THE RELATIONSHIP BETWEEN SEO AND ARTIFICIAL INTELLIGENCE

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Abstract

As digital marketing becomes increasingly important in both communications and sales, the right strategy can make companies more efficient. One possible method is to use Artificial Intelligence to develop a company's website in line with the requirements of Marketing 5.0. This paper examines the relationship between Artificial Intelligence and Search Engine Optimization. The question is whether the website can rank better, communicate in better quality and generate higher purchase intent than a marketing expert, a sales expert or even a consumer, based on predefined parameters.

Keywords: Search Engine Optimization, On-Page SEO, Artificial Intelligence

1. Introduction

Year after year, online commerce data shows a positive trend for website owners: in 2021, 68.9 million successful orders worth 1,203 billion forints were executed in Hungary. (GKID, 2022).

The increasing number of offers led to the emergence of competitors, so that in 2021 more than 15,000 Hungarian web stores competed for the attention of consumers. (Molnár, 2021).

In addition to the challenges posed by competition, issues of integration, security, and reliability also emerged. (Bostanshirin, 2014). It is up to marketers and entrepreneurs to try to succeed with a variety of online marketing strategies, some of which are outbound and some inbound. These may include advertising, social media, affiliate programs, etc. (Navarro, 2021). In addition, the digital marketing strategy that deals with the website and its immediate environment appeared SEO, i.e. Search Engine Optimization. (Yalçın and Köse, 2010).

From time to time, Search Engine Land has been updating and publishing the so-called SEO periodic system (see figure 1.) since 2011, which is similar to the chemical system and represents the main groups of Search Engine Optimization and the corresponding parts of them (Search Engine Land, 2021). The 10 main groups include content, architecture, HTML coding, discovery, link network, user groups, and so-called black hat SEO factors, as well as local, e-commerce, and publishing factors.

Scores for each group range from three to eight, and each score can be positive or negative depending on the impact on the site. The score recorded shows how an item affects Search Engine Optimization. Based on previous experience, I have to agree with Fard and Kouhzadi (2020) who claim that the impact of Search Engine Optimization within the site on ranking is only 25% compared to 75% of off-page optimization. Nevertheless, it strengthens the overall level of optimization with a multiple induced effect, so it can be the first step in developing a strategic direction.

This study examines the quality criteria in the first, second and third main groups of the table, focusing on the content and the applicable Artificial Intelligence.
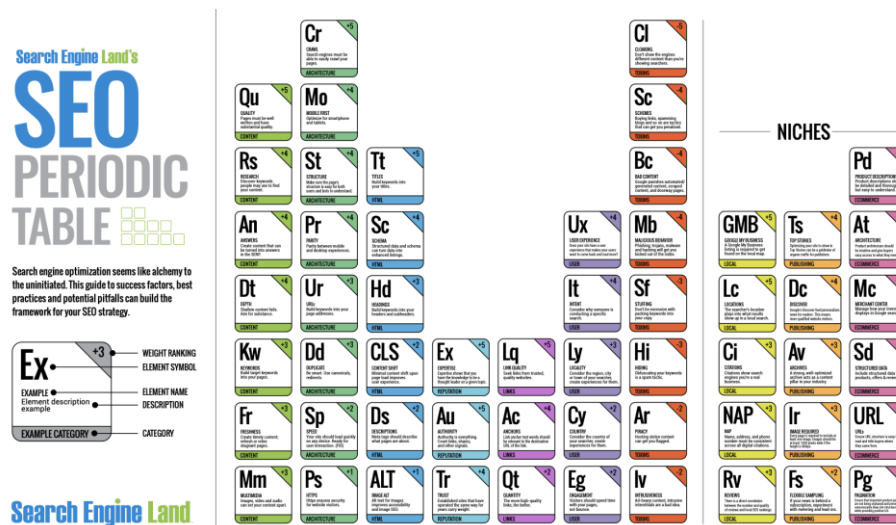
Figure 1. *SEO Periodic Table*
Source: https://searchengineland.com/seotable

2. Literature review

Among the many digital marketing strategies (SEO, email marketing, paid ads, social media advertising, affiliate programs, etc.), SEO has the highest ROI (Databox, 2020). The goal of this strategy is to increase the level of optimization of the website to the maximum based on certain factors and thus attract even more visitors (Port, 2009). It does this by giving the company a "free", slow to implement, and long lasting effect by getting it into the SERP (Papp, 2016). Search Engine Optimization is a multi-part, multi-disciplinary field that encompasses the knowledge of IT, content marketers, programmers, and many other stakeholders. Its parts can be grouped in different ways, some by their position, others by the direction of their impact. Changes to this SEO factor can be made inside or outside the website (Ledford, 2009). Its influence on the ranking of the website in the search list can be positive or negative (Halpern, 2021). In the literature, no significant distinction is made between these grouping options, but they are treated together. This is confirmed by Search Engine Land, which created the first SEO period table in 2011 (Search Engine Land, 2021).

This table contains a total of 10 main categories. The first phase is about the content criteria. These include seven elements, including quality, research, answers to questions, depth, keywords, freshness, and multimedia content. The second and third main groups focus on the architecture and HTML criteria of a website, including some factors related to content. In my previous research, I compared different literature sources on Search Engine Optimization and searched for the most important SEO factors. The criteria of content, structure and HTML coding also had a great weight in the studies of these authors and agreed with the data in the periodic table. (Matoševi c et al. 2015, 2020, Hamdy, 2021, Kumar et al. 2019, Ghulam et al. 2017, Mustafa et al. 2015, Pistol et al. 2015, Fard és Kouhzadi 2020b, Hayati és Meylasari 2021).

The majority of Search Engine Optimization takes place in Google's search engine systems, as the company holds a market-leading position worldwide (85.5%, January 2022) (Statista, 2022). Google has released several algorithm updates in recent years that have impacted optimization activities. Their

SEO-related impact is addressed both in practice (Search Engine Journal, 2022) and in scientific sphare (Kumar et al. 2019b).

With more than 200 factors impacting Google rankings (Backlinko, 2013) and constantly changing thanks to algorithm updates, it is challenging to identify and evaluate the elements. In order for this publication to factually address content evaluation, the remainder of my literature review will examine the elements of content, architecture, and coding of the SEO periodic system in the context of this research filled with other authors' thoughts and confirm their impact on Search Engine Optimization.

2.1. Criteria for the contents

One of the most interesting criteria for this article is the issue of quality expectations. Many authors (Sharma (2018), Aragon (2020) Search Engine Journal (2021) Rakt (2022)) consider quality content to be one of the most important factors in Search Engine Optimization, and there is practically no publication of this type that does not mention this factor. Baye et al. (2016) found a significant correlation between content investment and branding, as well as direct and indirect customer acquisition.

The criteria follow clearly defined principles described in the following key steps:
- Identify the touch points: What does the customer want to achieve and how can the company solve this problem?
- Choose the right topic: what problem should the company focus on when creating content?
- Assess the competition: what are the weak points of the existing content published by the competition?
- Identify opportunities: how can the company differentiate itself from the competition and exploit their weaknesses?
- Apply the 4U model: useful, urgent, very specific, unique. What headline would meet these criteria?
- Thorough research: is the research thorough enough and is the information delivered?
- Plan the structure: does the structure of the content meet consumer expectations?
- Create the content: does it meet the expectations listed so far?
- Formate the text: Does it meet 21st century consumer habits?
- Disseminate the content: on which platforms and how does the company make it available to consumers? (Sharma, 2018).

From this list, it can be concluded that meeting quality requirements is anything but easy, as they require a wide range of customer and subject matter expertise. And content quality brings with it other requirements for content in the table, such as freshness, answers to questions, and depth of content. One of the goals of this article is to determine whether Artificial Intelligence can write text that meets these expectations. In addition to the strong effect of the content quality factor, it induces several Search Engine Optimization factors in a positive or negative direction. This benefit extends to the development of a link network structure where other providers can link to approved content, as well as sharing on social media by consumers. High-quality content also reduces visitor bounce rates and increases time spent on the website (Hallan, 2017).

An important part of creating new content is selecting keywords and search terms and targeting the markets in which the content will be displayed (Nagpal and Petersen, 2021). Keyword selection in the existing literature is primarily based on awareness, engagement, and conversion events, with less emphasis on cost savings and long-term cost planning (Erdmann et al. 2022). The ability to find the right keywords is different from normal marketing research. In Search Engine Optimization, there are 3

stakeholders, namely the customer, the company, and the search engine (Randaswamy et al. 2020). Therefore, the secondary information database is provided by search engines, such as the Keyword Planner tool in the case of Google. Leist (2022) suggests the following steps for keyword research:

- Definition of articles and relevant topics related to the company,
- Subjective definition of keywords related to topics and articles,
- Mapping the relationship between keywords and purchase intention,
- Looking for the latest trend in keywords.

I would like to highlight the third item on this list, which is that keywords change in relation to purchase intent. When selecting a keyword, the length of the keyword is clearly related to purchase intent (Vivian, 2019). Accordingly, terms consisting of 3 or more words show greater purchase intent. Also, there is less competition in the ranking for the term when it consists of multiple words. Regardless of which term you search for (Apple iPad Pro 2020, referring to this article), the increase in the number of words leads to a decrease in results: Apple keyword: 9 billion, Apple iPad keyword 2 billion, Apple iPad Pro 1 billion, and Apple iPad Pro 2020 only 500 million results (search start date: 06/25/2022. Miskolc, Hungary). There is no specific literature source or Google algorithm update that gives a concrete answer to the proportion and amount of keywords in content, but research and testing has been done to determine the optimal number. The optimal proportion is about 1-2% (Forsey, 2022), taking into account the stuffing factor in the Toxic section of the periodic table. In addition to plain text, videos and images can also be used as content on any website. For example, video content serves as the primary source of information for 66% of consumers, and 93% of companies attract new customers by posting branded video content (Techjury.net, 2022). Images and videos are playing an increasingly important role in Search Engine Optimization. They give a new face to the company in vertical marketing systems and influence loading speed and structure. The optimal design is influenced by a number of factors addressed by experts (Image SEO (2019), Toonen (2020), Semrush Blog (2020), but also by the official development team of Google (Google Developers, 2022), which refer to the size and coding of images belonging to the main group of architecture and HTML coding.

2.2. Criteria for the architecture

The generally accepted theoretical example of the relationship between Search Engine Optimization and a website compares it to a library and books. The customer enters the library, tells the librarian what type of book he is interested in, and selects the books he thinks are appropriate based on the information (keywords) provided. This is done in a fraction of a second by Google's algorithm after scanning headings, subheadings, content, and many other factors (Vested Marketing, 2020). Therefore, it is necessary to give the website owner the opportunity to crawl. Optimally, the website is structured on several levels. From the main page, one can navigate to different menus (e.g., the page about the company), from which one can access other sub-items (Villalpando, 2021). I believe that this type of linear approach is very similar to Fayol's organizational structure model. In addition to consumer behavior, device usage is also changing as more people use mobile devices. The number of mobile users is growing by an average of 100 million per year and is estimated to reach 7.5 billion by 2025 (Statista, 2020). This trend has also led to changes in Search Engine Optimization, and the topic of mobile optimization has become more important. The goal of the mobile-first trend, which can also be seen in the periodic table, is for the company to plan the structure of the website so that it is optimized and responsive not only on the computer but also on the mobile phone (Bakos, 2020). The page loading speed directly and indirectly affects the ranking of the page. 70% of consumers said that loading speed

has an impact on their purchasing decisions (Southern, 2019). Google expects a website to load in 5 seconds with 3G internet access, a criteria that 85% of websites fail to meet. And surveys have shown that consumers abandon websites after waiting 3 seconds (Unbounce, 2022). Regarding loading speed, Wang et al. (2021) published an extremely interesting study that the display of the logo and slogan also have a positive impact on waiting time and emotions. In Google, this does not appear between clicking and loading a page, so it does not increase latency for the consumer. In most cases, reducing the size of images is the first step to faster loading speed. The target maximum size is ideally 70 kb (Search Engine Watch, 2019).

2.3. Criteria for the HTML coding

After selecting keywords and creating content according to architectural criteria, a series of coding changes can ensure the optimal on-page function of a website.

The so-called title tag (meta title) appears at the top of the browser (browser tab) and acts as a headline in the SERP and serves either as a CTA. It ideally consists of 55-60 characters and contains the previously defined keyword (Harsel, 2020). The meta description has a similar function; it must also contain one or more keywords, but is ideally 155-160 characters long. If the description is missing or insufficient, Google has the option to change it itself (Keenan, 2021). On mobile devices, the predefined meta description is changed by Google 71% of the time, compared to 68% on desktop (Hall, 2020). Another coding guideline is the requirement that images must be alt-tagged. This helps Google's algorithms to crawl the images. Therefore, the alt tag of the image should also contain the keyword while following the density guidelines (Bigcommerce.com, 2022). Formatting the raw text can facilitate the mapping mentioned in 'he architecture. For this purpose, the content should be tagged with various tags. The most important information is the title of the content, followed by the subheadings and so on. In the coding, the letter H should be used and the most important factor should be associated with the lowest number. In this interpretation, the H1 tag denotes the title. (SmartKeyword, 2018)

2.4. Toxins that affect the content

In the context of the present study, the main group of toxins also includes a number of factors that affect the level of Search Engine Optimization of a website. These include the problem of cloaking, where users are shown different content on a website than is shown to search robots (Google Developers, 2022). It also includes content being created in the same colour as the background so that it cannot be seen by consumers but can be matched by search robots from a keyword perspective. Flash content is also a problem for crawling, as is HTML coding and poor text ratio (Khan, 2019).

Keyword stuffing has been shown to negatively impact SERP rankings. However, according to information published in Shahzad (2022), this is false; keyword stuffing no longer affects optimization. Other elements listed under toxicity are also worth mentioning, including the bad content factor. According to the information in the table, automatically generated content is not accepted. On closer inspection, based on the article by Johnson (2019), it is more appropriate to say that Google's intent is to present unique content that is relevant to the search engine's intent and provides accurate and authoritative information. A 164-page document was published for this purpose (Johnson, 2019). Presumably, the Periodic table identified automation as creating bad content, which is why it counts auto-generated content among the negative factors.

2.5. Artificial Intelligence in SEO

The topic of Artificial Intelligence has permeated the entire world and has also changed the marketing process (Kotler, 2021). Artificial Intelligence raises many issues, including job loss and an uncertain future. According to some studies, AI will lead to the loss of 85 million jobs, but in contrast, 97 million new jobs will be created. It will also lead to major changes in marketing. Statistics already show that 2/3 of modern shoppers would be open to using AI to increase customer loyalty. 26% of consumers already interact with AI on a daily basis. The use of AI can also make data handling safer. 4 in 10 consumers believe a company that uses AI will take better care of their data. (Dataprot, 2022)

The application of AI in Search Engine Optimization is often defined by marketing practitioners (Worldlift (2021), Brightedge (2022), Kaput (2022)), while there is little theoretical literature and research on the topic (Shahzad, 2022). However, the importance of the topic is reflected in the fact that companies using AI have seen a 30% increase in revenue (Statista, 2022) and that in 2019, 37% of companies have used some form of AI to improve their operational tasks (outranking. io, 2021). AI has contributed to this higher revenue growth, both indirectly and directly, and its applications are diverse (Patel, 2020). The most common applications include keyword research, SEO strategy development, content optimization, content creation, more accurate listings (extended to various platforms outside of Google SERP listings), and a range of automation processes (Kaput, 2022).

There are three levels of involvement in content creation, depending on the level of intervention:
- Data collection: AI collects data from CRM and other relevant sources,
- Analysis: AI analyses and interprets trends and patterns,
- Insights and recommendations: AI modifies content to make it more effective (Patel, 2021).

As seen in the ClickZ (2018) article, AI was used 4 years prior to the writing of this article to create posts and online newspaper articles on various topics (e.g., Olympics) that were deceptively similar to human-created content. Statistics have shown that the application of AI in social media will exceed $2 billion by 2023 (Marketsandmarkets.com, 2018). Helfrich (2022) pointed out the use and benefits of AI, but also how to get the most out of AI. Among other things, he suggests looking at AI-generated copy as a template that a copywriter should adapt to achieve higher customer engagement. He also pointed out that AI can also be used to gather user opinions, which can have a big impact on consumer decision making, according to Trends (TurnTo Networks, 2017).

3. Research Method

The purpose of this article is to evaluate the relationship between Search Engine Optimization and Artificial Intelligence. For this purpose, the text for a specific keyword for Search Engine Optimization is studied based on the SEO factors found in the literature review and the subjective opinions about quality and purchase intention are collected from a sample of 50 people from the target audience.

This study is based on 4 pre-generated texts. One of these texts was written by a marketing expert who has never used the product, one by a sales expert who is an official seller of this product but has never heard of Search Engine Optimization, one by a customer who uses the product but has never heard of SEO and sales, and one was written by an Artificial Intelligence. The criteria for this pre-generated text were to get the following keywords: Apple iPad Pro (2020) and the length had to be between 1500 and 2000 characters. Formal settings were not required.

The first step of the analysis was performed with an automatic text evaluator. It analysed all four pre-generated pieces of content in raw text format and then as formatted text on the website www.seoreviewtools.com. The articles were then tagged with metadata such as the meta title and meta

description. The fourth analysis included an alt-tagged image, and the final step was a test with a linked version.

The literature review shows that SEO is also influenced by consumer behaviour. Therefore, the present study investigates the quality criteria and purchase intention on a sample of 50 people belonging to the target group (university students). They were given pre-generated texts without names, but formatted texts and without knowing who wrote them. They had to rate all the pre-generated content on a Likert scale from 1-10. With this research I want to show an indirect way to determine the bounce rate and the time spent on the page.

To evaluate the relationship between Artificial Intelligence and Search Engine Optimization, I asked myself the following questions:

Q1: Can Artificial Intelligence produce better text for search engine algorithms than a real human?

Q2: Can Artificial Intelligence communicate better with consumers than a real human?

Q3: Can Artificial Intelligence produce higher purchase intent after the consumer consumes the content?

4. Results

According to the automatic evaluation performed on 06/26/2022 at www.seoreviewtools.com, all pre-generated texts received more than 0 points. As shown in figure 2. from left to right, the results include raw text for the first time, formatted text for the second. Then metadata was given that met the maximum requirements, including length and keywords. The fourth analysis includes an image with alt tag that also met the requirements. The 5th and final bar shows the most optimized content considering architecture and HTML coding criteria. The values are displayed on a scale of 1-100.
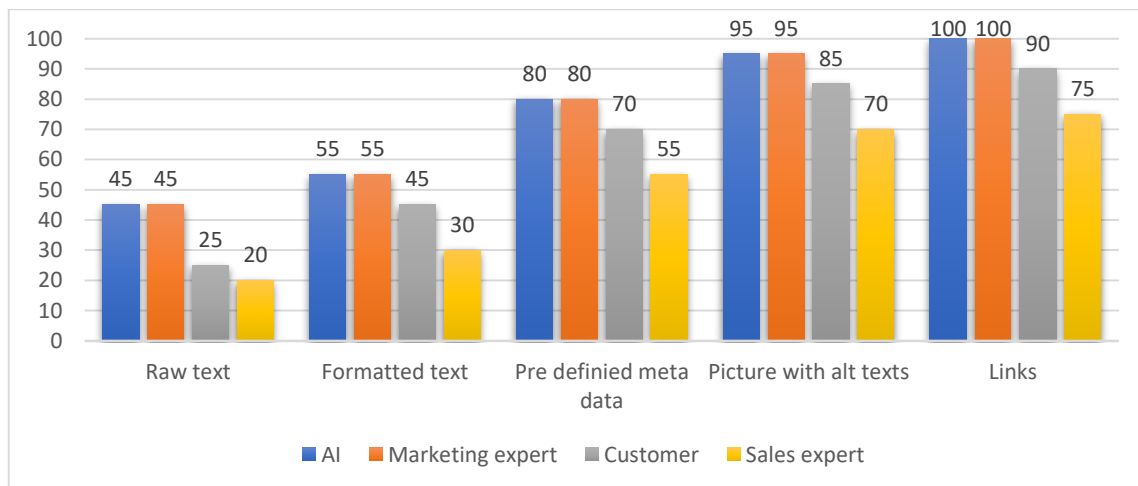

Figure 2. *SEO text review*
Source: Own editing

The result of the evaluation is quite interesting. According to it, the raw text, without applying the formal requirements of SEO, is only between 20 and 45 points on a scale of up to 100. The worst performer was the seller, who did not learn Search Engine Optimization and could not apply it in his raw text, while both the marketer and the Artificial Intelligence scored 45-45 points. The discrepancy in

this case was due to the inappropriate use and ratio of keywords. In the next step, the text was formatted according to SEO criteria, including headings and subheadings with H1 and H2 tags. As a result, the obtained scores increased and reached an average of 46.25 points. The scores obtained in this case also show significant differences. After I added a predefined meta title and meta description to the evaluated studies that meet the SEO requirements, the order of the data remains unchanged, with the content created by marketers and Artificial Intelligence still at the top with an optimization score of 80%. When I added images with appropriate alt tags to the content, the Search Engine Optimization score was 95% for the AI and marketers, 90% for the consumer-written content, and only 70% for the seller. The version with an additional link increased optimization to an amazing 100% and met all types of SEO requirements for both the marketer and the AI.

In the second phase of the research, a sample of 50 students from the target audience was surveyed. The respondents included 24 males and 26 females. Before completing the questionnaire, they were asked to read texts written by a marketer, an AI expert, a consumer, and a sales expert. They then had to rate them on a scale of 1 to 10 in terms of quality and purchase intent (PI), without knowing the authors of the texts. The results of the survey are shown in Figure 3.

Descriptives

Descriptives								
	Marketing expert quality	AI quality	Customer quality	Sales expert quality	Marketing expert PI	AI PI	Customer PI	Sales expert PI
N	50	50	50	50	50	50	50	50
Missing	0	0	0	0	0	0	0	0
Mean	7.94	6.84	5.54	7.12	7.54	6.74	5.34	6.82
Median	8.00	7.00	6.00	7.00	8.00	7.00	6.00	7.00
Standard deviation	1.50	1.71	2.21	1.72	1.74	1.54	2.34	1.44
Minimum	4	3	1	4	3	3	1	3
Maximum	10	10	10	10	10	10	10	10

Figure 3. *Quality and PI of formatted texts*
Source: Own editing

The text produced by the marketing expert received an average score of 7.94 for quality from the sample, the highest rating. This was followed by the content created by the sales expert, which received a score of 7.12. Artificial Intelligence was third in the quality criterion, with a score of 6.84. Consumer-created content was rated much lower by the students in the sample, with a score of only 5.54. I find it very interesting that the ratings for purchase intent vary with quality level. Again, the content created by the marketing expert received the highest rating of 7.54, followed by the elaboration of the sales expert with 7.12. In third place was the elaboration of Artificial Intelligence with an average score of 6.74, which showed the smallest difference between quality and purchase intent. The weakest score was again for consumer-generated content.

To illustrate the relationship between quality ratings and purchase intention, I have created a chart, shown as figure 4.

Figure 4. shows a graph where the x-axis contains the average scores of text quality and the y-axis contains the average scores of purchase intentions after reading the texts. The graph shows the differences between the elaborations. The consumer-created content had the lowest score on both factors, followed by the AI with a larger deviation. The elaboration by the sales expert was more

qualitative, but was just ahead of the AI in terms of purchase intent. The content developed by a marketing expert outperformed its theoretical counterparts in all areas.
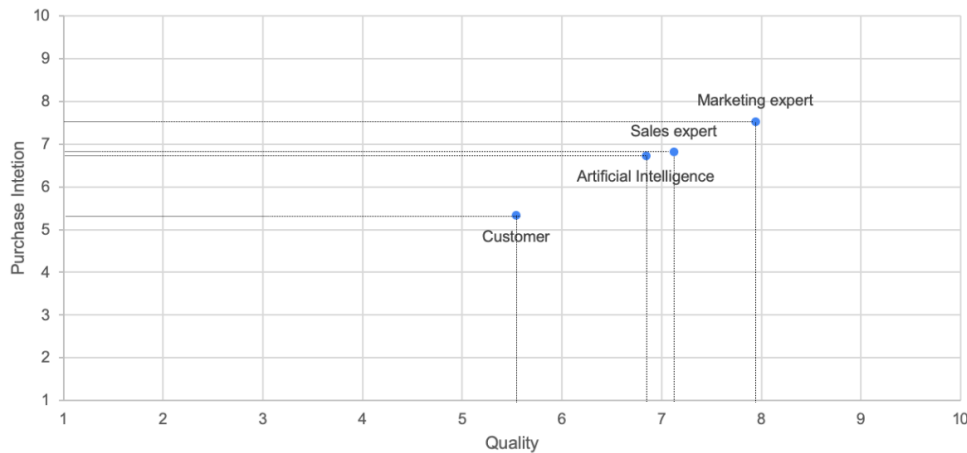

Figure 4. *Review of quality and PI according to texts*
Source: Own editing

If we assume that the quality of the text is proportional to the time spent on the page (as consumers rate it better, they consume more of it without bouncing back) and the Purchase Intention to the occurrence of purchase conversion, then Figures 3 and 4 suggest that the impact of AI on off-page optimization is almost equal to the sales expert, while the marketing expert has a highly superior performance. The consumer's impact on off-page optimization and the occurrence of a purchase event both scored low.

5. Conclusions

The challenges of Search Engine Optimization have a great impact on the number of methods that can be used. As the era of Marketing 5.0 has upgraded the contribution of Big Data and Artificial Intelligence in marketing (Espinosa, 2022), the diversity of their applications in Search Engine Optimization is also increasing (Shah, 2021). In addition to diversity, the issue of quality should not be neglected: Is it worth replacing the company's copywriter with automatisms, or is the human factor in content creation not yet replaceable by machine techniques? To answer these and two other questions, a marketing expert, an Artificial Intelligence, a consumer and a sales expert created content for a defined keyword in the range of 1500-2000 characters, which was tested in a test run on seoreviewtools.com in raw text, formatted text format, with predefined metadata, with an image with alt text and as a linked version. Based on the test results, the automated copywriting software on the marketer and Artificial Intelligence uniformly performed the best and achieved the maximum level of optimization. From the literature review, it can be concluded that these contents would rank better in SERPs than the consumer contents, especially the contents created by the sales expert, without considering other Search Engine Optimization factors. The latter showed weaknesses in keywords, their placement and density.

This was done using a sample of 50 people, including university students, who were presented with the 4 previously created pieces of content in a formatted text format, with the authors' names and titles

hidden. They rated each draft on a Likert scale of 1 to 10 and found that the best quality text on a given topic was produced by the marketing expert, followed by the sales expert. Artificial Intelligence ranked just behind the sales expert in terms of quality and purchase intent, while consumer-created content ranked lowest in terms of both quality and purchase intent. When examining Search Engine Optimization factors, it appears that the marketing expert and the sales expert communicate more effectively, so the bounce rate is likely to be lowest and the time spent on the page longest in these two cases.

When a company begins Search Engine Optimization, it might consider using Artificial Intelligence to optimise the ON website, as it gives the website a better ranking without taking consumer behaviour into account.

Q1: Can Artificial Intelligence produce better text for search engine algorithms than a real human?
A1: The analysis performed on www.seoreviewtools.com shows that the text produced by the AI matches the values of the text produced by a marketing expert. The very surprising result is due to the fact that the technical changes were made starting from the raw text, after the text was received. In any case, we reached the point where the text created by the AI was better than the text created by the consumer and the marketing expert for a given keyword with a given length.
Q2: Can AI communicate better with consumers than a real human?
A2: On a scale of 1 to 10, student respondents were able to rate content created by a marketer, an AI, a consumer, and a sales expert without the authors being labelled or identifiable in any way. This "blind test" was used to determine the subjective opinions of the participants in the sample. The results show that after the marketing expert and the sales expert, the AI itself also took its place, with a small qualitative difference. And compared to the text written by a consumer, the AI scored more than 1.5 points higher.
Q3: Can AI generate a higher purchase intention after the consumer consumes the content?
A3: Sample responses suggest that quality and purchase intent are correlated in this case. High quality content consumed by respondents resulted in higher purchase intent, which was closest to the quality indicator for AI.

After reading the paper, a general picture of the relationship between Artificial Intelligence and Search Engine Optimization can be sketched, showing that it can be used for optimization, communication and better sales. The opinions of the measured sample and the tests conducted should confirm this to a small extent, but further studies and more research are definitely needed to draw clear conclusions about the evolution of AI. My goal is to conduct an exploratory study on the same topic in the near future, the results of which will confirm the trend changes.

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