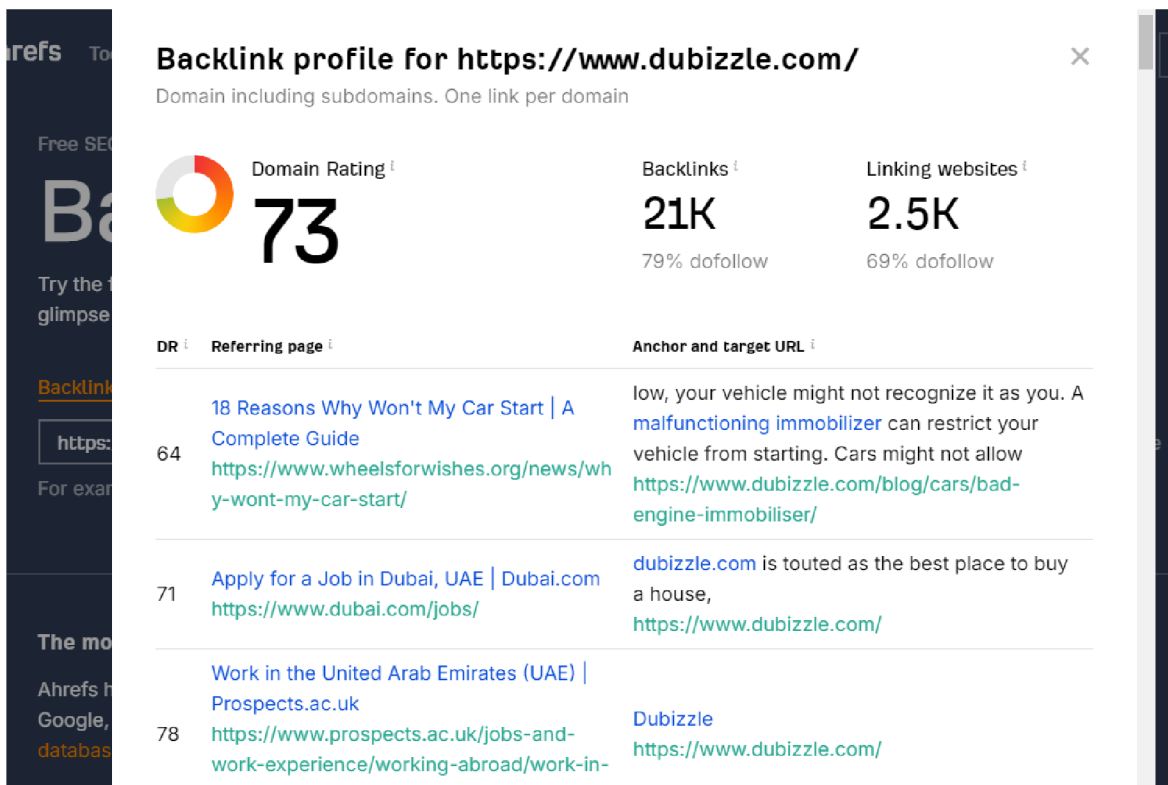


Figure 23: Backlink Profile of Dubizzle, After SEO, Source: Ahrefs

Prior to obtaining the backlinks, we must take into account three crucial factors: reputation, authority, and significance. Relevance is the idea that the website you are attempting to obtain backlinks from should be associated with your particular niche. Furthermore, authority suggests that a website should be authoritative in terms of its backlink profile, degree of establishment, etc. and reputation relates to things like traffic volume and total brand reviews, among other things.

Table # 16: On-Page & off -Page Scores for websites

website	On-page seo	Off- page seo
https://dubai.dubizzle.com/	98.51	52.33
https://www.carrefouruae.com/	96.81	59.53

Source: (Moz, 2024)

4.13.3 Revenue and Traffic

I analyse the traffic and revenue of the two websites I used for the research, Carrefour UAE and Dubizzle. A website that provides information on any website's traffic and revenue matrices. First, there are the Carrefour UAE website's before and after income, traffic, total visits, and average visit duration.

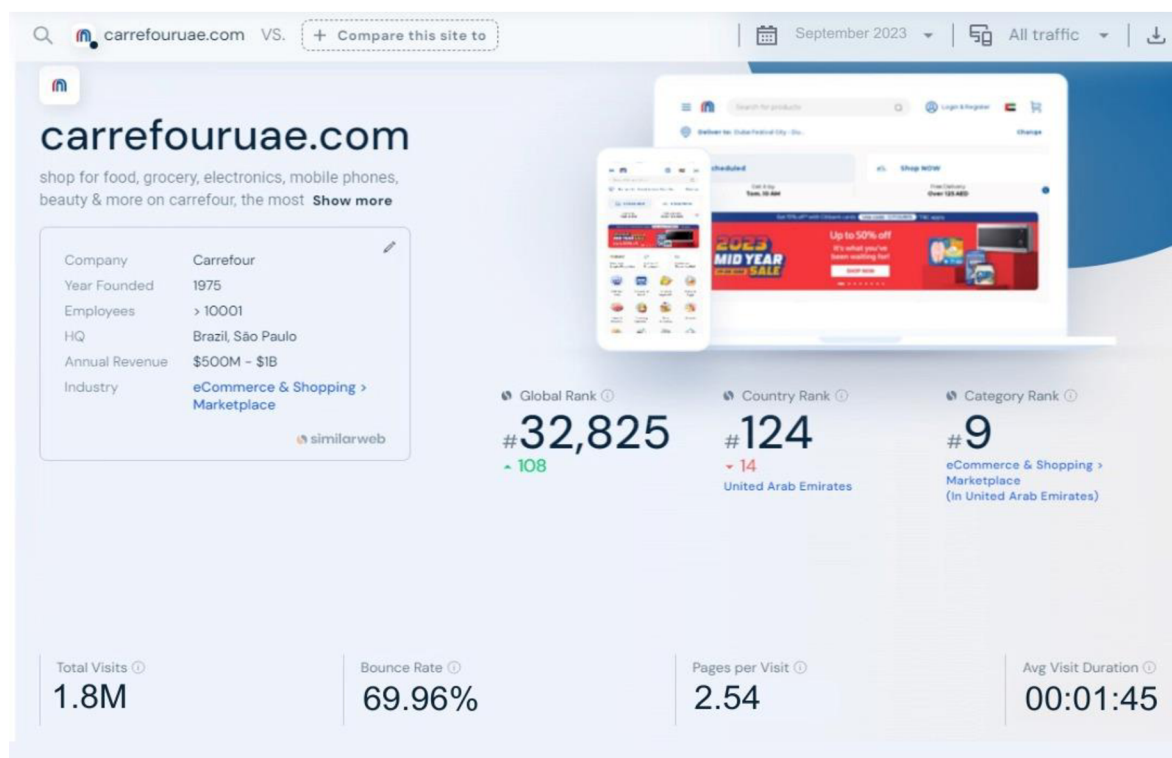


Figure 24: Revenue and Traffic Before, Carrefour uae, Source: Similarweb

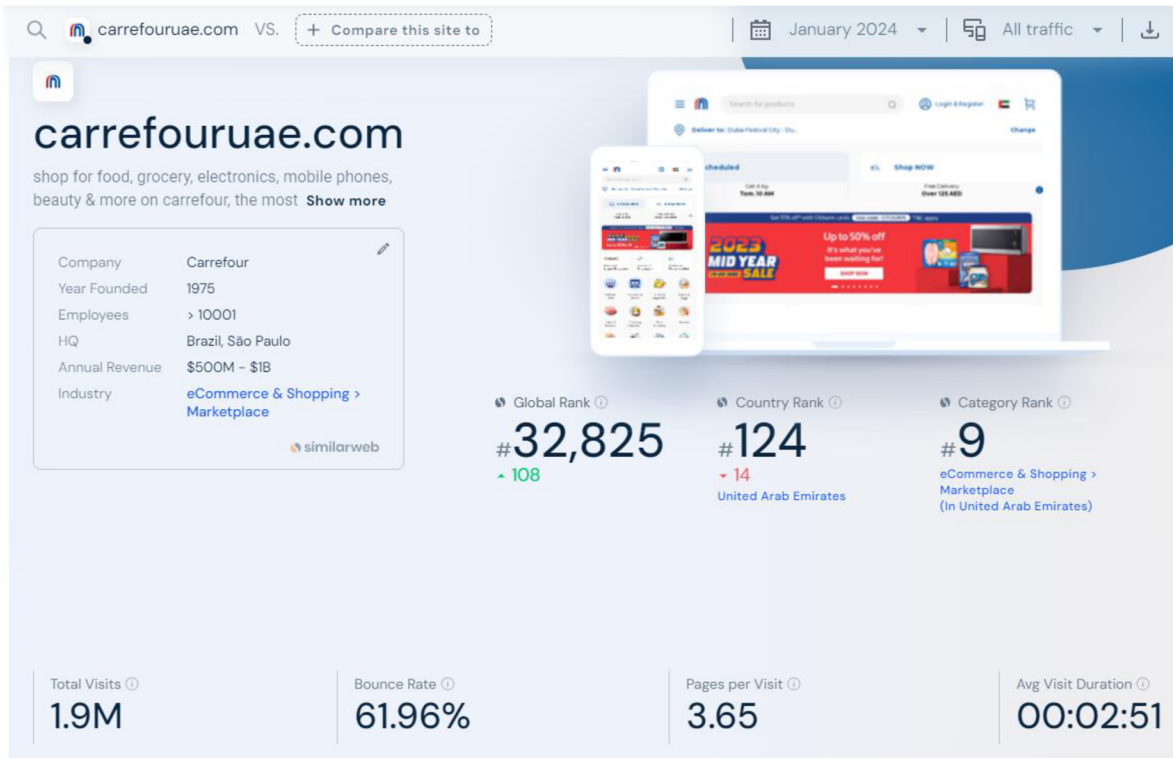


Figure 25: Revenue and Traffic After, Carrefour uae, Source: Similarweb

Secondly, there is before and after revenue, traffic, total visits website is getting and average visit duration of Dubizzle website.

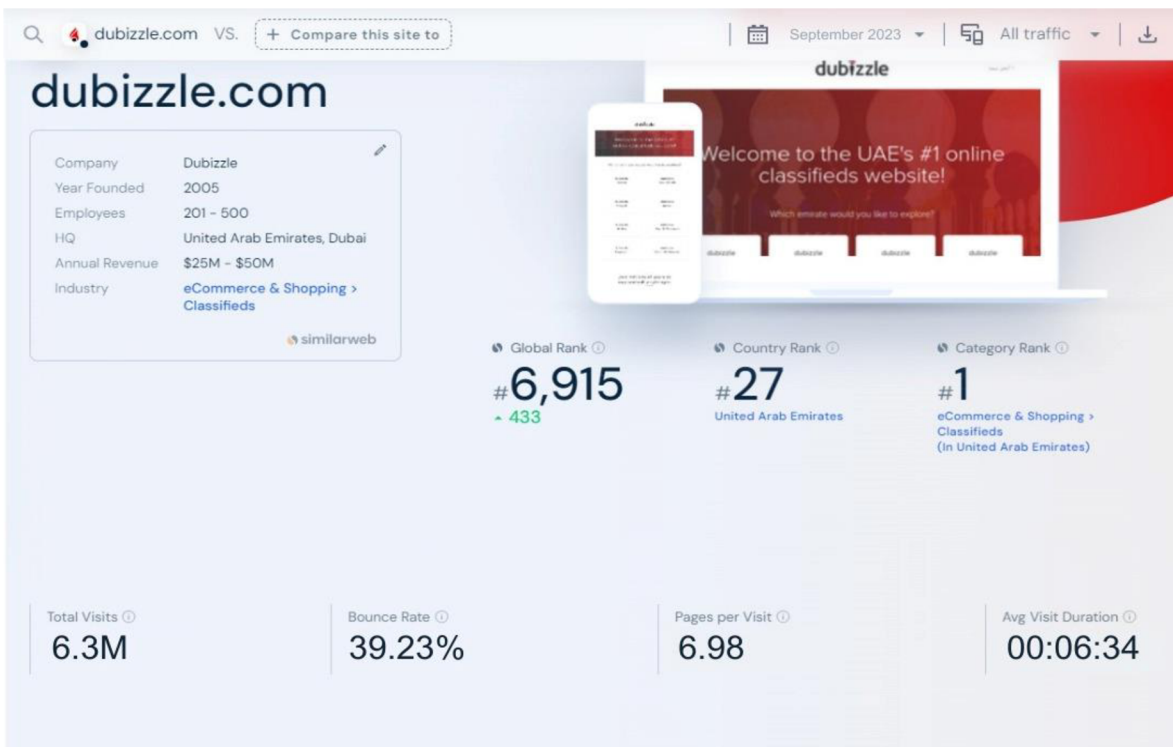


Figure 26: Revenue and Traffic Before, Dubizzle, Source: Similarweb

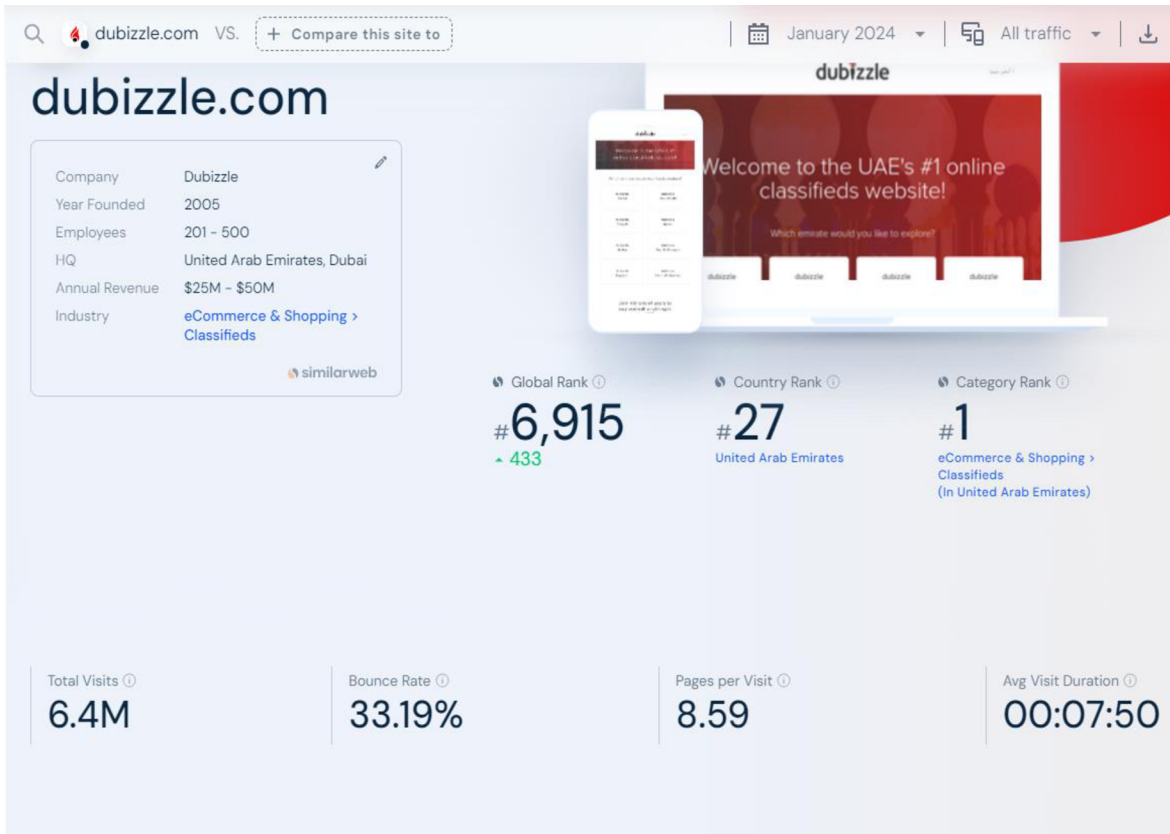


Figure 27: Revenue and Traffic After, Dubizzle, Source: Similarweb

5. Conclusion

Results & Interpretation

This study thematically focused on the issue of selected ecommerce websites, i.e. Dubizzle and Carrefour, which use Search Engine Optimisation with respect to real time data. Different techniques are used that can raise a website's search engine ranking. The study focused on a number of SEO variables, such as brand query, Ahrefs DR, MoZ DA, Page Authority (PA), On-page SEO, Off-page SEO, and SEO Difficulty. Also for On page SEO analysis, keyword optimisation, images optimisations, meta data, internal linking, url optimisation, heading and content optimisation techniques have been used. And for Off page SEO, link building strategy which is also known as backlinks, Question and answers, brand mentions, and reviews techniques have been employed. The research is basically a comparative analysis of websites that use SEO while taking into account actual data, a few established parameters, and their relationships. Additionally, a few formulas have been proposed inspired by the study Maitra et al. (2023) for the computation of important SEO parameters.

As all these websites are highly search engine optimised, as shown from the data analysis in above chapter, receiving a high number of organic traffic. As dubizzle got 3.4M traffic while Carrefour got 1.8M traffic as per Dec 2023 statistics. The following traffic metrics are gained from similar web website while analysing these websites. Looking at the revenue share of these websites, Carrefour annual revenue is greater than 1 Billion. High SEO optimised websites have a potential to gain potentially higher traffic than those which are not optimised and obviously high revenue share.

The main aim of this research was comparative analysis of on page seo and off page seo on different websites and how on page seo and off page seo plays its role in any website business outcomes and search ranking. So two ecommerce websites have been used for this analysis i.e. Dubizzle and Carrefour.

Firstly, on page seo techniques has been applied on Carrefour website and then analysed this linear regression model through OLS (Ordinary Least Square method). The results rejects null hypothesis of no impact of on page seo on website ranking or business outcomes.

Secondly , off page seo techniques has been applied on Dubizzle website and then analysed this linear regression model through OLS (Ordinary Least Square method). The results rejects null hypothesis of no impact of off page seo on website ranking or business outcomes.

Thirdly , both on page seo and off page seo techniques applied on both websites , Dubizzle and Carrefour and testest the hypothesis of no impact of on page seo and off page seo techniques on website ranking and business outcomes of these ecommerce websites using a multiple regression model and results showed that both seo techniques have their impact on websites rankings and business outcomes.

Search engine optimization (SEO) is critical to the success of e-commerce websites because it directly affects the websites' visibility on search engines, which in turn affects the amount of organic traffic the websites receive. Both on-page and off-page SEO contribute to the overall SEO strategy and have a significant impact on the commercial outcomes of e-commerce websites in addition to having a high Domain Authority (DA).

On-page and off-page SEO optimisation for e-commerce websites can have a big impact on business results. Search Engine optimisation enhance traffic and visibility of any website, Improved search engine rankings , Higher conversion rates, better user experience, establish reputation and trust, competitive advantage and expand the global reach of e-commerce website

Therefore, if a website optimizes for both on-page and off-page SEO, its search engine ranks will progressively improve. As seen in the figure where I've compared the analysis of SEO difficulties, on-page SEO, and off-page SEO. While off-page SEO and on-page SEO have similar goals, they approach them differently. Enhancing user experience is the aim of both on-page and off-page SEO strategies. Off page SEO takes longer to produce results than on page SEO, yet both are crucial for ranking higher in search results. On page SEO has an instant impact.

The importance of on-page and off-page SEO in the context of digital marketing cannot be emphasized since they both significantly affect a website's overall performance and search engine visibility. On-page SEO makes a single web page more relevant to search queries, which builds the foundation for a positive user experience. High-quality content

creation, careful keyword placement, and technological optimizations like mobile friendliness and site speed are needed to achieve this. The goal is to connect the website's content with user intent while making it visually appealing and easily accessible to search engines.

Conversely, off-page SEO expands the reach of a website beyond its own pages. This involves managing one's online reputation, interacting on social media, and building links, among other things. Backlinks are a vital part of off-page SEO since they increase the authority and trustworthiness of a website in search engine results, especially when they come from reliable websites. A website's popularity and relevancy are also influenced by social signals that come from its online presence and interactions on social media.

Ultimately, the most effective SEO strategy integrates both on-page and off-page elements in a seamless fashion. If one is overlooked, a website's potential could be restricted. On-page SEO creates the groundwork for relevancy and user satisfaction, and off-page SEO builds the website's credibility and reputation, which influences its ranking in search engine results. Securing a stable equilibrium between these two elements is crucial for substantial, long-term success in the ever-changing realm of search engine optimization.

In a nut shell, by taking into account both on-page and off-page SEO factors, a well-optimized website can lead to better user experiences, greater visibility, more traffic, higher rankings, and ultimately better business outcomes. It's critical to remember that SEO is an ongoing process and that being current with market trends and algorithm updates is necessary to sustain and improve these results over time.

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